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Assessing the Efficacy of Structural Merger Remedies

Title:
**Assessing the Efficacy of Structural Merger Remedies: Choosing
Between Theories of Harm?**

Stephen Davies & Matthew Olczak

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Contact details:
Stephen Davies, Centre for Competition Policy, University of East Anglia,
Norwich NR4 7TJ, UK. Corresponding author. Tel.: +44 1603592715.
s.w.davies@uea.ac.uk
Matthew Olczak, Economics and Strategy Group, Aston Business School,
Aston University, Birmingham, B4 7ET, UK.
m.olczak@aston.ac.uk

Abstract

This paper shows that many structural remedies in a sample of European merger cases result in market structures which would probably not be cleared by the Competition Authority (CA) if they were the result of merger (rather than remedy). This is explained by the fact that the CA's objective through remedy is to restore pre-merger competition, but markets are often highly concentrated even before merger. If so, the CA must often choose between clearing an 'uncompetitive' merger, or applying an unsatisfactory remedy. Here, the CA appears reluctant to intervene against coordinated effects, if doing so enhances a leader's dominance.

1   Introduction

When a competition authority (CA) anticipates that a proposed merger will lead to competitive harm, it is required to intervene, either by prohibiting the merger outright or, more commonly, requiring a merger remedy. Typically remedies are structural, requiring the divestment of certain assets[1]. This paper contributes to a growing literature, devoted to assessing ex-post the effectiveness of structural remedies.

The existing economic and legal literature is summarised by Davies & Lyons (2007, section 2.1). Widely discussed criteria for defining a 'good' remedy include: restoration of competition, minimisation of administrative costs, minimising the loss of merger-induced efficiencies, and efficient reallocation of divested assets (Lévêque, 2001; Balto, 2001). To date, the two most comprehensive empirical studies are by the Federal Trade Commission (FTC, 1999) and the European Commission (EC, 2005): both reviews evaluated efficacy largely in terms of the subsequent viability of the divested assets[2].

This paper differs from the FTC and EC studies. Rather than focussing, as they do, on the viability of divested assets, it examines the implied structures of markets, post-remedy. For a sample of 62 European Commission (EC) merger remedy cases, we identify the impact of divestiture remedies on

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[1] The EC's Notice on Remedies states a preference for remedies involving divestiture of a stand-alone business (Monti, 2003), and its evaluation study (2005) reveals that most remedies are indeed structural: 83 of the 96 remedies in its sample.
[2] The FTC reports that only 75% of divestitures in its sample were successful, in the sense that the acquirer was still in the market one year after, and was independent from the seller. The EC reports a higher success rate using a similar criterion (94% still in business three to five years later), but employing a wider criterion, it assessed only 57% of remedies as successful. See Papandropoulos and Tajana (2006) and Lévêque (2007) for discussion of the EC study, and Baer and Redcay (2003) on the FTC study.

market structure. Very often, the remedy returns the market to exactly its pre-merger structure. In this sense, the remedy succeeds in 'restoring competition', which is the stated objective of most CAs.

These post-remedy structures are then compared with the counterfactual structures had the merger been cleared without remedies. We also conduct an analogous comparison for a set of markets in which the merger was cleared without remedy: in that case, comparing the post-merger structure with what it would have been had remedies restored structure to its pre-merger status quo. In order to evaluate these comparisons, we employ a previously estimated model (Davies et al., 2010) which was used to explain the Commission's initial merger decisions on whether or not to intervene, and, if so, under which theory of harm.

We find that nearly half of post-remedy market structures would have been intervened had they arisen as a result of merger. In almost all cases, this is because the pre-merger structure was already highly concentrated, and this constrained the EC's ability to achieve, by remedy, a new structure free of competitive concern. We also find a sub-set where the EC is confronted by a difficult choice between single and collective dominance[3]. We find that the EC reveals a systematic preference: it is more likely to accept a merger which creates a larger #2 firm, in spite of an increased chance of collective dominance, if the alternative by remedy is a larger singly dominant #1 firm.

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[3] Henceforward we employ single and collective dominance – the prevailing EC terminology up to 2004 – as synonyms for unilateral and coordinated effects respectively.

2 A Sample of EC Mergers and Structural Remedies

The sample comprises 62 EU mergers over the period 1990-mid 2004 (i.e. up to the revision of the EC Merger Regulation), in which there is strong textual evidence in its decision report that the Commission seriously considered collective dominance as a potential outcome. Thus the sample is deliberately not random, but includes all mergers where single and collective dominance were considered in depth and simultaneously within the same merger. This is ideal, given our present interest in identifying how the Commission chooses *between* theories of harm.

Most of these mergers are multi-market, with the individual market defined typically at the Member State level, and most also involve a number of different product markets. In total they account for 386 different markets. Remedies are rarely required in all markets covered by the same merger (except in the extreme case of outright prohibition), and it is common to find non-interventions and interventions, and different types of intervention for different markets, in the same merger. In total, the Commission actually intervened in only 118 markets (44 for collective dominance and 74 for single dominance); in the remaining 268, no intervention was deemed necessary.

Structural remedies were applied in 112 markets[4]. The first part of Table 1 (POST-MERGER, full sample) shows the descriptive statistics on the concentration of these markets, and the market shares and rank of the merged firms. This part of the Table relates to the counterfactual: what *would*

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[4] Behavioural remedies were agreed in the other six intervened markets and these are not analysed here.

have happened, had the mergers been cleared without remedy[5]. As can be seen, they would all have been very concentrated, with the mean 2-firm concentration ratio ($CR2$) at 79%; on average, the merged firm would have had a market share (S_{me}) of 57% and in 104 of the 112 markets, it would have been the largest firm (ME=#1).

Table 1 Market structure of the remedied markets

		Frequency	Mean	Min	Max	Std Dev
POST-MERGER Structure						
Full sample N=112	$CR2$		79	30	100	15
	S_{me}		57	20	100	19
	ME=#1	104				
Reduced sample N=66	$CR2$		79	55	100	14
	S_{me}		54	20	95	18
	ME=#1	59				
POST-REMEDY Structure						
Reduced sample N=66	$CR2$		69	40	98	14
	S_{me}		37	15	85	11
	ME=#1	47				

Notes
All variables, except ME=#1, measured as percentages. ME=#1 indicates the merged entity is the largest in the market.
Full sample = all markets in which structural remedies imposed
Reduced sample = all markets in which structural remedies imposed, and both scale of divested assets and identity of purchaser known

For each of these 112 markets, we have sought to identify two pieces of information: (i) the scale of divested assets and (ii) the identity of the purchasers.   Our main source is the EC's merger decision reports,

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[5] Throughout the paper, all estimates of post-merger shares are computed by simply summing the pre-merger shares of the merging parties.

supplemented with information from other sources, including company reports and business news websites.

In the event, we were unable to quantify the scale of the divested assets in 28 of the markets – as this was this unclear from the EC's own decision report, and our own intensive searches failed to unearth reliable estimates. Moreover, amongst the 84 markets where scale could be identified, there are a further 18 where our searches were unable to identify the purchaser of the assets. This leaves a reduced sample of 66 markets for which we have the required information on divestments.

The second part of Table 1 repeats the same summary statistics as above for this reduced sample, still related to the hypothetical post-merger outcomes. As can be seen, the sample statistics are very similar to those for the full sample.

The third part of the Table, relates to the post-remedy outcomes[6] for this reduced sample. On average, divestment reduces CR2 by 10 points, and the share of the merged firm by 17 points – typically, the scale of divestment is by no means trivial, and in 12 cases this prevents the merged firm from becoming #1.

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[6] Post-remedy shares are computed by subtracting the shares of divested assets from the above calculated post-merger shares.

Table 2 The structural remedies: by size & purchaser of divested assets

	Total	Scale of divested assets (D) relative to scales of smaller and larger merging parties (S_S & S_L)			
		$D < S_S$	$D = S_S$	$S_S < D < D_L$	$D = S_L$
Total	112				
Scale of divested assets known	84	9	58	4	13
Scale of assets and identity of purchaser known	66	9	50	4	3
Purchaser = entrant	49	3	41	2	3

For the 84 markets where the scale of divested assets is known, Table 2 first expresses the scale of assets (D) relative to the pre-merger market shares of the parties to the merger. Recall that the *scale* of divested assets is known in 84 cases. In 71 of these, divested assets were exactly equal to the market share of one of the parties (usually the smaller one (58))[7]. In the 9(4) other cases, divested assets were smaller (larger) than the size of the smaller party. This leads to:

> **FINDING 1a** *The 'typical' divestment remedy (in 71/84=85% of cases) returns the market share of the merged entity to the pre-merger share of the one of the parties (usually the larger one.)*

In the remainder of the Table, we focus on the 66 markets where we have been able to identify the purchaser, as well as the scale of the asset. In every case, there was only a single purchaser, and in only 17 was this firm already present in the market; in the other 49, it was an entrant[8]. In these 49 cases, it

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[7] These include the markets in four mergers which were prohibited outright, and two which were eventually abandoned by the parties. In these cases, we have treated markets as being returned to their pre-merger status quo. Similarly, where a remedy involves divestment of a share in a Joint Venture, this is arithmetically equivalent to a return to the status quo.

[8] 'Entrant' denotes a new player in the specific country-product market. However, these firms are very often already present in the same product market in other countries and/or present in

follows that structure post-remedy will be very similar to pre-merger structure because the 'exiting' merger party is simply replaced by an entrant. Indeed, in the special case, where the scale of divested assets is identical to the size of one of the merging parties and the purchaser is an entrant, the *immediate* effect of the transfer is to render the two market structures identical[9]:

> **FINDING 1b.**   *The most common outcome of divestment remedies (in 44/66=67% of the markets for which we have sufficient information) is to return the market exactly to its pre-merger structure.*

If we are prepared to interpret an unchanged size distribution as evidence of unchanged competition, these findings suggest that the EC practices its remedy policy in a way which is consistent with the broad objective as set out in its published guidelines:

> "Where a concentration raises competition concerns…, the parties may seek to modify the concentration in order to resolve the competition concerns"[10]

The US guidelines also include a similar objective:

> "Although the remedy should always be sufficient to redress the antitrust violation, the purpose of a remedy is not to enhance premerger competition but to restore it."[11] [12]

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other products markets within the same broad product category in the same, or other, countries.

[9] By 'immediate' we refer to only the effect of the transfer in ownership of divested assets. This abstracts, of course, from any subsequent developments post-remedy, such as rationalisation by the buyer, or contraction due to non-viability. We have no information on these for the current sample, but return to this general issue at the end of section 4.

[10] "Commission notice on remedies acceptable under Council Regulation (EC) No 139/2004 and under Commission Regulation (EC) No 802/2004" (2008, para.5), Retrieved July 8, 2010, from http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2008:267:0001:0027:EN:PDF

[11] US DoJ, Antitrust Division Policy Guide to Merger Remedies. Retrieved July 8, 2010, from http://www.justice.gov/atr/public/guidelines/205108.pdf, p.4.

[12] The UK Competition Commission's guidelines (2008, p.15) also express a similar objective.

To investigate the possibility of selection bias in these two findings, we return to the 46 markets excluded from the reduced sample because the scale of divestment and/or identity of purchaser are unknown. We find no significant difference between them and the included markets in terms of post-merger mean concentration. However, there is a significant difference in the EC's declared theory of harm: single dominance was cited for 89% of the excluded markets, as opposed to 65% of the included markets. There is no obvious *a priori* explanation for this, but we return to the implications in the final section.

This means that we should not rule out the possibility of a selection bias in the magnitudes of the two sample percentages in Findings 1a and 1b [13]. However, for present purposes, the exact magnitudes are relatively unimportant, since all we require is the conclusion that it is neither uncommon, nor unexpected, that merger remedies will restore a market to its pre-merger structure. Corroboration that remedies typically do restore pre-merger structure is provided from a completely different EC sample by Davies and Lyons (2007, p.243). They refer to this outcome as "prohibition within the market" since, even if the merger is not prohibited in all markets, such a remedy in a particular market implies a return to the pre-merger structure[14].

3. Assessing market structures post-remedy

Against this background, we now turn to two further questions. It appears that remedies often restore the structure of the market to its pre-merger state, but

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[13] For example, this would occur if there was a difference between single and collective dominance cases in the EC's tendency to exactly remove overlap.
[14] In principle, prohibition within the market need not return structure to its pre-merger state. As shown by Vergé (2009, pp.12-15), the remedy can reduce concentration if divested assets are sold to more than one purchaser, but, in all cases here, there was only a single buyer.

should this always necessarily be preferred to the structure which would result from simply clearing the merger, and, how does EC choose between the two?

3(i) Methodology for assessing market structures

To answer these questions, we need some means of assessing the 'competitiveness' of different market structures. For this purpose, we return to the econometric model estimated by the authors in a previous paper (2010). The objective there was to identify the implicit model of market structure used by the European Commission, when deciding whether mergers are likely to have coordinated effects[15]. It was estimated on the same sample of 62 mergers covering 386 markets as described above, with the individual market within each merger used as the unit of observation.

The model draws explicitly on a reading of the EC's own published merger guidelines, which explain that the likelihood of competitive harm depends upon: i) **market shares and concentration** levels (including asymmetries), and ii) a **checklist of other market conditions** (barriers to entry, absence of countervailing buyer power, price transparency and capacity). Davies et al. (2010) argue that the EC interprets this checklist as a series of necessary conditions which must be satisfied if it is to intervene. This is confirmed by a detailed reading of the EC's decision documents which reveal no cases where intervention occurs in spite of one or more checklist factors *not* being satisfied. This obviates the need to measure or proxy concepts such as price transparency or barriers to entry which are inherently unmeasurable in any

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[15] That paper builds on the sizeable empirical literature which attempts to explain CA merger decisions, including most recently: Bergman et al. (2005) for the EU, Coate (2005) and Coate and Ulrick (2006, 2009) for the US, and Bergman et al. (2009) comparing the EU and the US.

objective manner. There are 154 markets for which the EC reports that no intervention was required because the checklist was not satisfied, and these are excluded from estimation. In the remaining 232, with the checklist satisfied (in the eyes of the EC), the theory of harm (if any) then depends on the configuration of market shares.

A multinomial logit model is estimated to predict the Commission's decision for each of the 232 markets in terms of market structure. Three outcomes are possible: Collective Dominance (CD), Single Dominance (SD) or Non-Intervention (NI). The Commission's reports always set out its reasons for intervention in terms of either collective or single dominance: as explained in section 2, it found CD and SD in 44 and 74 markets respectively, the remaining markets were not intervened. Nearly all the markets would have had no more than two or (much less frequently) three major players[16] post-merger. With only one exception, the Commission never identified collective dominance with a market of more than two major firms. Therefore two simple measures of structure are used as explanatory variables, based solely on the prospective post-merger shares of the largest two firms (S1 and S2): SUM = S1+S2 and RATIO =S2/S1. SUM is a simple measure of concentration and RATIO is a measure of size asymmetry between them[17].

Table 3 reports the results: 81% of the model's predictions are correct, and both SUM and RATIO are strongly significant at the 99% level for both SD and

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[16] For example, defining a 'significant' market share arbitrarily as no less than 15%, there would have been only 1 or 2 significant players post-merger in 79% of markets, and 3 major players in another 19%.
[17] Experiments showed that no other vector of market shares or concentration achieved a better fit than this parsimonious form.

CD. Estimated coefficients have the expected signs, indicating that intervention is more likely in concentrated markets (higher SUM) and, for CD, in symmetric markets (high RATIO) but for SD in asymmetric markets (low RATIO).

Table 3 Explaining EC Merger Decisions (Davies et al., 2010, Table 2)

SD	
SUM	6.355*** (1.217)
RATIO	-6.188*** (1.284)
Constant	-1.4390** (0.605)
CD	
SUM	10.052*** (2.080)
RATIO	7.382*** (1.979)
Constant	-13.899*** (1.963)
N	232
Pseudo R^2	0.454
Log-L	-123.627
Wald Chi^2	110.99***
Correct predictions (%):	
ALL	81
SD	81
CD	83
NI	80

***Significantly different from 0 at 1% level, ** significantly different from 0 at 5% level. Standard errors in parenthesis. Equations are estimated with observations clustered by merger.

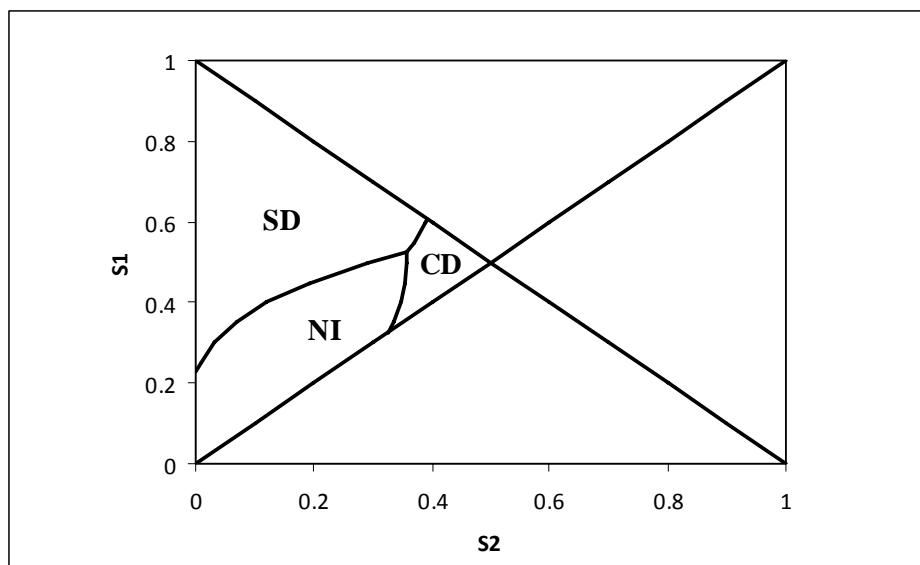**Figure 1 Predicted theories of harm as revealed in EC merger decisions**

Figure 1 presents a graphical depiction of the results. For any given (S1, S2) pair it shows the outcome with the highest predicted probability (recalling that this is conditional on the checklist of other factors having been satisfied.)

3(ii) Assessing post-remedy structures

Since this model achieves a high predictive power, we interpret it as a reasonably accurate representation of how the EC assesses prospective post-merger market structures. By now using it to assess the remedies, where imposed, we follow Motta's suggestion (2004, p.268), that [18]:

> "evaluation of merger remedies should follow the same twofold test used in merger analysis, that is the evaluation of unilateral effects and pro-collusive effects. Remedies should be accepted, and the merger proposal cleared, only if both tests are satisfied."

We now refer to a structure (S1, S2 pair) as

- **'uncompetitive'** if it is located in the SD or CD regions, or

- **'competitive'**, if otherwise in the NI region.

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[18] In the recent theoretical literature, Vergé (2009) also assesses the competitive efficiency of remedies by treating their outcome as if the result of a new merger.

The term 'uncompetitive' here is used largely for expositional convenience, and it is clearly very context-specific – an 'uncompetitive' market is one in which the structure would typically attract EC intervention if resulting from a merger – given that the other market characteristics such as entry barriers are also conducive to the exercise of market power. This should not be taken to imply that market power can always simply be imputed from market shares, nor does it deny that the CA might often employ data on shares as proxies for underlying factors such as closeness of substitutes and the underlying causes of asymmetry. It simply captures, fairly accurately, the implicit reduced form 'model' that the EC reveals in its decision making.

Consider first, Table 4, part (a), which reports the results of applying this model to estimates of S1 and S2 in each of the 66 markets which were remedied, to predict 'competitiveness' under three scenarios. In each case, it shows the outcome with the highest predicted probability according to the model. REMEDY is based on the post-remedy market structure (assuming that the size of the divested asset remains unchanged following the transfer of ownership.) MERGER is a counterfactual, based on the structure which would have resulted had the merger been cleared (assuming analogously that the market share of the merged entity would be the sum of the pre-merger shares of the merging parties.) For comparative purposes the actual PRE-MERGER structure is also computed.

The MERGER column confirms that, without remedies, 75% (=49/66) of markets would have been 'uncompetitive' following merger. The REMEDY column reveals a more surprising result:

> **FINDING 2** *Nearly half (47%=31/66) of all divestment remedies result in 'uncompetitive' structures, i.e. structures which the Commission would have sought to remedy (according to our model) had they been the result of a merger.*

At least part of the explanation for this is revealed in the PRE-MERGER column:

> **FINDING 3** *Even before merger, 39%(=26/66) of these markets involved 'uncompetitive' market structures.*

The implication of Findings 2 and 3 taken together is as follows. Many markets are 'uncompetitive' pre-merger, and typically remedies can at most only return the market to that pre-merger structure. Therefore, remedies will often result in a structure which remains 'uncompetitive' – in the sense that the EC would typically require a remedy, had it been the result of a merger. As such, Motta's suggestion, quoted earlier, that remedies should be accepted only if they result in a market free of competitive concerns, may be setting an unrealistic target in some cases (those mergers where *no* feasible remedy could lead to a market structure free of concern.)

Table 4: Market structures classified according to Figure 1

	PRE-MERGER	MERGER	REMEDY
(a) Remedied Markets (66)			
Uncompetitive	26	49	31
Competitive	40	17	35
(b) Cleared markets (89)			
Uncompetitive	13	16	-
Competitive	76	73	-

3(iii) Assessing pre-merger structures in non-intervened markets

Part (b) of the Table examines the opposite scenario by considering those sample markets where the EC chose *not* to intervene – are some of these markets cleared in spite of an implied 'uncompetitive' merger, because there was no practicable possibility of removing the problem by remedy?

There are 114 sample markets in which the EC chose not to intervene. We have sufficient data on the pre-merger values of S1 and S2 for 89[19]. In the majority of these (73), the clearance is uncontentious because the markets were 'competitive' even following the merger, but in 16 others the merger resulted in an 'uncompetitive' structure, i.e. one in which an intervention would have been expected (according to the model.) Significantly, in 13 of these, the pre-merger structure was also uncompetitive, and this certainly suggests the opposite scenario to the above - sometimes the EC prefers *not* to intervene in an uncompetitive merger because there is no feasible remedy which can lead to a competitive structure.

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[19] In the 25 others, the decision report records only the combined post-merger share of the merged firm.

4. Choosing Between Anticompetitive Structures

Given then that there will be cases where the Commission is faced by a choice between clearing and remedying mergers, where neither option will lead to a market structure free of competition doubts, we now explore the apparent basis on which it makes that choice in this sample.

In particular, we are interested in the possibility that this may sometimes involve a choice between alternative theories of harm. This responds to a suggestion by Motta et al. (2003) that, because the EC typically strives to ensure that remedies secure a viable competitor to the merged firm (in order to avoid single dominance), it might have sometimes so enhanced symmetry in market shares as to have increased the chance of collective dominance post-remedy.

This tension is also implicit in Compte et al.'s (2002) critique of the EC decision in the Nestle/Perrier merger of 1992. Applying a theoretical model of competition between asymmetrically capacity-constrained oligopolists to that case, they argue that the EC's chosen remedy, divesting some assets to a major rival, significantly increased the chances of coordinated effects, precisely because it reduced asymmetry. Allowing the merger without remedy would have been preferable.

To identify how commonly such a choice may occur in the present sample, Table 5 now focuses on a sub-set of the sample markets: those in which

structure is 'uncompetitive', both pre- and post-merger. Here, we employ the pre-merger structure as indicative of the scope for practicable remedies. This can be thought of as an 'upper bound'[20]- the maximum that might be achieved by remedy – and recalling that remedies do typically return the market to this upper bound (Finding 1(b)). The Table also now distinguishes between single and collective dominance (SD and CD respectively).

Table 5: Markets which are 'uncompetitive' both pre- and post-merger

		MERGER	
		SD	CD
PRE-MERGER		Intervened markets (26)	
	SD	13	1
	CD	6	6
		Cleared markets (12)	
	SD	10	0
	CD	0	2

In total, there are 38 such markets (25% of those for which we have the necessary data). In 26 the EC chose to intervene, but in 12 it did not[21]. Reading down the columns, in 29 markets the mergers would have lead to SD, and in 9 to CD. Consider first the 26 interventions: in some cases the choice was straightforward – notably the 13 in the (SD, SD) cell, in which the merger merely strengthened a leading firm's single dominance, and intervention was the obvious choice. More interesting are the 6 markets in the

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[20] A recent theoretical literature allows for a continuous distribution of potential divestments between no intervention and this upper bound (for example, Cosnita and Tropeano, 2009). However, our above findings suggest that interior choices between the two are rare for the EC.
[21] The numbers in Table 5 relate to those in Table 4 as follows. The total of 38 (Table 5) are the 39 uncompetitive pre-merger cases (Table 4), excluding one in which the merger rendered the market competitive. The 26 intervened markets (Table 5) is a sub-set of the 31 cases where the remedy resulted in an 'uncompetitive' structure (Table 4), excluding those where the remedy did not fully return the market to its pre-merger structure. The 12 cleared markets (Table 5) are a sub-set of the 16 cleared in spite of an 'uncompetitive' post-merger structure (Table 4), excluding 4 in which the pre-merger position was not uncompetitive. Arguably, these 4 may be 'mistakes' by the Commission in that an anti-competitive merger could have been effectively remedied by a return to the status quo.

(CD, SD) cell – here, by intervening, the Commission revealed a preference for a pre-market structure of CD to a post-merger structure of SD. There was only 1 intervention case where the EC revealed the reverse preference (SD over CD).

Amongst the 12 non-intervened markets, the most frequent choice (10) again involved structures implying single dominance both before and after merger, but here the Commission preferred to clear the mergers. In these cases, however, there is a different explanation. In all 10, the merger increased the market share of the #2 firm, while leaving the dominant firm's share unchanged. Under the EC Merger Regulation operative over this time period, the only possible grounds for intervention in such cases would be to invoke a collective dominance theory of harm. The fact that it chose not to implies that, if anything, it viewed the merger as pro-competitive by strengthening a #2 firm, competing with a dominant #1 firm.

In order to examine this role of firm rank more formally and widely, we now return to the econometric model in section 3(i), as estimated on the original full sample of 232 markets. Recall that there S1 and S2 are the shares of the two largest firms in the market post-merger, *regardless of identity*, i.e. the merged firm may be #1 or #2. Here, to explore the possibility that rank of the merged firm may influence the decision, we re-estimate the model separately[22], distinguishing whether the merged firm was #1 or #2 post-merger. Where #1, as before, the EC can choose between NI, SD and CD,

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[22] Since this estimation does not require quantitative information on the pre-merger market shares, it can be estimated for the full original sample size of 232 markets.

and multinomial logit estimation remains appropriate; but, as explained, where the merged firm would be #2, SD is not an option, and there is only a binary choice between NI and CD, and binary probit estimation is now used instead.

Table 6 reports the results and Figure 2 illustrates graphically. To aid understanding, in contrast to Figure 1, the vertical axis now represents the share of the merged entity (S_{me}), *regardless of its rank*, and the horizontal axis shows the share of the largest other firm not involved in the merger, denoted hereafter by 'outsider' (S_o). For any given (S_{me}, S_o) pair it shows the outcome with the highest predicted probability. When presented in this way, the area below the diagonal is no longer empty, but depicts cases where the merged entity is #2 post-merger.

The results in Equation I, now estimated only for markets where the merged firm is #1 post-merger, are qualitatively unchanged from the original model as reported in Table 3: both single and collective dominance are more likely in more concentrated markets, and collective (single) dominance is more (less) likely the more symmetrically sized are the #1 and #2 firms. Comparing Figures 1 and 2 *above* the diagonal, the CD and SD areas are largely unchanged. This is important for the claim in the previous paper that it had identified the ranges of size (a)symmetries which the Commission views as conducive to *tacit collusion.*

However, in equation II for #2 firms, only CD or NI are possible. While the signs and significance of coefficients are unchanged, their magnitudes are

smaller. The implications become clear from the area under the diagonal in Figure 2. Here, the CD area is noticeably smaller when the merged firm is #2 [23]. As a numerical illustration, a post-merger market structure of ($S_{me} = 0.4, S_O = 0.33$) is consistent with collective dominance, but ($S_{me} = 0.33, S_O = 0.4$) is not. This leads to:

> **FINDING 4**: *for a given post-merger market structure, the Commission is less likely to remedy on the grounds of Collective Dominance if, post-merger, the merged entity would be the #2 firm.*

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[23] This does not necessarily imply that the EC views the possibility of tacit collusion as less likely when the merged firm is #2, but rather that this possibility has to be balanced against the risk of a singly dominant leader were the merger to be remedied.
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**Table 6: Re-estimation of the model, distinguishing rank of merged firm**

	I	II
	ME = #1	ME = #2
Sample		
N	176	56
SD		
SUM	12.671*** (2.760)	
RATIO	-7.747*** (2.544)	
Constant	-3.679*** (0.934)	
CD		
SUM	13.455*** (3.202)	4.768*** (1.374)
RATIO	7.230*** (2.658)	3.217*** (0.959)
Constant	-15.542*** (3.092)	-6.775*** (1.407)
Pseudo R^2	0.582	0.302
Log-L	-70.634	-17.238
Wald Chi^2	44.18***	26.21***
Correct predictions (%):		
ALL	85	91
SD	91	-
CD	94	83
NI	78	92

***Significantly different from 0 at 1% level, ** significantly different from 0 at 5% level. Standard errors in parenthesis. Equations are estimated with observations clustered by merger.

Finding 4 thus offers no support for the hypothesis that the Commission might sometimes have used CD, under the old ECMR, to justify its intervention where a merger would have led to a lessening of competition *without* coordinated behaviour, but where it could not be prevented on SD grounds[24]. Rather, the reverse is true, and this raises the contrary question of why the EC was *less* likely to intervene against CD when the merger did not involve the market leader.

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[24] Motta (2004, pp.272-3.) cites the EC prohibition of the Airtours/First Choice merger (M.1524) (subsequently overturned by the appeals court) as a possible example of this.

Figure 2: Revised areas of harm, taking account of rank
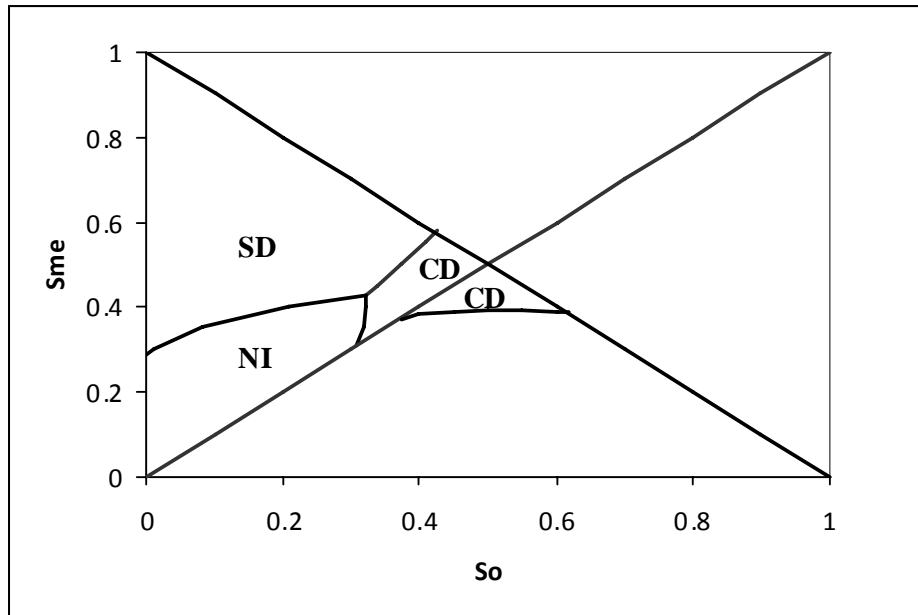
We believe that the answer lies in the likely impact of any structural remedy in these circumstances. Clearly, any remedy imposed on a #2 firm does not reduce the size of the leader, but it does reduce market share symmetry. In terms of Figure 2, the remedy has the effect of moving market structure in a westerly direction - reducing the likelihood of collective dominance, but increasing the probability of single dominance. One interpretation of the preference not to remedy is that, on balance, the EC views a more sizeable #2 firm as a greater constraint on an otherwise singly dominant firm.

Furthermore this tolerance of possible collective dominance would be reinforced if the Commission had any doubt about the medium-term viability of the divested assets. Such doubts can not be discounted, given the finding of the EC's own remedy study (2005, pp.129-30), that the market share of divested businesses decreased in 44% of its sample 3-5 years after remedy

(increasing in only 18% of cases). In contrast, for businesses retained by the merged entity, market share increased in 47% of cases (decreasing in only 33%) over the same period of time. This implies that any remedy returning a market to a pre-merger position close to SD might risk increased future single dominance as the market share of the divested asset declines.

5. Implications and Qualifications

At the heart of this paper is a simple idea. When deciding remedies for markets in which a merger leads to competition concerns, CAs typically set their objective as restoring competition to its pre-merger level. However, this raises a question which, although fairly obvious, is rarely discussed in either the policy or academic previous literatures: 'how should the CA proceed where the pre-merger market is already not free of competition concerns?' Where this is the case, the CA would be faced with an awkward choice between two potentially undesirable states – an 'uncompetitive' merger or returning a market to an 'uncompetitive' pre-merger state.

Using a sample of EC structural remedies, we derive four main findings. First, structural remedies invariably remove the increment in market share of the merging parties, and this usually returns the structure of the market to its pre-merger level. If one is prepared to equate structure with the level of competition, the EC would therefore appear to typically achieve its stated objective.

Second, in nearly half of all remedy cases, the post-remedy structure is itself not consistent with competition, in the specific sense that the EC would have sought to remedy it, had it been the result of a merger.

This can be largely explained by our third finding, namely that many of these markets are already 'uncompetitive' even before merger. In such cases, the EC is indeed confronted with a choice between two 'uncompetitive' states. A similar choice is also evident in another class of cases within the sample – those markets in which the EC chose *not* to intervene, preferring to clear a seemingly anticompetitive merger where the alternative would have been to restore an uncompetitive pre-merger structure. The choice is sometimes between alternative theories of harm – single or collective dominance (i.e. unilateral or coordinated effects.)

Our fourth finding is that, in this particular sample, the EC is less likely to intervene by imposing remedies to counteract collective dominance if, post-merger, the merged entity would be the #2 ranked firm. We suggest that this implies a greater tolerance of potential collective dominance where the alternative is to otherwise accept increased potential single dominance.

Finally, we assess how sensitive these findings might be to two key features of our methodology: (i) sample selection and (ii) the empirical model employed to define uncompetitive market structures.

Sample selection

As stressed earlier, this sample is definitely not random. Rather, it was constructed deliberately so as to include all EC mergers where single and collective dominance were considered in depth and simultaneously by the EC. Moreover, even within this sample, there is an implicit selection bias due to the unavoidable omission of markets for which we did not have full information on the nature of the remedies. As described in section 2, nearly all of these omitted cases involved remedies designed to counteract single dominance. This suggests that the useable sample under-represents the frequency with which the EC chooses single dominance as its theory of harm. However, this can not undermine our conclusion that the EC has an apparent preference for the possibility of collective over single dominance – if anything, it reinforces the conclusion.

More generally, our sample necessarily excludes another class of mergers – those considered by the parties, but never actually proposed because the parties anticipated that they would pose the EC precisely the awkward choice just described. We can not rule out such a deterrence effect, but it is not obvious how this would systematically bias results towards one theory of harm over another.

Finally, one other distinguishing feature of this sample is the time period, 1990-2004, which covers the period up until the EC revised its Merger Regulation. Again, this was quite deliberate, and in order to avoid mixing two potentially significantly different regimes. A main feature of the 2004 revision

was to introduce a 'significant impediment to effective competition' test, under which intervention remained possible on single dominance grounds, but in addition provided the Commission with an extra tool - intervention against unilateral effects even when the merged firm was not singly dominant and collective dominance (now re-titled coordinated effects (CE)) was considered unlikely. This revision also allowed the EC to explicitly consider any evidence of merger efficiencies[25].

Davies et al. (2010, pp. 28-9) summarise the Commission's merger decisions in the years following revision. Interventions on the grounds of CE became extremely rare[26]. Without further analysis, it is unclear what were the reasons for this, but it is, at least superficially, consistent with our above finding that the Commission tended to be more tolerant of possible collective dominance than of enhanced single dominance in the years prior to 2004.

Defining uncompetitive structures

Our methodology rests on the distinction between 'uncompetitive' and 'competitive' market structures, based on the model from our previous paper which explains the EC's initial merger decisions in terms of market structure. This has the virtue of drawing on the EC's own revealed behaviour when it assesses mergers, and it ensures internal consistency between merger assessment and remedy decisions.

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[25] Before 2004, it is unclear to what extent efficiency gains were recognised and they were never accepted (see Motta, 2004, pp. 274-5).

[26] There were 19 mergers (covering 334 markets) in which there were interventions and the decision documents reveal that collective dominance was seriously considered. In only 4 of these markets did the Commission actually intervene on the grounds of coordinated effects.

Superficially, this potentially exposes us to the conventional criticism that the level of competition should not be simply equated to market structure. However, a key assumption of our model, based on the EC's guidelines, is that market shares and concentration only 'matter' if the EC is convinced that the other characteristics of the market (such as high entry barriers, absence of buyer power etc.) are consistent with the exercise of market power. As explained in section 3(i), all markets in the sample satisfy these necessary conditions and 'uncompetitive', as we have defined it, entails not just high concentration, but also the existence of entry barriers, absence of buyer power and transparent prices (in the case of coordinated effects). More pragmatically, the model achieves a high success rate in explaining the Commission's merger decisions, and can be interpreted as a fair description of its underlying model – regardless of any limitations that model might have.

Nevertheless, the fit is not perfect, and alternative interpretations of what constitutes an uncompetitive market are clearly possible. Indeed, for the purpose of this study, we have abstracted from any assessment of the subsequent viability of divested assets, but, as already stressed in the previous assessments of the FTC and EC, this turns out to also be a key dimension of the post remedy evolution of market structure.

Bearing in mind these qualifications, further work is clearly required – for other samples (for other jurisdictions and time periods) before claiming too much generality for our findings. It seems very likely that some of our findings will

be robust: we would expect that very often remedies do restore the market to its pre-merger structure (given the stated objective of CA guidelines); and that those pre-merger structures will often themselves raise potential competition concerns – this is almost inevitable given that most mergers investigated in depth by CAs will tend to occur in markets which are already tightly oligopolistic.

However, our results on the potential trade off between unilateral and coordinated effects, must be conditioned on the very specific feature of our particular sample. This was selected precisely in order to focus on this issue. This has allowed us to confirm that some of the issues raised in the classic Nestle-Perrier merger and Compte et al.'s critique are not singular to this case, and are potentially replicated in other cases. However, we would not necessarily expect the trade-off to be as frequent in more general random samples.

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