PRICE EFFECTS OF PARTICIPATION IN NATIONAL BUYING GROUPS

Prepared for Metro AG

March 2020

David Foster

+44 20 7031 7095

david.foster@frontier-economics.com

CONTENTS

1 EXECUTIVE SUMMARY

Buying groups involving retailers and wholesalers have become increasingly common in the grocery product value chain over the last decade. Whilst their impact has been a subject of debate, empirical evidence for their effects in Europe has been limited. This report aims to contribute the debate by providing a quantitative analysis of the price effects of buying groups using actual retail price data provided by Metro AG, spanning six years and several European countries.

1.1 Retailers and wholesalers sit in the middle of the grocery product value chain. Upstream, they negotiate with suppliers and fix the purchasing conditions for products that are eventually sold on to their customers. Downstream, they compete with other retailers and wholesalers to attract customers to their stores and websites.

1.2 Purchasing conditions are an essential input for the value that retailers and wholesalers can offer their customers. They govern how products are marketed, when and where discounts can or have to be applied and, above all, the price that a reseller (i.e. a retailer or wholesaler) can sustainably charge to its customers.

1.3 Downstream markets are characterised by intense competition between rival retailers (or between rival wholesalers) with their customers constantly seeking the "best deal" of product choice and value for money. As a result, any improvements in purchasing conditions are typically shared with customers as retailers and wholesalers use improved terms to gain a competitive advantage over their rivals.

5-7% lower prices

Empirical analysis of the impact of buying group participation in 5000+ products – consistent with other previous research

1.4 Buying groups affect this supply chain by concentrating the power of retailers and wholesalers in the procurement market: strengthening their negotiating power versus suppliers. Below we summarise why:

a. economic theory predicts that this should lead to lower prices for customers and, ultimately, end consumers in all but exceptional circumstances (circumstances which are already proscribed by EU competition law); and

b. the new empirical evidence put forward in this report supports this prediction, showing that Metro's participation in a buying group in France has lowered prices for customers by around 5%-7%. This is in line with another recent empirical study of buying groups in France (Molina 2019), which also finds a price reduction of 5%-7%.

Economic theory suggests that buying groups lower prices for end consumers

1.5 The first order effect of a buying group is to lower end prices for customers. This is because:

a. buying groups only concentrate reseller power in procurement – this doesn't reduce competitive tension in the negotiation (in fact, it increases the pressure on suppliers to offer the best terms) and it doesn't reduce competition tension between resellers, who continue to compete against each other downstream;

b. retailers' and wholesalers' incentives to use their buyer power in procurement are fundamentally aligned with the interests of customers and end consumers – who also want retailers and wholesalers to obtain the lowest input prices; and

c. because buying groups do not concentrate competition in the downstream retail and wholesale markets, retailers and wholesalers who gain a stronger bargaining position continue to have strong incentives to share terms improvements with their customers.

1.6 It is therefore fundamentally misleading to characterise buying groups as similar in their effects to other forms of horizontal concentration – the economic effects are fundamentally different. They are pro-customer and pro-consumer by default.

1.7 There are, in theory, circumstances where buying groups can be harmful to competition in the upstream or downstream markets. This arises when the concentration of buyer power is so great as to give buying group members the power to exclude competition – either by foreclosing other market participants, or by facilitating coordination.

1.8 However, such exceptional circumstances already sit fully within the ambit of existing EU competition law provisions – designed to prohibit exactly these types of horizontal concentration. There can be no credible suggestion of an enforcement gap in EU competition law, precisely because buying groups remain pro customer and pro-consumer at levels of horizontal concentration significantly above the threshold at which EU competition law would already intervene in other circumstances.

The empirical evidence suggests buying groups lower prices for customers and end consumers

1.9 This report presents the results of a detailed quantitative analysis of the price effects of buying group participation. Our study uses a large dataset of article-level monthly selling price data provided by METRO AG (hereafter 'Metro') for six EU countries over the period from 2013-2018, of which ultimately four countries were used for the econometric analysis

1.10 This data enabled us to identify Metro's buying group in France as suitable for econometric regression analysis – enabling us to make statistically robust pricing comparisons that control for product mix effects and general inflation thereby isolating the resale price effect of buying group participation.

1.11 Our analysis shows that Metro's participation in the buying group in France led to lower selling prices for its customers of around 5%-7%, and that:

- The results are robust to a number of sensitivity tests such as variations in the econometric specification, time period covered or when using a dataset with an alternative SKU identification.

- The effect broadly holds in the within-country analysis, when the data satisfies the more stringent criteria under a smaller sample size.

- The fall in prices was found to also apply in most product categories covered by buying group participation within our sample.

2 THE ECONOMICS OF BUYING GROUP PARTICIPATION

2.1 Whilst buying groups are cooperation agreements between horizontal competitors, it is misleading and economically incorrect to think of them as a form of horizontal concentration like any other – and therefore as something presumptively bad for competition.

2.2 The first order economic effect of buying group participation is to lower costs, enabling more competition and lower prices for customers. Negative effects on competition from buying group participation are the exception rather than the rule, arising only under certain circumstances. And those circumstances are already proscribed by competition law rules.

2.3 In this report we are focusing on buying groups involving either retailers or wholesalers (or both). It is therefore worth mentioning the following points of terminology.

   a. We use the collective term "reseller" to refer to both retailers and wholesalers. This is because whilst retailers and wholesalers operate in different downstream distribution channels (retailers sell direct to end consumers, wholesalers sell to independent business customers, who themselves then serve end consumers), they nonetheless are typically engage in sourcing the same products from upstream suppliers, and so frequently collaborate in buying groups.

   b. The term "customer" when used in this report is used to refer to the direct customers of a reseller (either the end consumer as a customer of the retailer, or the independent business customer of a wholesaler). "End consumers" refers to the final consumer of the goods at the end of the supply chain.

2.4 In this section we briefly describe the economic effects of buying groups between resellers and why economics suggests that they should be presumed to be procompetitive unless they meet existing tests for anti-competitive effects as set out by European competition law.

The first order economic effect of buying group participation is to lower prices for customers

The supply chain is best understood in three stages

2.5 The effects of buying groups are best understood in the context of three stages in the retail supply chain. These are:

   a. Upstream production – suppliers design and manufacture the goods which are sold to wholesalers and retailers;

   b. An intermediate procurement stage in which retailers and wholesalers negotiate with suppliers to agree the terms on which purchase goods from those suppliers; and

c. Downstream distribution – where resellers compete to sell products to their customers:

    i. For retailers such as supermarket grocery (Aldi, Tesco, Carrefour etc.), this involves selling direct to end consumers.

    ii. In the case of wholesalers, this involves selling to independent business customers, (who then themselves compete in their respective downstream market sell on the goods to their own customers).

2.6 These are summarised in the diagram below.

Figure 1   Key stages in the supply chain relevant to buying groups

The dynamics of procurement negotiation are different to retail competition

2.7 Competitive tension exists at all stages of the supply chain pictured above. Suppliers compete with each other to secure sales of their brands. Suppliers and resellers both compete in procurement negotiations to secure distribution of those brands on the best possible terms. Resellers compete to secure sales in their downstream retail or wholesale markets.

2.8 The defining economic feature of a buying group is that it concentrates buyers' economic power in procurement without changing the structure of the downstream resale markets. This means that buying groups' economic effects are fundamentally different to other horizontal concentrations. This is for two fundamental reasons:

a. First, reseller vs reseller competition is not the main source of competitive tension in the procurement negotiation; and

b. Second, the incentives of resellers are aligned with customers when they participate in procurement.

Buying groups don't reduce competitive tension in procurement – they affect the balance of power in negotiations

2.9 Procurement negotiations (at least in a sector such as the grocery sector) is best understood in a bargaining framework, where prices are negotiated between suppliers and resellers.[1]

2.10 As noted above, it is the competitive tension between supplier and reseller that produces economic outcomes in procurement negotiations. It is a gross over-simplification to claim that any concentration of buyer power in procurement reduces competitive tension. This is not correct.

2.11 Of course, outcomes in procurement negotiations are not independent of the market structure of the supplier and retailer/wholesaler sides of the negotiation. They are of critical importance: bargaining power in the procurement negotiation depends on the extent to which either side can credibly walk-away from the negotiating table and rely on alternative options instead. Whether or not credible alternatives exist depends on the degree of horizontal competition in upstream and downstream markets. This means:

   a. the position of suppliers is strengthened when they can play-off alternative resellers against each other; and

   b. the position of resellers vis-à-vis the suppliers is strengthened when there are alternative brands which they can rely on as alternatives.

2.12 The principal role played by buying groups is to improve the negotiating position of resellers: consolidation of resellers reduces the alternative routes to market available to the supplier outside the negotiation.

2.13 The impact of the buying group is therefore not to reduce competitive tension in the negotiation – since this continues to exist between the supplier and the buying group – rather it is to change the balance of bargaining power in that negotiation. Indeed, buying groups increase the competitive pressure felt by suppliers to offer the best terms.

The interests of resellers and their customers are aligned in the procurement negotiation

2.14 This is where the second fundamental feature of the procurement market is so important. Suppliers and retailers/wholesalers have opposite incentives when negotiating. Suppliers want high prices. Resellers (whether retailers or wholesalers) want low prices. Resellers want to lower purchase prices because it will enable them to compete more effective and win customers.[2]

---

[1] The economics of buyer power is somewhat different in "commodity" markets where prices are not negotiated, but rather set at " market clearing" output level according to market supply and demand conditions. This is sometimes referred to as the "monopsony power" model of buyer power – see for example Mazzarotto, N. Buyer power: Understanding and assessing its potential positive and negative effects. Available at https://www.law.ox.ac.uk/sites/files/oxlaw/n_mazzarotto.pdf

[2] Although it is worth noting that even if resellers didn't face lots of competition, they would *still* want lower purchase prices because this would give them higher margins needed in light of the very low overall profit margin of the retail sector and the very cost intensive operation of stores.

2.15 This means the incentives of resellers as buyers are fundamentally aligned with their customers (who also want low prices) whereas the incentives of suppliers are fundamentally aligned against the interests of customers.

2.16 A shift in bargaining power that favours buyers is also one that tends to favour outcomes that benefit customers and, ultimately, end consumers – lower prices. Conversely, anything which tends to restrict bargaining power of resellers will tend to favour suppliers obtaining higher prices to the detriment of customers.

2.17 Now, it might be said that competition between resellers is nonetheless important because competition on the level of retailers or wholesalers, respectively, is needed to ensure that lower sales prices are passed on to customers. But this is not a valid economic reason to restrict buying groups in all but exceptional circumstances. Buying groups do not consolidate market power at the retail and wholesale level – resellers continue to compete to serve their end customers, and therefore continue to have the incentive to pass price savings on.

2.18 This pro-consumer dynamic, which distinguishing buying groups from other standard forms of horizontal concentration is well recognised in the economic literature on buyer power. For example, Inderst and Wey (2003) note:[3]

> "[I]n many instances anti-competitive effects on the final goods market are also not likely to occur. Members of buyer groups, while pooling their orders to obtain better deals from suppliers, may continue to compete fiercely for consumers."

Circumstances where buying groups could harm competition

2.19 There are some limited circumstances where buying groups can restrict competition and lead, in theory, to worse outcomes for their customers. Because the first order economic effect of buying groups is to benefit customers (even when procurement markets are concentrated) these circumstances arise only in exceptional cases.

2.20 In this section we briefly summarise these circumstances and explain why these circumstances are already comfortably within the purview of existing EU competition law rules: there is no "enforcement gap" for buying groups that would benefit from additional regulatory protection.

2.21 In general, scope for competitive harm arises when:

a. the degree of concentration of buying power is sufficiently great as to result in some form of anti-competitive foreclosure; and

b. the extent of any foreclosure is great enough to counteract the first-order positive effects of lower procurement prices.

---

[3] Inderst, Roman; Wey, Christian (2003) : Buyer power and supplier incentives. Available at https://www.econstor.eu/bitstream/10419/50953/1/372412777.pdf

2.22 The idea that buyer power can be beneficial to competition, but that competition authorities need to be alert to the risk of foreclosure is recognised in the European Commission's horizontal merger guidelines:[4]

> "*Competition in the downstream markets could also be adversely affected if the merged entity was likely to use its buyer power vis-à-vis its suppliers to foreclose its rivals. On the other hand, increased buyer power may be beneficial for competition. If increased buyer power lowers input costs without restricting downstream competition or total output, then a proportion of these cost reductions are likely to be passed onto consumers in the form of lower prices.*"

2.23 There is also a close economic parallel in the way in which European competition law assesses the competitive effects of non-horizontal concentrations where there is also i) a recognition that the first order effects of such concentrations are positive for consumers; ii) the principal competition concern relates to the risk of anti-competitive foreclosure; and iii) where assessment is based on the overall economic effect – taking into account the *net* impact any countervailing pro- and anti- competitive effects.[5]

2.24 In focusing on the risk of anti-competitive foreclosure, we need to consider both:

a. the risk of foreclosure in the downstream retail market; and/or

b. the risk of foreclosure in the upstream supplier market.

2.25 Finally, there is an alternative theory of harm that buying groups might facilitate coordination in the downstream retail market by increasing the commonality between reseller rivals' input costs.

2.26 We consider each of these theories of harm further below.

Foreclosure risks in the downstream resale market

2.27 Concerns regarding foreclosure of rival retailers or rival wholesalers involve the following sequential steps:

a. the buying group gives its members a scale that enables them to obtain superior terms that are not available to smaller "outsider" resellers;

b. this gives those members a competitive advantage in their respective resale market, growing their market share at the expense of "outsider" resellers;

c. those outside the buying group lose scale, and this in turn further weakens their negotiating position versus suppliers.

2.28 This theory of harm is often referred to as the "waterbed effect" – because it posits the idea that lower purchase prices obtained by a large buyer ultimately cause higher purchase prices to smaller rivals, leading to foreclosure.

2.29 The idea that waterbed effects exist in practice in European grocery markets is a persistent myth of the last twenty years – even though successive detailed competition investigations have repeatedly debunked it.

---

[4] Paragraphs 61 and 62 see https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:52004XC0205(02)&from=EN

[5] See EU non-horizontal merger assessment guidelines, available at https://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:265:0006:0025:en:PDF

2.30 There are two main reasons why one does not observe this phenomenon in practice.

   a. First, the relationship between sheer scale and buying terms in grocery retail is not sufficient to produce anti-competitive foreclosure.

   b. Second, the level of buying concentration needed to produce anti-competitive foreclosure would already be prevented by existing EU competition rules.

2.31 The alleged waterbed effect in grocery retailing has been comprehensively investigated by the Competition Markets Authority ("CMA") in the UK, in the context of several different competition investigations. It first did so in a market investigation into the grocery retail sector in 2000, where it found:[6]

   > "*In the 2000 investigation, the [CMA] conducted various analyses to assess whether there were significant differences between the prices paid by large grocery retailers and smaller grocery retailers for grocery supplies. The [CMA] found that, on average, there were differences, but that there were also cases where small retailers paid lower prices. In some cases, there was no statistically significant difference between large grocery retailers, despite their difference in size.*"

2.32 This was a critical empirical finding. The CMA found that the relationship between sheer scale and buying terms was not straightforward. Although larger buyers did manage to obtain some buying advantage *on average*, the evidence suggested that i) this advantage was generally small; and ii) small retailers also had advantages that meant they could sometimes buy better than larger retailers.

2.33 Whilst the latter finding might seem surprising, it is consistent with the economic theory of bargaining. Large buyers can be at a disadvantage if they are "pivotal" to the supplier – where a large buyer can become responsible for ensuring that the supplier is able to cover their fixed costs of operation.[7] A smaller buyer that is "non-pivotal" can sometimes be in a position to free-ride on these fixed investments of suppliers (already "paid for" buy the large buyers), and so obtain benefit from more "marginal" pricing.

2.34 The CMA subsequently repeated and replicated precisely the same result as recently as April 2019 in the context of its investigation of the J Sainsbury/Asda merger. The results below show the relationship between scale and buying terms found by the CMA in 2019 (similar to the one also found in 2000), namely that:

   a. larger retailers obtain a decreasing benefit from scale (see the red line in the chart below) – for retailers with a market share above around 10%, the incremental gains from additional scale are small; and

   b. whilst the benefits from scale hold on average, many smaller retailers obtain significantly better terms than the larger retailers whose terms tend to be closer to the average.

---

[6] Appendix 5.4 of the Final Report of the Groceries market investigation, 2008, paragraph 33.

[7] See for example Pivotal Buyers and Bargaining Position, Alexander Raskovich, The Journal of Industrial Economics, Vol. 51, No. 4 (Dec., 2003), pp. 405-426.

Figure 2   The relationship between relative wholesale prices and retailer size
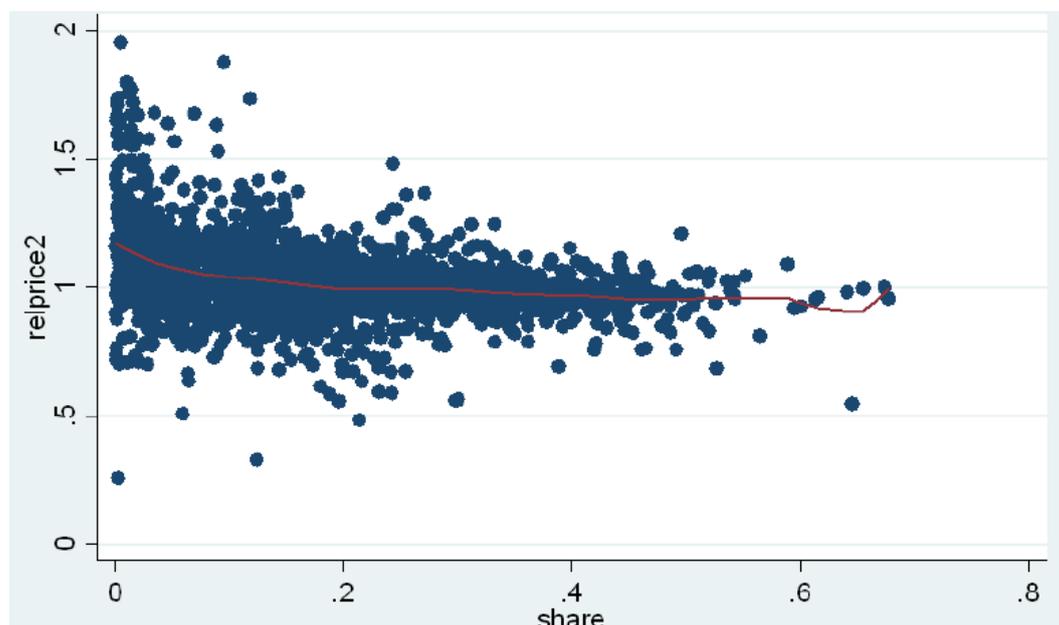
2.35   The UK CMA conducted a second detailed market investigation of the UK groceries market in 2008, where it again considered the possibility of a waterbed effect resulting in foreclosure of smaller retailers. In doing so, it considered detailed evidence on the development of the UK retail market over time, concluding:

> "*the evidence that we have reviewed does not support a conclusion that a waterbed effect operates in UK grocery retailing to any material extent. If a waterbed effect had been operating in recent years, we would have expected to observe an increased disparity in the input costs paid by large grocery retailers and smaller grocery retailers, increases in the relative prices charged to consumers by small retailers and a shift of overall consumer demand from small retailers to large grocery retailers. The evidence that we have reviewed is not consistent with these expected observations. Accordingly, we conclude that, to the extent that any waterbed effect exists in the UK grocery retailing sector, it is likely to be of limited impact, affecting a minority of suppliers of groceries and largely not affecting the price aspects of the retail offer. In addition, we conclude that the likelihood that a waterbed effect is resulting in material detriment to UK consumers of groceries is very small*"

2.36   Other subsequent investigations confirmed the same conclusion that so-called waterbed effects were also implausible in the case of *wholesalers* as well as retailers in the grocery market, with the CMA also reaching the conclusion that suppliers would often be incentivised to offer better (rather than worse) terms to

smaller wholesale purchasers as a reaction to large buyers increasing their buyer power[8] – a win-win for resellers' customers.

Foreclosure risks in the upstream supplier market

2.37 A second category of concern is that buying groups might result in competitive harm in the upstream supplier market. This theory of harm can be summarised as:

  a. a particularly large and powerful buyer extracts unfairly low prices from a supplier;

  b. the supplier faces a financial squeeze as a result;

  c. the supplier can no longer afford to make investments in product quality and/or innovation; and

  d. as a result, customers and end consumers (although they enjoy lower prices) ultimately receive lower quality products.

2.38 In general, resellers will be incentivised to ensure that they can source the best possible products from their suppliers – and therefore have no incentive to actively harm their supply base by demanding unfair terms. However, there are certain circumstances where this concern could in theory apply. In particular where:

  a. the large buyer has a very high degree of bargaining power, such that they are able to dictate terms to a supplier;

  b. suppliers are in a weak or marginal position, such that deterioration of their terms and conditions might impact on their ability to make investments; and

  c. the suppliers are domestic rather than international in scope (such that their investments are contingent on their profitability in the relevant affected market).

2.39 In general, these circumstances are unlikely to hold in respect of buying groups as they typically occur in Europe. This is for two main reasons.

2.40 First, the scope of most buying groups is – often for competition law compliance reasons – limited to include branded products manufacturers, and typically excludes fresh product suppliers who are most often the smaller domestic suppliers with more marginal economics. Large branded products manufacturers on the other hand are more often international in scope, or otherwise have strong national brands. Again, the CMA has closely investigated the impact of buyer power in the grocery supply chain and finds the following:[9]

> "*We conclude that, based on the size of grocery retailers, wholesalers and buying groups relative to suppliers, together with the evidence on supplier pricing and margins, all large grocery retailers, wholesalers and buying groups have buyer power in relation to at least some of their suppliers. However, we found that the buyer power of even the largest grocery retailers may be offset by the market power possessed by suppliers of the most prominent branded goods.*"

---

[8] Final Report of Tesco/Booker, paragraph 8.64, https://assets.publishing.service.gov.uk/media/5a3a7dd7ed915d618542b8df/tesco-booker-final-report.pdf)

[9] Final Report of the Groceries market investigation, 2008, paragraph 9.82

2.41 Second, wholesale and retail markets in the EU are generally competitive, and the scope of buying groups is not large enough to give buyers the power to dictate terms to suppliers to the point at which they suffer financially. Rather, when it has been investigated in detail, the CMA has found that the beneficial pro-consumer effect of buyer power that dominates:[10],[11]

> "*Grocery retailers' buyer power is of benefit to consumers since part of the lower supplier prices arising from this buyer power will be passed on to consumers in the form of lower retail prices. We do not find that the financial viability of food and drink manufacturers was under threat as a result of the exercise of buyer power by grocery retailers.*"

Coordinated effects in resale markets

2.42 A final category of concern relates to buying groups making price coordination easier in the resale (wholesale or retail) market. This is because if competing resellers share a common input cost (because they are part of the same buying group) this increases transparency – in theory making coordination easier to establish and/or to monitor.

2.43 Again, this concern is largely theoretic in nature, since it doesn't apply in practice to those situations in which buying groups occur in practice in Europe. This is because:

a. buying groups don't operate at a scale that enables enough of the market to be covered by joint purchasing; and

b. in any event, cost asymmetry is not a major factor in limiting coordination in resale markets – other factors are much more important.

2.44 As discussed further in the next section, the provisions of EU competition law would kick in long before a buying group reached the scale at which it had substantially removed any lack of transparency in input costs across the market: any buying group permissible under EU rules would continue to face competition from a substantial portion of the market that was outside the agreement (or party to alternative agreements). This means that even if the members of a particular buying group had the ability and incentive to coordinate resale pricing amongst themselves, any such attempt would immediately be disrupted by competitors outside the buying group – unless the buying group reach such a scale whereby this outside constraint was no longer capable of being disruptive.

2.45 However, as shown in Figure 2 above, input cost asymmetry is unlikely to be a determinative factor in preventing coordination in EU wholesale and retail markets. For larger buyers, input costs are already relatively closely aligned. Whilst resellers will work hard to obtain small improvements in their terms to help them compete, this broad alignment does mean that other factors are more important in preventing coordination. These typically include, but are not limited to:

---

[10] Final Report of the Groceries market investigation, 2008, paragraph 9.83

[11] The CMA found only that a certain restricted set of practices – mainly focused on retailers seeking to retrospective changes to the terms agreed with suppliers – had the potential to affect investment an innovation in the supply chain. However, this was not found to be a symptom of a wider problem with retailer buyer power, and was found in the context of retailer buyer power generally operating in the interests of consumers.

a. significant asymmetries in market shares in the resale market;

b. substantially different brand positioning and competitive strategies in the resale market;

c. the practical impossibility of coordinating the pricing of tens or hundreds of thousands of individual stock keeping units (SKUs);

d. rapid innovation, product development and change in resale markets;

e. fluctuations in customer / consumer preferences and demand, both seasonally and year-on-year.

2.46 These same considerations apply as much to wholesalers (and the independent retailers they serve) as to integrated retailers. If anything, the conditions for coordination are even less likely to apply in the wholesale channel because:

a. wholesalers themselves face very sophisticated independent retailer customers who are experienced buyers themselves, willing to multi-source across multiple competing wholesale channels;

b. many wholesale customers have material buyer power themselves to extract the best terms, since they run substantially sized downstream businesses;

c. there is significantly less price transparency in wholesale markets, because many prices are individually negotiated by customers and cannot readily be compared across the many different channels of wholesale supply (cash and carry, delivered wholesale, direct distribution, specialist wholesale, fresh food wholesale markets, etc); and

d. prices in wholesale are also constrained by competition to serve non-retail (e.g. restaurant and catering) – because whilst these customers' product requirements substantially overlap with the product range of retailer customers, they are not competing in the same downstream market as retailers.

2.47 Consequently one would only become concerned about the risks of coordination under relatively exceptional circumstances, where i) the coverage of the agreement was very broad across the resale market; and ii) the nature of the resale market in question meant that some of the other limiting factors preventing coordination were not present.

The adequacy of existing EU competition law provisions

2.48 In summary:

a. the first order effect of buying groups is to achieve lower prices for customers / end consumers;

b. this is because the economics of concentrating buyer power does not operate like other horizontal concentrations;

c. buying groups will be beneficial to customers / consumers in most cases, and only have the scope to create problems in exceptional circumstances; and

d. these circumstances arise where the buying group creates a super-scaled purchaser that had a very material size advantage over its competitors.

2.49 However, this is precisely the sort of scenario that existing EU competition rules would comfortably prohibit, either:

a. because a horizontal agreement that created a super-sized buyer with an unassailable advantage in buying terms advantage would be found incompatible with Article 101 of TFEU; or

b. because a buying joint venture that created a super-sized buyer with an unassailable advantage in buying terms would be found incompatible with the EU merger regulation.

2.50 Again, it is important to draw the distinction between buying groups and other forms of horizontal concentration. Because buying groups do not directly eliminate any of the competitive tension between suppliers and resellers, they do not create competitive concerns at lower degrees of concentration. They do not operate on a "sliding scale" from less problematic to more problematic like a conventional horizontal concentration – rather they remain pro-competitive even within more concentrated market structures. This means that buying groups occurring outside highly concentrated market structures are not merely "low risk", but actively pro-competitive and beneficial. This also means that there is no risk of an "enforcement gap" in competition law whereby problematic arrangements fall below the intervention threshold for competition authorities.

2.51 The figure below aims to illustrate this. It shows the "sliding scale" for standard horizontal concentrations – whereby there is limited scope for competition problems at relatively unconcentrated market structures, but with the scope for problems growing steadily as markets become more concentrated. If there is a concern that the threshold for competition law intervention is reasonably high on this scale (for example, due to prioritisation of resources by a competition enforcement agency) then this creates the risk of a so-called "enforcement gap" of problem cases that are harmful to competition but which aren't caught by competition law. In theory, there is a case for greater ex ante regulation in markets where there is a risk of many arrangements falling into such an enforcement gap.

2.52 This same "enforcement gap" does not apply in the case of buying groups, which remain actively pro-competitive (and pro-customer) even at more concentrated market structures. This means that those exceptional cases which are potentially problematic exist *well within* the threshold for investigation and prohibition under EU competition law.

2.53 This is particularly the case because the majority of buying groups involve relatively modest combined market shares of the participants on the relevant procurement markets. This is consistent with the results shown in Figure 2 above, that the most material benefits from scale in buying groups are to be obtained with combined market shares in the range of 10%-20%, with benefits above that level much more modest. This is materially below the level of horizontal concentration usually taken to be indicative of market power.

2.54 Agreements between retailers and wholesalers would also tend to be even less potentially problematic than agreements between rival retailers. This is because wholesalers and retailers do not directly compete head-to-head for the same direct customers and only compete indirectly (wholesalers serve, among other groups of

professional customers, independent retailers, who in turn compete with other retailers).

Figure 3   Buying groups – no risk of an "enforcement gap"
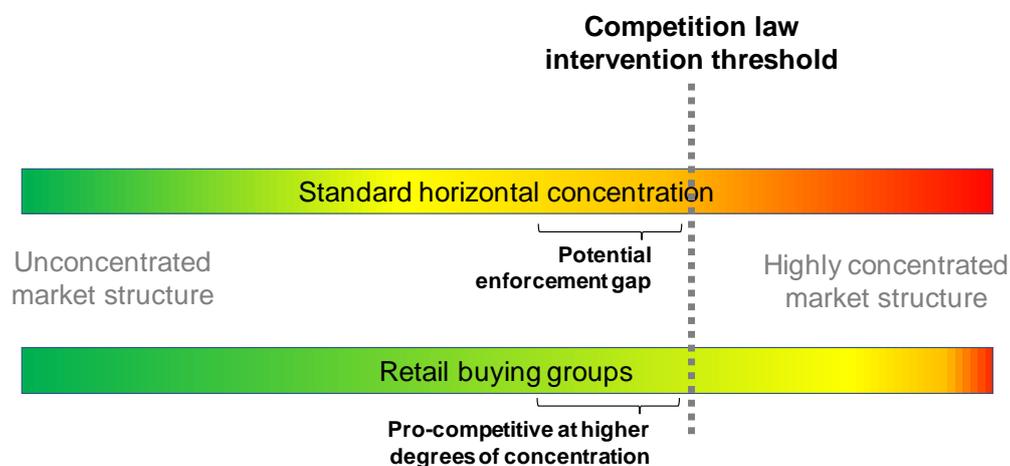
2.55   The fact that buying groups have different economic effects to standard horizontal concentration is recognised in the economic literature on buyer power and antitrust, for example Doyle and Inderst:[12]

> "*When determining a critical threshold for buyer power, this should not be done in isolation from the potential theory of harm that would be (subsequently) applied. In contrast to the exercise of (horizontal) market power, there is not even a clear presumption that the exercise of buyer power causes consumer detriment.*"

2.56   There is therefore no cogent economic case for regulation of buying groups to extend beyond the existing provisions of EU competition law. On the contrary – buying groups are in general significantly better for consumers than other types of horizontal concentration that EU competition law is already designed to police.

---

[12]   Some Economics on the Treatment of Buyer Power in Antitrust, Chris Doyle and Roman Inderst, 2007. Available at https://www.researchgate.net/publication/322404333_Some_Economics_on_the_Treatment_of_Buyer_Power_in_Antitrust

3 THE IMPACT OF METRO'S BUYING GROUP PARTICIPATION ON RESALE PRICES

3.1   As set out in the previous section, economic theory suggests that as long as they are compatible with European competition law, buying groups will be pro-competitive and result in lower prices for customers / consumers.

3.2   Empirical economic evidence on the impact of buying groups in Europe is relatively limited. As discussed above, one notable exception is perhaps the UK grocery market where the UK CMA have consistently found a small but measurable price reduction associated with greater buying scale, and where the CMA has concluded:[13]

> "*Grocery retailers' buyer power is of benefit to consumers since part of the lower supplier prices arising from this buyer power will be passed on to consumers in the form of lower retail prices.*"

3.3   In addition, Molina (2019) have conducted an empirical estimation of the impact of buying group participation on bottled water in France for the period 2013 to 2015. With results "*provid[ing] evidence of a countervailing buyer power effect that reduces retail prices by roughly 7%.*"[14].

3.4   In this report we have sought to widen the empirical evidence for the impact of buying groups by using data from Metro. Metro is a large grocery wholesaler with a pan-European presence (outside the UK).

3.5   Although it is a large wholesaler, the scale of its buying activities from suppliers is often significantly smaller than that of the largest integrated retailers, who typically supply a much larger proportion of the overall retail market, than those independent retailers who rely on wholesalers like Metro. Metro has participated in national buying groups in a number of European countries since 2016, often joining procurement activities with a major retailer.[15] Only non-fresh food products are covered by Metro's buying group arrangements.[16]

3.6   Any effect of Metro buying group participation on customers and, ultimately, end consumers (through improved negotiation and subsequent pass-on of the gains on purchasing conditions) should in theory be identifiable in Metro's resale prices for products included in the scope of buying groups versus those not covered by the arrangements. In practice, many factors affect the development of resale prices, so statistical analysis is required to identify and isolate the impact of buying group participation.

---

[13]   Groceries market investigation, Final Report, paragraph 9.83.

[14]   Molina, Hugo, Buyer Alliances in Vertically Related Markets (September 12, 2019).

[15]   For instance, in France, Metro is in a buying group with Auchan since 2016.

[16]   We note that this is consistent with buying groups particularly aiming to balance negotiation powers with large multinational suppliers, who are predominant in the non-fresh food sector while fresh food products are typically characterised by smaller and regional suppliers where any potential improvement in the negotiation position for retailers/wholesalers is likely to be more limited.

Identifying the relevant data from Metro

3.7 Metro participates in a number of buying groups across Europe. In identifying a relevant dataset to look at the impact of Metro's participation in buying groups, we sought to identify both:

a. countries where Metro participated in a buying group, and where there is likely to be sufficient data to measure its effect; and

b. other countries where Metro is also active but does not participate in a buying group, in order to serve as comparators.

3.8 Not all countries where Metro participates in some form of agreement was relevant for the analysis. In particular, certain of these agreements relate only to the provision of services (e.g. where retailer and wholesaler groups collectively provide market data to suppliers). In addition, certain agreements are relatively new, and there is insufficient data to examine their impact. We therefore first focused on those countries where Metro participated in established buying groups that involve collective negotiation of purchase prices.

3.9 We identified three countries where Metro had participated in buying groups since 2016: Poland, France, and Romania. After further investigations, (which are set out in more detail in Annex B) we identified Metro's buying group in France as having sufficient data in order to be suitable for our econometric analysis.

3.10 The data for France was also combined with data from three comparator countries (Czech Republic, Italy and Spain) where Metro has a material market presence but where it does not participate in any buying group in the time period in question.

The dataset covers an extensive range of Metro's product portfolio

3.11 The data provided by Metro provides resale price information on a monthly basis for each SKU (stock keeping unit) offered by Metro in a country for the period 2013 to 2018.[17] The data covers around 227,000 SKUs and includes information on:

- Country;
- Product name;
- Product hierarchy, i.e. the departments and product categories a specific SKU belongs to;
- Supplier name;
- Volume sold (number of units);
- Resale revenue[18]; and
- Whether a product was in scope of the French buying group or not.

---

[17] A SKU defines a distinct type of product for sale which is defined on the basis of the characteristics that differentiate it from other products. These characteristics could include supplier, product description, material, size, colour or packaging.

[18] We exclude promotional prices and volumes since this may not always be reported consistently.

3.12 Since Metro's buying group participation always excluded non-food products from joint negotiations, we focus the analysis on food products. We also exclude fresh food, which is never in the scope of the buying groups that Metro participates in.

3.13 As shown in Figure 4, the remaining dataset is a representative sample of Metro's product portfolio, representing 70% to 90% of total sales of the original dataset shared by Metro.

Figure 4   Total sales of dataset used for analysis

| Country	Currency	Total Sales	Share of full dataset
Czech	CZK	[redacted]	87%
France	EUR	[redacted]	75%
Italy	EUR	[redacted]	86%
Spain	EUR	[redacted]	72%

Source: Metro, Analysis Frontier Economics

3.14 Figure 5 below shows the percentage of observations in scope of buying groups, relative to those that are not, for each year in France. We note that there were no observations in France in 2013 and buying groups were only formed from 2016 onwards.

Figure 5   Buying group participation in France

	Not in buying group	In buying group
2014	100%	0%
2015	100%	0%
2016	65-80%	20-35%
2017	65-80%	20-35%
2018	65-80%	20-35%

Source: Metro, Analysis Frontier Economics

3.15 The table above shows that we have a large proportion of observations covered by the scope of buying groups. In addition, we note that the sample of observations in buying group represents roughly [5-10%]of the total observations across all countries in the relevant years.

3.16 In practice, these SKUs are well-distributed across food departments, both for products in the scope of the buying group, and those not in scope. Figure 6 shows the proportion of total SKUs in each department depending on their buying group status across the four countries included in our analysis.

Figure 6   Distribution of SKUs across departments
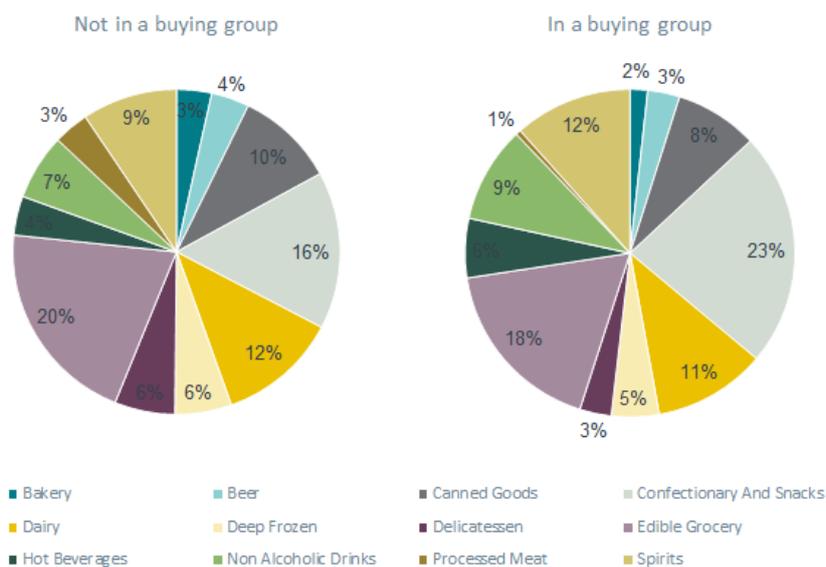
Source: Metro, Analysis Frontier Economics

Using econometric techniques to isolate the impact of Metro's buying group participation

3.17   In order to isolate the impact of Metro's buying group participation on resale prices, we can, in principle, compare average resale prices for SKUs included in the dataset across two dimensions:[19]

a. **SKUs in and out of buying groups**. This approach consists of comparing the average prices for SKUs that are covered by the scope of buying groups (within a specific country or across countries) and those not covered.

Our data contains an extensive number of SKUs, some of which are in buying groups and others that are out. In addition, both SKUs in and out of buying group appear across many departments.[20] In other words, the data allows us to compare the resale prices of SKUs within the same product group, i.e. the same department. In addition, the data also covers sufficient departments to be able to identify a representative effect across different departments.

b. **Periods before and after**. Following this approach, we compare the evolution of average resale prices before and after specific products became included in the scope of buying groups.

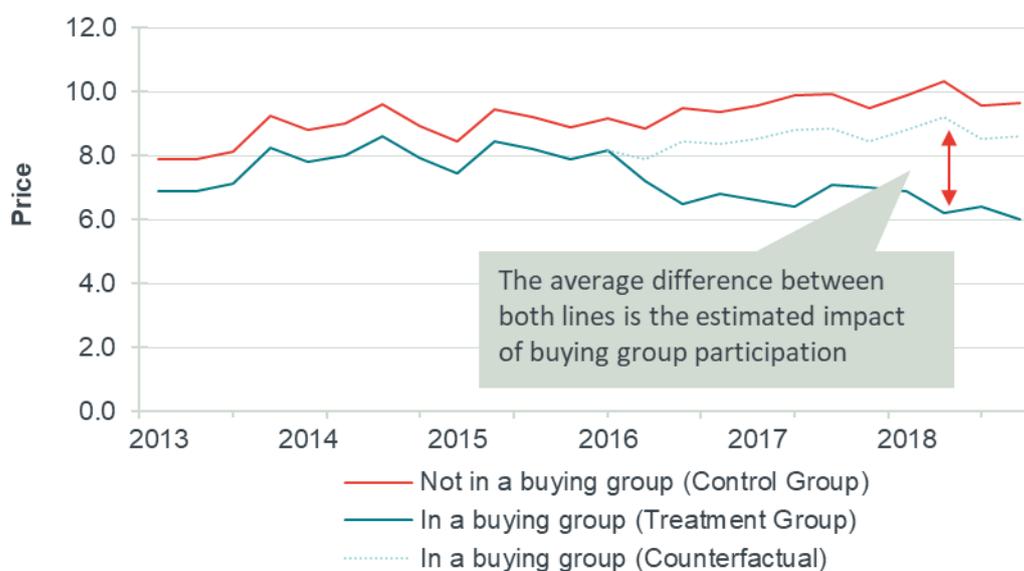Our data covers the period from January 2013 to December 2018. Since Metro only joined buying groups from March 2016 onwards, we can compare the prices of SKUs when they were in buying groups to their prices prior to joining.

---

[19]   We define retail prices by dividing monthly retail revenues for a given SKUs by the respective monthly volume sold.

[20]   These are broad grouping of SKUs by characteristics e.g. Dairy

3.18 We estimate the impact of buying group participation using a general "difference-in-difference" approach that allows us to control for resale price drivers (e.g. difference between countries, difference between products, differences between suppliers) other than buying group participation.[21,22] In essence, this technique estimates the buying group effect as the difference between the resale prices of products that are covered by buying group to what *they would have been* if they had not joined. Figure 7 provides a stylised illustration of the methodology.

Figure 7   Illustration of methodology

The average difference between both lines is the estimated impact of buying group participation

— Not in a buying group (Control Group)
— In a buying group (Treatment Group)
····· In a buying group (Counterfactual)

Source: Frontier illustration

3.19 As shown in Figure 7, we derive the counterfactual resale price, i.e. the price that products in buying groups would have *had they not joined a buying group*, by looking at a control group of products that share a similar resale price trend in the period *before* the buying groups began. The impact of buying groups is then estimated as the *difference between the actual resale price of SKUs in buying groups and their counterfactual price.*

3.20 We have chosen this methodology as it allows us to focus on differences in the *evolution* of resale prices over time rather than differences in the levels of prices. Therefore, any factors that differ between SKUs and influence prices levels, such as the type of SKUs (e.g. alcoholic vs non-alcoholic drinks) will not impact our estimate of the buying group effect. For more details, see Annex C.

3.21 We estimate two distinct models:

a. In the first specification, we compare the monthly resale price evolution of SKUs in buying groups to the average monthly resale price evolution across all other SKUs. In other words, we compare the evolution of prices for SKUs in buying groups to an approximation of "general inflation".

---

[21]   We implement this approach using a "fixed-effects" model i.e controlling for product characteristics over time

[22]   We note that this is also the estimation technique employed by Molina in the paper "Buyer Alliances in Vertically Related Markets"

b. In the second specification, we refine this approach by additionally comparing the resale price evolution of SKUs in buying groups to inflation of resale prices for products in their particular product category. We do that by controlling for yearly inflation and yearly inflation within a department.[23]

Our analysis suggests lower resale prices for products in scope of buying group participation

3.22 Exploiting the variations presented above (i.e. in scope and out of scope, before-and-after), our analysis suggests that the resale prices of products covered by Metro's buying group arrangements are on average 5% lower than they would otherwise have been had products not been covered by a buying group arrangement. As such, Metro's French customers benefit *directly* from Metro's participation in buying groups.

3.23 Using the two models described in 3.21 above and data on the remaining four countries included in the dataset, we estimated the effect of buying group participation on logged resale prices.[24] The results are shown in Figure 8 below. Despite the noisiness of SKU-level price changes over time, we nonetheless find that the buying group indicator parameter is estimated with a high degree of precision.

Figure 8　　Baseline results

Log(Resale Price)	Specification (1)	Specification (2)
Buying Group indicator	-0.0589***	-0.0534***
	(0.000917)	(0.000916)
Control variables		
Year terms	Excluded	Included
Month terms	Excluded	Included
Year and month interaction	Included	Excluded
Department and year interaction	Excluded	Included
Observations	3,464,402	3,464,402
R-squared[25]	0.003	0.021

Source:　Metro, Analysis Frontier Economics

Note:　　Robust standard errors in parentheses

　　　　*** p<0.01

---

[23]　In addition, we also account for potential seasonality effects which could occur if SKUs in/out of buying groups appear more/less in certain higher/lower priced months (e.g. before Christmas relative to January).

[24]　We are using log prices as this is a way of standardizing values, and therefore the results are to be interpreted as the percentage change in price after SKUs change buying group status.

[25]　We have provided R-squared statistics for completeness, although it is of relatively little significance in this model, where we are principally interested in the statistical significance of the buying group parameter estimated in noisy SKU-level price data. This is in line with standard econometric practice, for instance Peter Kennedy's A Guide to Econometrics (6th edition Wiley 2008, page 380) has advised "In general, do not pay much heed to R squared." Kennedy emphasised that what is a "good" R squared depends on context and purpose, the loss function in statistical jargon. An R squared of 0.99 in an equation explaining macroeconomic time-series may be completely spurious, while an R squared of 0.05 explaining financial returns can be an immensely profitable signal in a noisy environment. In the context of this model, we are not concerned with how well price variation over time can be explained by the regressors, but rather if participation in a buying alliance is associated with a significant price difference and the degree of this price difference.

3.24   Our analysis suggests that buying group participation leads to a 5% decrease in resale prices for SKUs in the scope of buying groups.[26] In particular, the measured effect is relatively stable across both specifications presented above, suggesting a relatively accurate estimate of the impact of buying group participation.

3.25   We also conducted a number of sensitivity analysis which confirm that buying group participation lowers prices. The sensitivity analysis suggests that the impact on resale price ranges between 4% to 7%. The detailed results and methodology are shown in Annex A.

3.26   To conclude, we found that buying group participation by Metro is beneficial to consumers as it led to a decrease in the resale price of products. Our findings supports the observations made by the CMA who stated that *"…buying groups have buyer power in relation to at least some of their suppliers [and] this buyer power will be passed on to consumers in the form of lower retail prices"*.[27] In addition, our analysis suggests that resale prices are lowered by approximately 5% which is in-line with the estimates of Molina (2019) who found that buying group participation lowered prices by approximately 7%.[28]

---

[26]   The coefficient estimated is significant at a 1% significance level (i.e. $p<0.01$), meaning that the probability of the actual impact of buying groups being 0 (i.e. no impact) is lower than 1%. This suggests that a high level of statistical confidence can be placed on this estimate.

[27]   Groceries market investigation, Final Report, paragraph 10.5.

[28]   Molina, Hugo, Buyer Alliances in Vertically Related Markets (September 12, 2019).

ANNEX A ADDITIONAL SENSITIVITY ANALYSIS

The sensitivity analyses confirm that buying group participation leads to lower resale price

A.1 We used econometric analysis to evaluate the impact of buying group participation on the resale price of products in Metro's portfolio. The baseline results suggest that overall resale price decreased by approximately 5% for products that were in scope of buying groups.

A.2 As discussed in paragraph 3.21, our baseline results were estimated based on two specifications: controlling for general inflation; and controlling for both general inflation and department specific inflation.

A.3 To test the robustness of the baseline results, we repeat the analysis described above with variations of the data. These include:

a. Using an alternative measure to identify the unit of observation (SKUs);

b. Estimating a within-country analysis by only using the French data;

c. Evaluating the impact of buying group participation for each department; and

d. Investigating the effect of buying groups 12 months after they began.

The sensitivity analyses confirm our previous finding that buying group participation leads to a decrease in resale prices. We find the impact to range between 4% to 7%.

The result is robust to using alternative measures when defining the unit of observations

A.4 The previous results were estimated using the raw data obtained directly from Metro's internal database. The granularity of this data is advantageous as it allows us to eliminate the impact from changes to products specification and package size. Such changes will be reflected in the name of SKUs and therefore treated as a different observation in the analysis.

A.5 However, we also understand that this raw data can be subject to a minor degree of inconsistency, notably in relation to article naming. Figure 9 below provides a few examples of this. While the names in both columns could be interpreted as referring to the same product, they are treated as distinct products in the baseline analysis. As such, this analysis is only looking at the resale price evolution of a sub-sample of articles, i.e. those for which the SKUs have not changed across the period that we use in our estimation.

Figure 9   Inconsistencies in SKU names

SKU names [1]	SKU names [2]
Airwaves black menth 10 drx30	Airwaves black menth 10 dr
16 bn chocolat x6 box	16 bn chocolat x6 assortiment
7up boite 33cl	7up reg 33cl vc

Source: Metro, Analysis Frontier Economics

A.6   To ensure that our results are robust, even when applying a less restrictive criteria on potential changes to the SKUs in the dataset, Metro conducted an extensive in-house data cleaning process which helped to significantly standardise the product names underlying specific SKUs over time. These measures included:

    a.   Removing the description of products containers e.g. PET, BT; or

    b.   Removing the description of package size e.g. 500ml, 50CL, 4*25

A.7   Figure 10 shows the results and we can see that the effect is still largely consistent with the baseline analysis above.

Figure 10   Sensitivity analysis using "clean" names

Log(Resale Price)	Specification (1)	Specification (2)
Buying Group indicator	-0.0707***	-0.0667***
	(0.000972)	(0.000972)
Control variables		
Year terms	Excluded	Included
Month terms	Excluded	Included
Year and month interaction	Included	Excluded
Department and year interaction	Excluded	Included
Observations	3,413,782	3,413,782
R-squared	0.003	0.020

Source: Metro, Analysis Frontier Economics

Note: Robust standard errors in parentheses

      *** $p<0.01$

Focusing solely on the French data further confirms our previous findings

A.8   Given that buying group status changes in France, we also want to test if the estimated buying group impact changes when we only use the French data. This is because there may be heterogeneity changes in inflation and trends that could have biased our results when we included the additional countries.

A.9   Figure 11 shows the results and we can see that the effect is still largely consistent with the baseline analysis above.

Figure 11   Sensitivity analysis using French data

Log(Resale Price)	Specification (1)	Specification (2)
Buying Group indicator	-0.0571***	-0.0460***
	(0.00104)	(0.000999)
Control variables		
Year terms	Excluded	Included
Month terms	Excluded	Included
Year and month interaction	Included	Excluded
Department and year interaction	Excluded	Included
Observations	1,081,288	1,081,288
R-squared	0.013	0.109

Source: Metro, Analysis Frontier Economics

Note: Robust standard errors in parentheses

            *** $p<0.01$

While the size of impact differs between departments, joining buying groups generally leads to lower resale price

A.10   Based on the above results, it is not possible to determine whether the effect of buying groups is consistent across departments, or whether a specific department is driving the overall effect of buying groups upon resale price. To investigate this further, we estimate the buying group coefficient for each department. The full specification of the model is detailed in Annex C.

A.11   Figure 12 shows the results of the department specific analysis. From this, we can see that buying group participation is associated with lower resale prices for most departments.

A.12   All departments, with the exception of Delicatessen and Edible Grocery show that buying groups are associated with decreases in resale prices. Furthermore, we note that the two positive effects found are not significant when department specific inflation is controlled for. This suggests that the positive effect identified in specification 3 is partly driven by changes in inflation for these departments, relative to overall inflation.

Figure 12   Sensitivity analysis estimating department specific impacts

Log(Price)	Specification (3)	Specification (4)
Buying Group indicator		
Bakery	-0.0309***	-0.0240***
	(0.00752)	(0.00764)
Beer	-0.251***	-0.197***
	(0.00500)	(0.00531)
Canned Goods	-0.0214***	-0.0290***
	(0.00302)	(0.00310)
Confectionary	-0.0417***	-0.0346***
	(0.00206)	(0.00221)
Dairy	-0.00595**	-0.0216***
	(0.00249)	(0.00265)
Deep frozen	-0.0590***	-0.0584***
	(0.00397)	(0.00426)
Delicatessen	0.0103*	0.00369
	(0.00532)	(0.00546)
Edible Grocery	-0.0105***	-0.0271***
	(0.00180)	(0.00187)
Hot Beverage	-0.0405***	-0.0446***
	(0.00481)	(0.00503)
Non Alcoholic Drinks	-0.350***	-0.256***
	(0.00298)	(0.00322)
Processed Meat	0.0301**	0.0213
	(0.0150)	(0.0149)
Spirits	-0.0376***	-0.0345***
	(0.00223)	(0.00240)
Control variables		
Year terms	Excluded	Included
Month terms	Excluded	Included
Year and month interaction	Included	Excluded
Department and year interaction	Excluded	Included
Observations	3,464,402	3,464,402
R-squared	0.007	0.023

Source: Metro, Analysis Frontier Economics

Note: Robust standard errors in parentheses
             *** p<0.01

We find an average decrease in retail prices of 5% per year when investigating the impact across two years

A.13   The results and analyses detailed above were all estimated based on the contemporaneous change of resale prices when SKUs join buying groups. However, we understand from Metro that buying groups could potentially take some time to be fully implemented. Consequently, it is plausible that the impact of buying group participation can only be observed fully a year later.

A.14 We investigate this further by including an additional variable that measures the change in resale price arising from SKUs joining buying groups in the previous year, see Annex C for details. The results are shown in Figure 13, and we can see that resale prices have decreased by an average of 5% per year, which is consistent with the baseline results.

A.15 The results also imply that most of the effect occurs in the year after a SKUs becomes included in the buying group, as the coefficients is much larger in the second year of products joining buying groups. This suggest that having at least two years of data is necessary for our results to be accurate and reliable.

Figure 13   Sensitivity analysis estimating lagged effects

Log(Resale Price)	Specification (1)	Specification (2)
Buying Group indicator		
Immediate effect	0.0239***	0.0152***
	(0.00135)	(0.00134)
After one year	-0.132***	-0.117***
	(0.00121)	(0.00121)
Average impact per year	-0.0541	-0.0509
Control variables		
Year terms	Excluded	Included
Month terms	Excluded	Included
Year and month interaction	Included	Excluded
Department and year interaction	Excluded	Included
Observations	1,884,380	1,884,380
R-squared	0.009	0.042

Source: Metro, Analysis Frontier Economics

Note: Robust standard errors in parentheses

           *** p<0.01

ANNEX B COUNTRY SELECTION PROCESS

B.1 As discussed in the main report, Metro has participated in national buying groups in a number of European countries since 2016, often joining procurement activities with a major retailer. Metro has provided resale price information across six countries, with half of them (Poland, France and Romania) being countries where Metro has participated in buying groups.

B.2 The econometric analysis relies to an important extent on having a sample of products that can be observed for a period of time *outside* a buying group and then be observed *inside* the buying group (a before and after analysis). In order to correctly estimate the impact of buying groups on resale prices, it is therefore important that our data satisfies the following criteria for each country where there was a buying group:

   a. a sufficiently large proportion of SKUs change their buying group status and remain in buying groups; and

   b. a sufficiently large number of observations are observed in buying groups over an extended period of time.

   We investigate each of these factors in turn and find that whilst the data for France is suitable for analysis, the Polish and Romanian data do not satisfy these criteria.

B.3 While the buying group variable in our dataset is binary, the buying group status of a SKUs is not. This is because SKUs can be newly introduced *after* the introduction of buying groups. Furthermore, products can also leave buying groups, for example when buying groups are terminated, or when certain suppliers and/or products become excluded from buying groups.

B.4 As discussed in paragraph A.15, buying groups can take up to a year to be "fully" implemented.

B.5 Therefore, while buying groups may be set up in year T, the full effect is only seen in year T+1. In practise, this implies that we need a large number of relevant observations that are in buying groups between the 2017 and 2018 since buying groups were only introduced in 2016.

B.6 While there are significant number of observations that are in scope of buying groups every year in France, this was not the case for the Polish and Romanian data - either because the number of observations was very low across the whole period or because the number of observations varied widely during the whole period. Both lead to unreliable samples for our analysis and thus to the conclusion that the data for Romania and Poland was not suitable for our analysis.

ANNEX C   TECHNICAL APPENDIX

Data and summary statistics

C.1   The dataset contains 3,464,402 monthly resale price observations for the period January 2013 to December 2018. Price are collected on 164,573 unique SKUs, with 50 per cent of products being observed for at least 16 months[29].

C.2   While the dataset does contain observations from January 2013 to December 2018, the majority of observations cover the period from January 2014 onwards. From 2014 to 2018, the annual sample size remains relatively constant, albeit with a slight growth. This is consistent with a sample which captures all SKUs offered for sale.

Figure 14   Sample size by year

Year	Observations	Distribution
2013	244,887	7%
2014	615,305	18%
2015	637,656	18%
2016	641,844	19%
2017	648,753	19%
2018	675,957	20%
Total	3,464,402	100%

Source: Metro, Analysis Frontier Economics

C.3   The sample used for this analysis does not have one single date in which SKUs joined buying groups. Rather, the period in which a SKU joins a buying group, if it does at all, varies by product and supplier. Furthermore, SKUs which may not have previously been offered for sale may be now be included and are part of a buying group. As shown in Figure 15, the periods which SKUs join a buying group ranges from 2016 to 2018, with the majority of SKUs joining in 2016.

Figure 15   Buying group participation of SKUs in France

Year joined buying group	SKUs	Distribution
Never Joined	[redacted]	70-86%
Joined in 2016	[redacted]	10-20%
Joined in 2017	[redacted]	2-5%
Joined in 2018	[redacted]	2-5%

Source: Metro, Analysis Frontier Economics
Note: Sample includes SKUs in buying groups newly offered for sale.

C.4   Figure 16 shows the distributive statistics of resale prices across the entire sample. Due to currency differences, we have reported separate summary statistics for each country.

---

[29]   As SKUs are periodically introduced and removed from sale, this sample is not a balanced panel

Figure 16   Descriptive statistics of resale prices

Country	Currency	Mean	Median	Standard Deviation
Czech	CZK	118	36	447
France	EUR	10	6	26
Italy	EUR	7	4	10
Spain	EUR	6	3	13

Source: Metro, Analysis Frontier Economics

C.5   Figure17 below shows the number and proportion of SKUs that are in scope of buying groups and those not in scope for each department. For the smaller sample of SKUs that were available during the buying group period (2016 -2018), and could therefore theoretically be included in a buying group, we find that, on average across departments, 23% of SKUs were part of a buying group at some point during this period. However, this is not homogenous. Some departments, notably Hot beverages and, Confectionary and snacks have a higher concentration of 36% and more.

Figure 17   SKUs in and out in each department in France

Department	Not in buying group	In buying group	Total SKUs	% In
Bakery	[redacted]	[redacted]	[redacted]	15-30%
Beer	[redacted]	[redacted]	[redacted]	15-30%
Canned goods	[redacted]	[redacted]	[redacted]	15-30%
Confectionary and snacks	[redacted]	[redacted]	[redacted]	25-40%
Dairy	[redacted]	[redacted]	[redacted]	15-30%
Deep frozen	[redacted]	[redacted]	[redacted]	15-30%
Delicatessen	[redacted]	[redacted]	[redacted]	10-20%
Edible grocery	[redacted]	[redacted]	[redacted]	15-30%
Hot beverages	[redacted]	[redacted]	[redacted]	25-45%
Non-alcoholic drinks	[redacted]	[redacted]	[redacted]	25-45%
Processed meat	[redacted]	[redacted]	[redacted]	1-5%
Spirits	[redacted]	[redacted]	[redacted]	20-40%

Source: Metro, Analysis Frontier Economics

Regression model

C.6   As discussed, a fixed effects model has been used to identify the change in resale prices associated with SKUs joining buying groups.

C.7   In the analysis, the sampling units (SKUs), denoted using *i* are defined as unique combinations of:

- Country
- Article Name
- Supplier Name

C.8 For each sampling unit (SKU), *i* denoted 1 to n, resale prices are observed over time (monthly), with each time period *t*. denoted 1 to T

C.9 Conceptually, fixed effects models can be described as:

$$Y_{it} = \beta_1 X_{1,it} + \cdots + \beta_k X_{k,it} + \alpha_i + u_{it}$$

With $i = 1, \cdots, n$ and $t = 1, \cdots, T$

Where α_i is the sampling unit (SKUs) specific intercept, which captures heterogeneities across SKUs.

Or equivalently:

$$Y_{it} - \overline{Y_i} = \beta_1 (X_{1,it} - \overline{X_{1,i}}) + \cdots \beta_k (X_{k,it} - \overline{X_{k,t}}) + (u_{it} - \overline{u_i})$$

C.10 The advantage of a fixed effects model as distinct from an ordinary least squares model is that any time invariant unobserved heterogeneity can be controlled for. That is, any differences between SKUs which do not vary over time are implicitly controlled for (through the α_i term). As described in the main body of the report, this allows us to look at changes in the evolution of resale prices over time, due to changes in buying group status.

C.11 The fixed effects models we estimate use the resale prices of the same goods, before and after they join buying groups to estimate the percentage impact of buying group on resale prices, as measured by the buying group coefficient. In other words, the models track the monthly resale prices of the same SKUs across time and estimate the impact of buying group participation on the evolution of these monthly prices.

C.12 The buying group coefficient is estimated in these models by comparing the average percentage resale price change of SKUs joining buying groups to the average percentage price change of SKUs which have not joined buying groups. The identification assumption is that SKUs which joined buying groups would have experienced price changes equivalent to those products outside of buying groups, had they not joined.

C.13 Note that the impact of buying groups is estimated as the "average treatment effect on the treated". It is unclear as to whether these results are generalisable to "average treatment effects" for all SKUs. That is, the impact of joining a buying group may be different if another group of SKUs were to join buying group.

Model specifications

C.14 All models are primarily interested in identifying the change in resale prices associated with SKUs joining buying groups for all SKUs joining buying groups. As such, the coefficient of interest is the *percentage change* in prices for products entering buying groups, rather than absolute change in currency terms.

C.15 In order to enable this interpretation, all specifications express resale prices in log terms. That is, Y_{it} is $\ln(price_{it})$. As such, the buying group regression coefficients

in the models outlined below is "the impact of joining a buying group is associated with an X% decrease in resale prices".[30]

C.16   In model specification 1, time and month dummy variables are constructed and added to the model. These capture general inflation of all goods, regardless of whether they are in a buying group. This allows the buying group coefficient to be interpreted as the percentage change in resale prices for products in buying groups, after controlling for inflation.

Figure 18   Fixed effects model controlling for general inflation

Specification 1:

$$\ln(price)_{it} - \overline{\ln(price)_i} = \left(Buying\ Group_{it} - \overline{Buying\ Group_i} \right)\beta_0 +$$

Dependant variable

Difference in logs is analogous to change in prices for each SKU over time

$$\left(Feb\ 2013_{it} - \overline{Feb\ 2013_i} \right)\beta_1 +$$

...

$$\left(Dec\ 2018_{it} - \overline{Dec\ 2018_i} \right)\beta_{71}$$

Coefficient of interest: Percentage change in resale prices for SKUs joining buying group

Dummy variables: Year and month interaction terms (Base: Jan 2013)

Controls for general price inflation by month for all years

Source: Frontier illustration

C.17   Model specification 2 controls for department specific inflation (rather than all products) and accounts for seasonal price variation (by including monthly dummies). Additionally, inflation at a yearly level is also accounted for through the inclusion of year dummy variables.

Figure 19   Fixed effects model controlling for general and department inflation

Specification 2:

$$\ln(price)_{it} - \overline{\ln(price)_i} = \left(Buying\ Group_{it} - \overline{Buying\ Group_i} \right)\beta_0 +$$

Dependant variable

Difference in logs is analogous to change in prices for each article over time

$$\left(2014_{it} - \overline{2014_i} \right)\beta_2 +$$

...

$$\left(2018_{it} - \overline{2018_i} \right)\beta_5 +$$

$$\left(Beer\ 2013_{it} - \overline{Beer\ 2013_i} \right)\beta_6 +$$

...

$$\left(Spirits\ 2018_{it} - \overline{Spirits\ 2018_i} \right)\beta_{71} +$$

$$\left(Febuary_{it} - \overline{Febuary_i} \right)\beta_{72} +$$

...

$$\left(December_{it} - \overline{December_i} \right)\beta_{82}$$

Coefficient of interest: Percentage change in resale prices for SKUs joining buying group

Dummy variables: Year (Base: 2013)
Controls for general price inflation

Dummy variables: Department interacted with year (Base: Bakery each year)
Controls for department specific price inflation

Dummy variables: Month (Base: January)
Controls for seasonality of prices

Source: Frontier illustration

C.18   In addition, to investigate how the effect differs between departments, a department-specific specification was also estimated in model specification 3 and 4. This is achieved by interacting the buying group coefficient with a dummy variable for each department.

---

[30] As the difference of two natural logarithms closely approximates percentage changes for small differences.

Figure 2014 Fixed effects model with department specific coefficients controlling for general inflation

Specification 3:

$$\underbrace{\ln(price)_{it} - \overline{\ln(price)}_i}_{\text{Dependant variable}} = \left([Beer \times Buying\ Group]_{it} - \overline{[Beer \times Buying\ Group]_i}\right)\beta_0 +$$

Difference in logs is analogous to change in prices for each article over time

$$\dots$$

$$\left([Spirits \times Buying\ Group]_{it} - \overline{[Spirits \times Buying\ Group]_i}\right)\beta_{10} +$$

$$\left(Feb\ 2013_{it} - \overline{Feb\ 2013}_i\right)\beta_{11} +$$

$$\dots$$

$$\left(Dec\ 2018_{it} - \overline{Dec\ 2018}_i\right)\beta_{81}$$

Coefficient of interest: Percentage change in resale prices for SKUs joining buying group in a department

Dummy variables: Year and month interaction terms (Base: Jan 2013)

Controls for general price inflation by month for all years

Source: Frontier illustration

Figure 21 Fixed effects model with department specific coefficients controlling for general and department inflation

Specification 4:

$$\underbrace{\ln(price)_{it} - \overline{\ln(price)}_i}_{\text{Dependant variable}} = \left([Beer \times Buying\ Group]_{it} - \overline{[Beer \times Buying\ Group]_i}\right)\beta_0 +$$

Difference in logs is analogous to change in prices for each article over time

$$\dots$$

$$\left([Spirits \times Buying\ Group]_{it} - \overline{[Spirits \times Buying\ Group]_i}\right)\beta_{10} +$$

$$\left(2014_{it} - \overline{2014}_i\right)\beta_{11} +$$

$$\dots$$

$$\left(2018_{it} - \overline{2018}_i\right)\beta_{15} +$$

$$\left(Beer\ 2013_{it} - \overline{Beer\ 2013}_i\right)\beta_{16} +$$

$$\dots$$

$$\left(Spirits\ 2018_{it} - \overline{Spirits\ 2018}_i\right)\beta_{81} +$$

$$\left(Febuary_{it} - \overline{Febuary}_i\right)\beta_{82} +$$

$$\dots$$

$$\left(December_{it} - \overline{December}_i\right)\beta_{92} +$$

Coefficient of interest: Percentage change in resale prices for SKUs joining buying group in a department

Dummy variables: Year (Base: 2013) Controls for general price inflation

Dummy variables: Department interacted with year (Base: Bakery each year) Controls for department specific price inflation

Dummy variables: Month (Base: January) Controls for seasonality of prices

Source: Frontier illustration

C.19 Finally, to evaluate the impact of buying group participation in the contemporaneous year and in the year after SKUs join buying groups, we include an additional lagged term that evaluate changes in price due to previous buying group status. This is detailed in model specification 5 and 6.

Figure 22 Fixed effects model with lagged coefficients controlling for general inflation

Specification 5:

$$\underbrace{\ln(price)_{it} - \overline{\ln(price)}_i}_{\text{Dependant variable}} = \left(Buying\ Group_{it} - \overline{Buying\ Group}_i\right)\beta_0 +$$

Difference in logs is analogous to change in prices for each SKU over time

$$\left(Buying\ Group_{it-12} - \overline{Buying\ Group}_i\right)\beta_1 +$$

$$\left(Feb\ 2013_{it} - \overline{Feb\ 2013}_i\right)\beta_2 +$$

$$\dots$$

$$\left(Dec\ 2018_{it} - \overline{Dec\ 2018}_i\right)\beta_{72}$$

Coefficient of interest: Percentage change in contemporaneous and next year resale prices for SKUs joining buying group

Dummy variables: Year and month interaction terms (Base: Jan 2013) Controls for general price inflation by month for all years

Source: Frontier illustration

Figure 23   Fixed effects model with lagged coefficients controlling for general and department inflation

Specification 6:

$$\ln(price)_{it} - \overline{\ln(price)_i} = \left(Buying\ Group_{it} - \overline{Buying\ Group_i}\right)\beta_0 +$$

Dependant variable

Difference in logs is analogous to change in prices for each article over time

$$\left(Buying\ Group_{it-12} - \overline{Buying\ Group_i}\right)\beta_1 +$$

$$\left(2014_{it} - \overline{2014_i}\right)\beta_2 +$$

$$\dots$$

$$\left(2018_{it} - \overline{2018_i}\right)\beta_6 +$$

$$\left(Beer\ 2013_{it} - \overline{Beer\ 2013_i}\right)\beta_7 +$$

$$\dots$$

$$\left(Spirits\ 2018_{it} - \overline{Spirits\ 2018_i}\right)\beta_{72} +$$

$$\left(Febuary_{it} - \overline{Febuary_i}\right)\beta_{73} +$$

$$\dots$$

$$\left(December_{it} - \overline{December_i}\right)\beta_{83}$$

Coefficient of interest:
Percentage change in contemporaneous and next year resale prices for SKUs joining buying group

Dummy variables: Year (Base: 2013)
Controls for general price inflation

Dummy variables: Department interacted with year (Base: Bakery each year)

Controls for department specific price inflation

Dummy variables: Month (Base: January)
Controls for seasonality of prices

Source: Frontier illustration