

Market review into the supply  
of card-acquiring services:  
Final report

## **Annex 4**

# Scheme fees

November 2021

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Note: The places in this document where confidential material has been redacted are marked with a [X].

# Introduction

- 1.1** Acquirers (and issuers) pay fees ('scheme fees') to operators of card payment systems for the services they provide. These include fees for scheme services and fees for processing services.
- 1.2** Before the launch of our market review, some stakeholders raised concerns that scheme fees had increased significantly in recent years. In our final Terms of Reference, we said we would examine as part of our market review how the scheme fees paid by acquirers have changed. We said we would not look at whether scheme fees are excessive.<sup>1</sup>
- 1.3** This annex describes the analysis we carried out to examine how average scheme fees as a percentage of GBP transacted, paid by acquirers to Mastercard and Visa, changed during the period 2014 to 2018. As explained below and in Chapter 5 of the final report, we find that scheme fees rose significantly.
- 1.4** There are several possible explanations why scheme fees may increase, namely:
- **Increases in total transaction volume or value:** If the total volume or value of transactions increases, this leads to increases in total scheme fees. Scheme fees per GBP transacted would increase depending on the structure of scheme fees. The relationship may not be linear if the structure of scheme fees gives rise to economies of scale. For example, if higher total transactions are associated with a lower per transaction fee, average scheme fees as a percentage of GBP transacted could decrease as the total volume or value of transactions increases.
  - **Changes in transaction mix:** If the underlying composition of transactions shifts towards those that incur higher fees (such as card-not-present transactions, which generally incur higher fees than card-present transactions), we can expect total scheme fees to increase.
  - **Increases in fee levels (that is, price):** If operators of card payment systems raise the level of existing fees or introduce new fees, we can expect total scheme fees to increase. Changes to the structure of fees may also cause total scheme fees to increase.
- 1.5** We examine whether the increases in scheme fees that we observe are due to increases in the total volume or total value of transactions, changes in transactions mix, or because of increases in fee levels. In this annex, we explain how we use econometric techniques to control for the effect of transaction volume, value and mix, to isolate any change in scheme fees that represents a price change.

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1 PSR, *Market review into the supply of card-acquiring services: Final terms of reference* (2019).

**1.6** This annex is structured as follows:

- details of our methodology
- description of the data we collected and summary of explanations Mastercard and Visa gave for recent trends in their fees
- presentation of the descriptive statistics
- presentation of the econometric analysis
- summary of results
- additional tables of results for reference

# Methodology

- 1.7** Our analysis focuses on the two largest card payment systems in the UK, Mastercard and Visa, during the period from 2014 to 2018. Together, transactions involving Mastercard and Visa cards accounted for around 98% of card transactions at UK outlets during this period, both by volume and value.<sup>2</sup>
- 1.8** We asked Mastercard and Visa to provide us with qualitative information on the scheme fees they charge acquirers, as well as information on what factors affect the overall level of these fees (that is, the fees' drivers). The information Mastercard and Visa provided to us forms the basis of our analysis. The purpose of our analysis is to determine whether scheme fee increases can be explained by increases in total volume of card transactions, total value of card transactions and/or a change in transactions mix, or whether these increases can be attributed to increases in fee levels.
- 1.9** Mastercard and Visa told us:
- Acquirers pay fees for participation in the card payment system ('fees for scheme services') and fees for the processing services they receive ('fees for processing services'), as well as fees for services that are neither scheme nor processing services. We exclude from our analysis fees for services that are neither scheme nor processing services; these fees are very low as a proportion of total fees.<sup>3</sup>
  - The drivers of fees for scheme services and processing services differ (see Figure 1 and Figure 2). In the interim report we therefore analysed fees for scheme and processing services separately.
  - Some fees are mandatory<sup>4</sup>, while others are for optional services. The amount of optional fees an acquirer pays may increase or decrease as the acquirer opts in or out of optional services and including them in the analysis would distort the assessment of whether changes in fees were driven by changes in fee levels. We consider that collecting information to control for this issue would have not been proportionate because optional fees are small relative to mandatory fees (see Figures 3, 4, 5 and 6). Therefore, we exclude optional fees from our analysis.<sup>5</sup>

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2 PSR analysis of data submitted by operators of card payment systems.

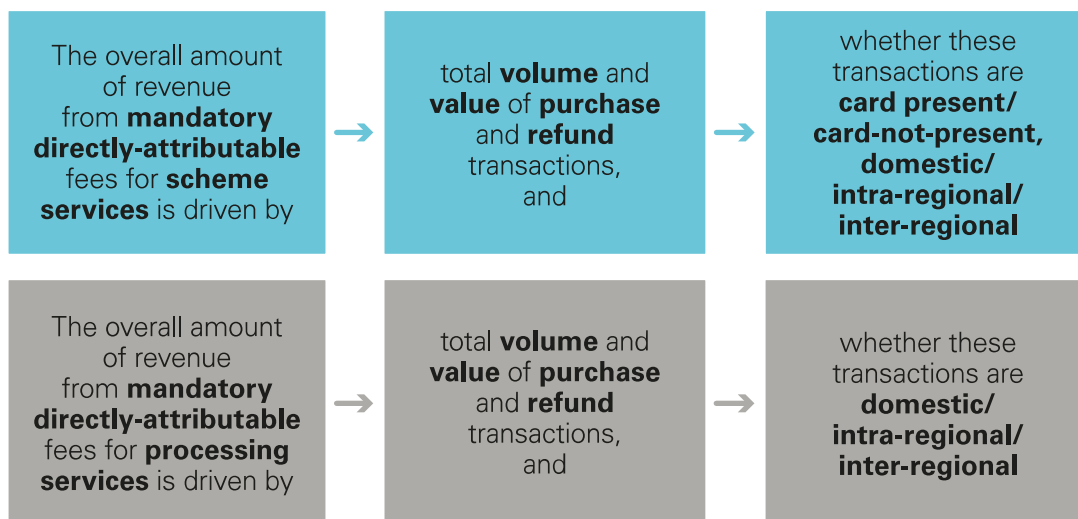
3 PSR analysis of data submitted by Mastercard and Visa.

4 Mandatory fees are fees paid by the acquirer to the operator of the card payment system as a condition of its participation in the card payment system.

5 Similarly, avoidable and behavioural fees may increase or decrease as acquirers trigger these fees. For the purposes of this analysis, we treat avoidable and behavioural fees like optional fees and they are excluded from the analysis.

- Some fees are directly attributable<sup>6</sup> to transactions (such as, for example, fees for processing services paid for each transaction), while others are not (such as licence fees). We exclude mandatory fees that are not directly attributable to transactions, and they are small relative to mandatory fees directly attributable to transactions (see Figures 3, 4 and 5).
- Some fees are not country-specific (for example, because they relate to all acquiring activity in the Europe region). We focus our analysis on fees paid in relation to the acquiring of transactions at UK outlets in line with the scope of our market review. Where fees are not country-specific, we asked Mastercard and Visa to partially apportion these fees to the acquiring of card transactions at UK outlets (for further detail, see paragraph 1.18).

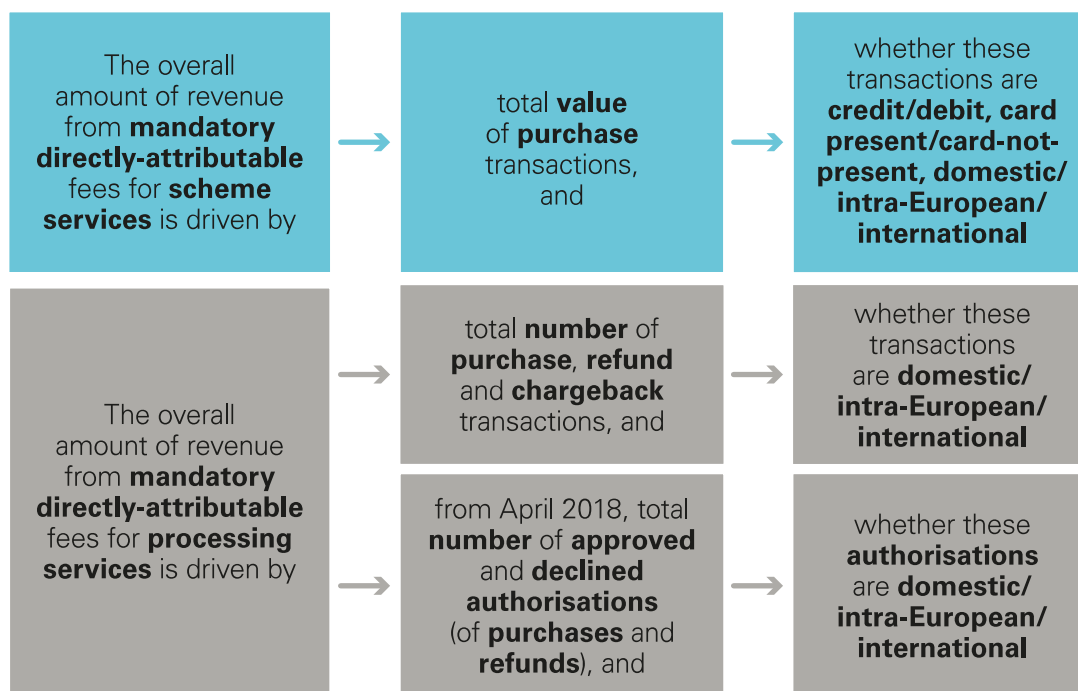
**Figure 1: Main drivers of Mastercard’s mandatory fees for scheme and processing services from 2014 to 2018**



Source: PSR summary of information provided by Mastercard. See Annex 1 for an explanation of domestic, intra-regional and inter-regional transactions.

<sup>6</sup> A fee that is directly attributable to a transaction is one that is incurred as a direct consequence of a card transaction involving a merchant.

**Figure 2: Main drivers of Visa’s mandatory fees for scheme and processing services from 2014 to 2018**



Source: PSR summary of information provided by Visa. See Annex 1 for an explanation of domestic, intra-European and international transactions. The schematic has been generated by us for the purposes of the market review. The terminology is not necessarily aligned with Visa’s fee schedule and the structure of charges is representative of the main drivers of fees from 2014 to 2018.

**1.10** Finally, while most fees from 2014 to 2018 were flat, some fees were stepped or tiered (for an explanation of these terms see Annex 5). Stepping and tiering may result in a non-linear relationship between total fees and transaction volume and/or value. We asked Mastercard and Visa to provide us with information on which fees were stepped or tiered from 2014 to 2018, and which step/tier an acquirer was allocated to during the period under consideration. However, in practice, stepping/tiering is very complex, so it was not possible to fully model this in our econometric analysis. We include transaction volume and value as explanatory variables, as well as acquirer-specific fixed effects, which will pick up some of the effect of stepping/tiering.

**1.11** Based on the above, we develop an econometric model where:

- The dependent variable (the variable we want to explain) is the average fee for scheme or processing services as a percentage of GBP transacted paid by a given acquirer in a given year, calculated by dividing total mandatory fees for scheme or processing services that are directly attributable to a transaction by total transaction value (for a given acquirer in a given year).
- The explanatory variables (the variables that may explain the dependent variable) are as outlined in Figures 1 and 2. We analyse Mastercard and Visa separately, and in the interim report we analysed fees for scheme and processing services separately.

- In addition, we include four dummy variables for each of the years 2015 to 2018 as explanatory variables (2014, our base year, is captured by the constant). The coefficient on a given year dummy captures any change in the dependent variable in that given year relative to the base year that is not explained by the other explanatory variables.

**1.12** Mathematically, our model can be described as:

$$f_{it} = \hat{\alpha}_i + \hat{\mu}_t + \sum_{k=1}^K \hat{\beta}_k x_{kit} + \hat{\varepsilon}_{it}$$

where

$f_{it}$  is the dependent variable – average fees for scheme or processing services as a percentage of GBP transacted by acquirer  $i$  in year  $t$

$\hat{\alpha}_i$  captures acquirer-specific time-invariant characteristics

$\hat{\mu}_t$  is a vector of four year dummies capturing year-specific effects (that is, the amount the average fee has gone up in a given year) holding all other variables constant, which gives us the increase in fees paid that can be attributed to increases in the fee level

$x_{kit}$  are the values of the  $k$  explanatory variables that could include transaction volume, value and mix and the  $\beta_k$  are their coefficients

$\hat{\varepsilon}_{it}$  is a random error term

**1.13** We estimate this model using weighted least squares (WLS) with time- and acquirer-specific fixed effects. Acquirer-specific fixed effects ( $\hat{\alpha}_i$ ) capture acquirer-specific time-invariant characteristics; and the year effects ( $\hat{\mu}_t$ ) capture time-specific acquirer-invariant differences.

**1.14** We weight data points with the transaction values. Giving more weight to the observations that account for a larger share of transaction value gives a more accurate representation of how scheme fees have changed overall.

**1.15** Since the interim report, we have carried out additional analysis, analysing fees for scheme and processing services together.



# Data and qualitative information collected

**1.16** We asked Mastercard and Visa to provide annual data on the scheme fees paid by 14 acquirers from 2014 to 2018 (a total of 70 observations). The 14 acquirers make up approximately 97% of transaction volume (98% of transaction value) in 2018 at UK outlets, and include a mix of larger and smaller acquirers.<sup>7</sup>

**1.17** We requested quantitative data on fees for scheme and processing services directly attributable to transactions, as well as data on their drivers, that is total volume and value of transactions, split by

1. debit or credit card
2. card-present or card-not-present, and
3. domestic, intra-regional/ intra-European or domestic, inter-regional/ international

**1.18** We sought to balance our need to collect data appropriate for robust analysis against the burden of data collection for Mastercard and Visa. Based on our engagement with Mastercard and Visa, we made the following decisions about what data to request:

- **We asked Mastercard and Visa to apportion fees where necessary.** This was necessary, for example, where fees are not country-specific (see paragraph 1.9) and where fees relate to acquiring of card transactions and other activities.<sup>8</sup> We engaged with Mastercard and Visa to ensure that the apportioning was done in a systematic and objective way. We did not find any issues with the assumptions made by Mastercard and Visa in providing the data.
- **We requested fees related only to transactions that were actually processed by Mastercard and Visa.** Fees for processing services are charged for transactions that are cleared and settled through the card payment system whereas fees for scheme services are charged for all transactions (irrespective of how they are processed).<sup>9</sup> Mastercard told us that it could not provide transaction data requiring knowledge of the merchant's location for transactions that it does not process. Visa told us that transaction data for transactions it does not process is less granular than for

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7 We asked for data on the scheme fees paid by the ten largest acquirers (when acquirers are ranked in descending order by the volume and value of purchases and refunds acquired at UK outlets for Mastercard and Visa in 2018), plus several smaller acquirers.

8 Some fees relate to acquiring of card transactions and other activities. For example, certain acquirers that are also issuers may pay some aggregated fees that relate to both businesses. We asked Mastercard and Visa to partially apportion an appropriate portion of these fees to the acquiring of card transactions.

9 An 'on-us' transaction is an example of a transaction that is not cleared and settled through the card payment system.

transactions it does process. For the majority of acquirers in the sample, the decision to examine only fees that related to transactions processed by Mastercard and Visa has no impact (because all their transactions are processed in this way). However, there were two acquirers in the sample ([X]) that processed 'on-us transactions'<sup>10</sup>; the fees for scheme services paid by these acquirers for these transactions are not included in our dataset. We do not consider this would affect our analysis materially because we are examining average fee per GBP transacted.

- **We requested annual data.** Different fee types are billed with different frequencies – that is daily, monthly, quarterly or annually. We asked Mastercard and Visa to aggregate fees at the annual level.
- **We requested data in GBP.** Mastercard records its fees in Euros, whereas Visa's systems record fees in multiple currencies, including Euros. We asked Mastercard and Visa to convert their data using Bank of England exchange rates.<sup>11</sup>

**1.19** We also asked Mastercard and Visa to describe and explain the trends in the fees acquirers paid in the period from 2014 to 2018 and any other observations they consider important to understanding the data they provided. We summarise the information provided below.

## Mastercard

**1.20** Mastercard said that, to understand changes in 'fee revenue' (that is, the total amount paid by acquirers) over time, it is important to distinguish between:

- volume mix effects – changes in fee revenue attributed to changes in the underlying composition and number of transactions
- price effects – changes in the level of a particular fee

**1.21** Mastercard said that price effects are only one factor that determine fee revenue and may not be the most significant factor in understanding the drivers of the overall increase in fee revenue between 2014 and 2018.

**1.22** Mastercard said that, taken together, the drivers of its fees (see Figure 1) largely determine the level of fee revenue it receives and noted the following key trends from 2014 to 2018:

- the total value of Mastercard transactions increased by [X]% and individual year-on-year growth accelerated

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10 See Annex 1 for a definition of 'on-us' transactions.

11 We identified a potential problem in that changes over time in scheme fees could be conflated with fluctuations in the exchange rate over the same period. However, we ran some additional analysis controlling for changes in the exchange rate and find that this does not impact our findings.

- the value of Mastercard card-not-present transactions (which attract higher fees than card-present transactions) increased by [X]%
- the value of Mastercard cross-border transactions (which attract higher fees than domestic transactions) increased by [X]%
- the number of Mastercard transactions grew [X]%
- the average transaction value of Mastercard transactions decreased<sup>12</sup>

**1.23** Mastercard said that the effect of these changes on an individual acquirer will depend on the types of merchants that they acquire and the transactions those merchants accept.

**1.24** Mastercard also explained that between 2014 and 2018, it made some adjustments to the fees it charges, which included introducing new fees, removing certain fees and restructuring others.

## Visa

**1.25** Visa explained that its business has changed significantly since its acquisition by Visa Inc in June 2016. Before that date, Visa operated as a member association in which acquirers (and issuers) were effective owners of the company and contributed to its decision-making processes. Following the acquisition, the sales proceeds were distributed to principal members of the Visa Europe Association and the company shifted to a fully commercial model whereby acquirers hold a commercial relationship with Visa.

**1.26** Visa said that the trends in fees paid by the acquirers we requested data for are linked to the following adjustments made to its fees necessitated by the shift to a fully commercial model:

- discontinuing rebates on scheme fees that acquirers received prior to the acquisition, which changed their level of net fees
- shifting from stepped to flat fees to align with Visa's global pricing structure and bring clarity and simplicity to clients, [X]
- adjusting international fees (that is, fees paid for international transactions) towards a level that is more aligned with Visa's global pricing
- introducing a new fee for authorisation services to ensure the continued development and innovation of the service and to reflect the varying extent to which acquirers use this service

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<sup>12</sup> Mastercard explained that while a lower average transaction value does not increase fee revenue, it may increase fee revenue per pound spent because fees are set according to both the volume and value of transactions, and the reported transaction fee is charged per transaction.

**1.27** Visa also said that the fees for any particular acquirer are driven by a combination of factors including its transaction volume, mix of transaction types, optional services, and avoidable and behavioural factors, noting that:

- in general, the transaction volume and value of the acquirers we requested data for had increased between 2014 and 2018
- from 2016, transaction volumes increased more rapidly than transaction values suggesting a shift towards lower-value transactions

# Descriptive statistics

**1.28** This section plots and describes the data Mastercard and Visa provided. It focuses on: total fees for scheme and processing services; transaction volume, value and mix; and average fees for scheme and processing services as a percentage of GBP transacted.

## Total fees for scheme and processing services

**1.29** Figure 3 and Figure 4 show, for Mastercard and Visa respectively, total fees for scheme services broken out into three components: mandatory fees directly attributable to transactions, mandatory fees not directly attributable to transactions, and optional fees, with the first making up the majority of the total.<sup>13</sup> Table 1 and Table 2 show, for Mastercard and Visa respectively, the year-on-year growth of total fees for scheme services and its three components. It also shows the overall growth of total fees for scheme services and its three components during the period 2014 to 2018. Between 2014 and 2018, not controlling for increases in total transactions or changes in transaction mix, total fees for scheme services increased by [X]% for Mastercard and [X]% for Visa.

**1.30** The rest of our analysis focuses on mandatory fees for scheme services that are directly attributable to transactions, which make between [X]% and [X]% of total Mastercard fees for scheme services and between [X]% and [X]% of total Visa fees for scheme services.

### Figure 3: Total fees for Mastercard scheme services, in millions

[X]

Source: PSR analysis based on data submitted by Mastercard.

### Figure 4: Total fees for Visa scheme services, in millions

[X]

Source: PSR analysis based on data submitted by Visa.

### Table 1: Growth of total Mastercard fees for scheme services, year-on-year growth and 2014–2018

[X]

Source: PSR analysis based on data submitted by Mastercard.

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13 The categorisation of fees described in this paragraph has been generated by us for the purposes of the market review. The terminology is not necessarily aligned with Mastercard or Visa's fee schedules.

**Table 2: Growth of total Visa fees for scheme services, year-on-year growth and 2014–2018**

[X]

Source: PSR analysis based on data submitted by Visa.

**1.31** Figure 5 shows total fees for Mastercard processing services, which break down into mandatory fees directly attributable to transactions, mandatory fees not directly attributable to transactions, and optional fees. Figure 6 shows total fees for Visa processing services, which break down into mandatory fees that were directly attributable to transactions and optional fees. Visa does not have mandatory fees for processing services that are not directly attributable to transactions.

**1.32** Table 3 and Table 4 show, for Mastercard and Visa respectively, the year-on-year growth of total fees for processing services and its components. It also shows the overall growth of total fees for processing services and its components during the period from 2014 to 2018. Between 2014 and 2018, not controlling for increases in total transactions or changes in transaction mix, total fees for processing services increased by [X]% for Mastercard and [X]% for Visa.

**1.33** The rest of our analysis focuses on mandatory fees for processing services directly attributable to transactions. These make up [X] of total fees for processing services for Mastercard between 2014 and 2018 and over [X]% for Visa throughout the period.

**Figure 5: Total fees for Mastercard processing services, in millions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Figure 6: Total fees for Visa processing services, in millions**

[X]

Source: PSR analysis based on data submitted by Visa.

**Table 3: Growth of total fees for Mastercard processing services, year-on-year growth and 2014–2018**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Table 4: Growth of total fees for Visa processing services, year-on-year growth and 2014–2018**

[X]

Source: PSR analysis based on data submitted by Visa.

## Transactions

**1.34** Figure 7 to Figure 16 show how Mastercard and Visa’s transaction volume and value evolved between 2014 and 2018:

- Overall, total transaction volume increased by [X]% and [X]%, and total transaction value increased by [X]% and [X]%, for Mastercard and Visa, respectively (Figure 7 and Figure 8).
- The number and value of card-not-present transactions (which generally incur higher fees than card-present transactions) has been growing faster than the number and value of card-present transactions (Figure 9, Figure 10, Figure 11 and Figure 12).
- The majority of transactions are domestic. However, there has been a small shift towards more inter-regional/international and intra-regional/intra-European transactions (which generally incur higher fees than domestic transactions) (Figure 13, Figure 14, Figure 15 and Figure 16).

**1.35** We control for these trends in the econometric analysis to examine whether they could be driving the increases in total fees for scheme and processing services we observe in the raw statistics presented above.

### **Figure 7: Total volume and value of Mastercard purchase transactions, in billions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

### **Figure 8: Total volume and value of Visa purchase transactions, in billions**

[X]

Source: PSR analysis based on data submitted by Visa.

### **Figure 9: Total Mastercard transaction volume by channel (card-present vs card-not-present), in billions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

### **Figure 10: Total Mastercard transaction value by channel (card-present vs card-not-present), in billions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Figure 11: Total Visa transaction volume by channel (card-present vs card-not-present), in billions**

[X]

Source: PSR analysis based on data submitted by Visa.

**Figure 12: Total Visa transaction value by channel (card-present vs card-not-present), in billions**

[X]

Source: PSR analysis based on data submitted by Visa.

**Figure 13: Total Mastercard transaction volume by location, in billions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Figure 14: Total Mastercard transaction value by location, in billions**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Figure 15: Total Visa transaction volume by location, in billions**

[X]

Source: PSR analysis based on data submitted by Visa.

**Figure 16: Total Visa transaction value by location, in billions**

[X]

Source: PSR analysis based on data submitted by Visa.



## Average fees for scheme and processing services as a percentage of GBP transacted

**1.36** We calculate average fees for scheme and processing services as a percentage of GBP transacted by dividing total fees for scheme and processing services that are directly attributable to transactions by the total value of transactions.<sup>14</sup> Figure 17 and Figure 18 show how Mastercard and Visa's average fees for scheme services, respectively, evolved from 2014 to 2018. Figure 19 and Figure 20 show how Mastercard and Visa's average fees for processing services, respectively, evolved from 2014 to 2018. We observe:

- For Mastercard, average fees for scheme services as a percentage of GBP transacted increased by approximately [X] percentage points between 2014 and 2018: a [X]% increase.
- For Visa, average fees for scheme services as a percentage of GBP transacted increased by approximately [X] percentage points between 2014 and 2018: a [X]% increase.
- Average fees for processing services as a percentage of GBP transacted do not follow a clear pattern. While average fees for processing services increased for Visa (in 2018 only), this is not the case for Mastercard. Mastercard's average fees for processing services increased in [X]. However, by [X], they had fallen back to [X] levels.

**1.37** The descriptive statistics do not account for increases in total transaction volume and value or changes in the transaction mix. In the next section, we use econometric techniques to control for these changes to isolate the effect of any increases in fee levels.

### **Figure 17: Average Mastercard fees for scheme services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Mastercard.

### **Figure 18: Average Visa fees for scheme services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Visa.

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14 For Mastercard, this is calculated by dividing total mandatory fees for scheme or processing services directly attributable to transactions by total value of purchase and refund transactions. For Visa fees for scheme services, this is calculated by dividing total mandatory fees for scheme services directly attributable to transactions by total value of purchase transactions. For Visa fees for processing services, this is calculated by dividing total mandatory fees for processing services directly attributable to transactions by total value of purchase, refund and chargeback transactions.

**Figure 19: Average Mastercard fees for processing services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Mastercard.

**Figure 20: Average fees for Visa processing services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Visa.

# Econometric analysis

**1.38** In the interim report we approached the econometric analysis, using weighted least squares (WLS) with time- and acquirer-specific fixed effects, as follows:

- Using average fees for scheme or processing services as a percentage of GBP transacted as the dependent variable, we started with a simple model which includes only a constant and dummy variables for each of the four years from 2015 to 2018 as explanatory variables. This simple model replicates the results of the descriptive statistics in the previous section, which describe the evolution of Mastercard and Visa's average fees for scheme and processing services as a percentage of GBP transacted during the period 2014 to 2018. The constant is the average fees for scheme or processing services as a percentage of GBP transacted in 2014, the base year. The coefficients on the year dummies capture the percentage point increase in that year compared to 2014.
- Adopting a specific-to-general approach<sup>15</sup>, we introduced additional explanatory variables into our estimations, one by one, testing for their statistical significance. In this way, we arrive at the preferred model.
- By introducing control variables, we can observe how the coefficients on the year dummies (which capture the percentage point increase in that year compared to 2014) decrease, as some of the increases in fees for scheme and processing services are now explained by these control variables. The coefficients on the year dummies now capture the percentage point increase in that year compared to 2014 that cannot be explained by the control variables. These increases can then be attributed to increases in fee levels.

**1.39** We now present the findings from our four analyses of fees for scheme and processing services for each of Mastercard and Visa carried out at the interim report stage. From paragraphs 1.61 to 1.69, we present the findings from the additional analysis carried out since the interim report on the fees for scheme and processing services combined.

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<sup>15</sup> This approach is widely used in empirical papers to make clear the impact of a more sophisticated model, for example, with fixed effects, which restricts what variation is used to estimate parameters. See for example: Herwartz, H. Forecast accuracy and uncertainty in applied econometrics: a recommendation of specific-to-general predictor selection. *Empir Econ* 41, 487–510 (2011).

## Mastercard fees for scheme services

**1.40** Table 5 and Table 6 summarise the results of our key regressions undertaken at the interim report stage:

- M0 is the simple model and replicates the results of the descriptive statistics in the previous section (see Figure 17). The constant tells us the average fee for scheme services per GBP transacted in 2014 ([REDACTED]%).<sup>16</sup> For 2015, we can calculate the average fee for scheme services per GBP by adding the constant and the coefficient on the 2015 dummy ([REDACTED]%). (For 2016–2018, the calculations are the same, using the appropriate coefficient.)
- M1 introduces volume and value of purchase transactions<sup>17</sup> [REDACTED].
- M2 introduces shares (by volume and value) of card-not-present transactions. [REDACTED]
- M3 introduces shares of domestic/intra-regional/inter-regional purchase transactions. [REDACTED]
- Finally, M4 introduces acquirer-specific fixed effects, [REDACTED]. The inclusion of the acquirer-specific fixed effects is important to our model. Acquirer-specific fixed effects capture time-invariant acquirer-specific characteristics. This could include the size of the acquirer (our sample includes both larger and smaller acquirers), [REDACTED].

**1.41** [REDACTED]

**1.42** [REDACTED]

**1.43** [REDACTED]

### Table 5: Analysis of Mastercard’s fees for scheme services

[REDACTED]

Notes: \* p<.05; \*\* p<.01; \*\*\* p<.001.

Source: PSR analysis based on data submitted by Mastercard.

### Table 6: Additional analysis of Mastercard’s fees for scheme services, share of card-not-present transactions

[REDACTED]

Notes: \* p<.05; \*\* p<.01; \*\*\* p<.001.

Source: PSR analysis based on data submitted by Mastercard.

16 Differences between M0 and Figure 17 are due to rounding.

17 Mastercard also told us that volume and value of refunds drive fees for scheme services. We run models with and without refunds. [REDACTED].

- 1.44** As explained in the section on methodology, the coefficients on the year dummies capture the increase in the dependent variable in that given year (relative to the base year) that is not explained by the control variables. We calculate the adjusted average fees for scheme services as a percentage of GBP transacted in a given year by [X]. Table 7 summarises the results.
- 1.45** The coefficient on the 2018 dummy is [X], indicating that average fees for scheme services as a percentage of GBP transacted increased by [X] percentage points between 2014 and 2018, even after controlling for potential explanations. The descriptive statistics show that average fees for scheme services as a percentage of GBP transacted rose by [X] percentage points (see Figure 17). The difference in the increase from the descriptive statistics and the econometrics is [X], indicating that the control variables explain only approximately [X]% of the increase we see in the descriptive statistics.
- 1.46** After controlling for potential explanations [X], average fees for scheme services as a percentage of GBP transacted rose from [X]% in 2014 to [X]% [X] in 2018. This equates to a [X]% increase that cannot be attributed to the drivers of fees for scheme services reported by Mastercard (see Figure 1), and which therefore can be regarded as pure increases in fee levels.
- 1.47** As discussed above, while there is some weak evidence to suggest that [X] could explain some of the increase in Mastercard's average fees for scheme services per GBP transacted, the evidence still strongly indicates there has been a substantial unexplained increase in fee levels.

**Table 7: Adjusted average Mastercard fees for scheme services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Mastercard.

## Visa fees for scheme services

- 1.48** Table 8 summarises the results of our key regressions:
- V0 is our simple model and replicates the results of the descriptive statistics in the previous section.
  - V1 introduces value of purchase transactions, and the share of transaction value that is attributable to debit versus credit cards. [X]
  - V2 (see Table 20) introduces shares of card-present/card-not-present transactions. [X]
  - V3 introduces shares of domestic/intra-European/international purchase transactions. [X]
  - Finally, V4 introduces acquirer-specific fixed effects, [X]

1.49 [§<]

**Table 8: Analysis of Visa’s fees for scheme services**

[§<]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Visa.

1.50 We calculate the adjusted average fees for scheme services as a percentage of GBP transacted in a given year by summing [§<]. Table 9 summarises the results.

1.51 The coefficient on the 2018 dummy is [§<], indicating that average fees for scheme services as a percentage of GBP transacted increased by [§<] percentage points between 2014 and 2018, even after controlling for potential explanations. The descriptive statistics show that average fees for scheme services as a percentage of GBP transacted rose by [§<] percentage points (see Figure 18). The difference in the increase from the descriptive statistics and the econometrics is [§<], indicating that the control variables explain only approximately [§<]% of the increase we see in the descriptive statistics.

1.52 After controlling for potential explanations, we find that average fees for scheme services as a percentage of GBP transacted rose from [§<] in 2014 to [§<] in 2018. This equates to a [§<]% increase that cannot be attributed to the drivers of fees for scheme services reported by Visa (see Figure 2), and which therefore can be regarded as pure increases in fee levels.

**Table 9: Average adjusted Visa fees for scheme services as a percentage of GBP transacted**

[§<]

Source: PSR analysis based on data submitted by Visa.

## Mastercard fees for processing services

1.53 The descriptive statistics showing the evolution of Mastercard’s fees for processing services between 2014 and 2018 show that they increased in [§<], but by [§<] had fallen back to [§<] levels.

1.54 We confirm this finding using econometric analysis. Table 10 summarises the results of our key regressions:

- MP0 is our simple model and replicates the results of the descriptive statistics in the previous section.
- MP1 introduces the total number and value of purchase and refund transactions. [§<]
- MP2 introduces acquirer-specific fixed effects, [§<]

### Table 10: Analysis of Mastercard's fees for processing services

[REDACTED]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Mastercard.

- 1.55** We calculate the adjusted average fees for processing services as a percentage of GBP transacted in a given year by [REDACTED]. Table 11 summarises the results.
- 1.56** We observe a pattern consistent with what we observed in the descriptive statistics (Figure 19): average fees for processing services increased in [REDACTED]. The year dummy for [REDACTED] is statistically significant. However, by [REDACTED], they had fallen back to [REDACTED] levels, though the dummies for [REDACTED] and [REDACTED] are not statistically significant.
- 1.57** Given the above observations, as well as insights from the descriptive statistics, we do not have strong evidence to conclude that the level of Mastercard's fees for processing services increased between 2014 and 2018.

### Table 11: Average Mastercard fees for processing services as a percentage of GBP transacted

[REDACTED]

Source: PSR analysis based on data submitted by Mastercard.

## Visa fees for processing services

- 1.58** Table 12 summarises the results of our key regressions:
- VP0 is our simple model and replicates the results of the descriptive statistics in the previous section.
  - VP1 introduces total number of purchase transactions, refunds and chargebacks. [REDACTED]
  - VP2 (see Table 22) introduces shares of domestic/intra-European/international transactions. [REDACTED]
  - Finally, VP3 introduces acquirer-specific fixed effects, [REDACTED]

### Table 12: Analysis of Visa's fees for processing services

[REDACTED]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Visa.

- 1.59** We calculate the adjusted average fees for processing services as a percentage of GBP transacted in a given year by summing [X].
- 1.60** Overall, we find that average fees for processing services as a percentage of GBP transacted increased by [X]% between 2014 and 2018. However, most of this increase occurred in 2018. We do not consider growth in one year to constitute strong enough evidence of a consistent upward trend.

**Table 13: Average Visa fees for processing services as a percentage of GBP transacted**

[X]

Source: PSR analysis based on data submitted by Visa.

## Mastercard fees for scheme services and processing services combined

- 1.61** In response to the interim report, Mastercard noted that we had analysed fees for scheme services and fees for processing services separately.<sup>18</sup> It said the regulatory requirement for these fees to be separately accounted for from 2016 onwards might have led to changes in internal accounting, so our analysis should have been of the sum of both types of fee.
- 1.62** To account for potential changes in internal accounting, we re-estimated the models M0-M4 but defined the dependent variable as the average fee for scheme and processing services combined as a percentage of GBP transacted.
- 1.63** Table 14 summarises the results of these regressions.

**Table 14: Analysis of Mastercard's fees for scheme services and processing services combined**

[X]

Notes: \* p<.05; \*\* p<.01; \*\*\* p<.001.

Source: PSR analysis based on data submitted by Mastercard.

- 1.64** The constant for MSP0 tells us the average fees for scheme services and process services combined per GBP transacted in 2014 ([X]%). [X]. Table 15 summarises these results. This shows that after controlling for potential explanations, [X], an [X]% increase.

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18 Other comments from stakeholders regarding our scheme fees analysis in the interim report are discussed in the final report, paragraphs 5.67 and 5.68.



**Table 15: Average Mastercard fees for scheme and processing services combined as a percentage of GBP transacted**

[REDACTED]

Source: PSR analysis based on data submitted by Mastercard.

- 1.65** Table 14 showed the results for the scheme fees regressions using the sum of scheme service and processing fees. In addition, [REDACTED] given the purpose of the work reported in this annex we did not consider it appropriate to investigate still more specifications.

## Visa fees for both scheme services and processing services

- 1.66** Similarly, we re-estimated the models V0–V4 but defined the dependent variable as the average fee for scheme and processing services combined as a percentage of GBP transacted.

- 1.67** Table 16 summarises the results of these regressions.

**Table 16: Analysis of Visa’s fees for scheme services and processing services combined**

[REDACTED]

Notes: \* p<.05; \*\* p<.01; \*\*\* p<.001.

Source: PSR analysis based on data submitted by Visa.

- 1.68** The constant for VSP0 tells us the average fees for scheme services and process services combined per GBP transacted in 2014 ([REDACTED]%). [REDACTED]. Table 17 summarises these results. This shows that after controlling for potential explanations, the average combined fees [REDACTED], a [REDACTED]% increase.

**Table 17: Average Visa fees for scheme and processing services combined as a percentage of GBP transacted**

[REDACTED]

Source: PSR analysis based on data submitted by Mastercard.

- 1.69** [REDACTED], we did not consider it appropriate to investigate more model specifications for the sum of Visa scheme service and processing fees than the ones shown in Table 16 which corresponds to the models estimated for Visa scheme service fees and shown in Table 12.

# Summary

- 1.70** During the period 2014 to 2018, Mastercard and Visa's average fees for scheme services as a percentage of GBP transacted increased by [X]% and [X]% respectively. These findings are based on descriptive statistics and do not account for other factors that may drive fees for scheme services. Mastercard and Visa told us that transaction volume and value, and changes in the transaction mix, drive their fees for scheme services. We use econometric techniques to control for these factors, in order to examine to what extent increases in average fees for scheme services can be attributed to increases in price.
- 1.71** Using econometric analysis to control for the main drivers of Mastercard and Visa's fees for scheme services, we find that average fees for scheme services increased by [X]% and [X]% for Mastercard and Visa, respectively. This indicates that there has been a significant increase in the level of fees for scheme services as a proportion of transaction value.
- 1.72** As discussed above, while there is some weak evidence to suggest that share of value of [X] could explain increases in Mastercard's average fees for scheme services per GBP transacted, the evidence is not strong enough to dismiss the hypothesis that there has been a significant increase in fee levels over time.
- 1.73** Average fees for processing services as a percentage of GBP transacted increased for Visa by [X]%. However, most of this increase occurred in 2018. We do not consider growth in one year to constitute strong enough evidence of a consistent upward trend. Average fees for Mastercard processing services increased in [X] then fell back to [X] levels in [X]. Overall, we conclude that there is not enough evidence to assert that the level of fees for processing services have significantly increased for Visa or Mastercard.
- 1.74** Since the interim report, we have undertaken additional analysis in response to Mastercard's submission that we should have analysed fees for scheme and processing services combined. This analysis shows:
- During the period 2014 to 2018, Mastercard and Visa's average fees for scheme and processing services combined as a percentage of GBP transacted increased by [X]% and [X]% respectively. These findings are based on descriptive statistics and do not account for other factors that may drive fees for scheme services.
  - Using econometric analysis to control for the main drivers of Mastercard and Visa's fees, we find that average fees for scheme and processing services combined increased by [X]% and [X]% for Mastercard and Visa, respectively. This indicates that there has been a significant increase in the level of fees for scheme and processing services combined as a proportion of transaction value.
- 1.75** Our analysis therefore suggests that scheme fees increased significantly over the period 2014 to 2018 and that a substantial proportion of these increases are not explained by changes in the volume, value or mix of transactions.

# Additional tables

## **Table 18: Additional analysis of Mastercard’s fees for scheme services, shares of value of inter-regional purchase transactions**

[X]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Mastercard.

## **Table 19: Additional analysis of Mastercard’s fees for scheme services, robustness checks for preferred model**

[X]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Mastercard.

## **Table 20: Additional analysis of Visa’s fees for scheme services**

[X]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Visa.

## **Table 21: Additional analysis of Visa’s fees for processing services**

[X]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Visa.

## **Table 22: Additional analysis of Visa’s fees for processing services, introducing share of intra-European and international transactions**

[X]

Notes: \*  $p < .05$ ; \*\*  $p < .01$ ; \*\*\*  $p < .001$ .

Source: PSR analysis based on data submitted by Visa.

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