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I. INTRODUCTION

Following AT&T/Time Warner and the recent adoption of U.S. Vertical Merger Guidelines, vertical merger policy has again become a subject of intense debate. Some commentators have argued that vertical merger enforcement is too lax and should be invigorated, in particular in the U.S. Others see a greater risk of false positives and argue that the standard for intervention should remain high in such cases. Against this background, this article discusses the economics of assessing vertical mergers with a particular emphasis on recent European case practice.

Like much of the debate, the article focuses on input foreclosure, the most common theory of harm in vertical mergers. Input foreclosure denotes the deterioration of access conditions to a critical input for downstream rivals of an integrated firm. It includes practices such as raising the input’s price, reducing its quality or limiting the quantity offered to competitors. Vertical integration may create an incentive to engage in such conduct since worsening access conditions makes rivals less competitive against the merged entity’s own downstream unit.

The article is structured as follows. Section II summarizes the basic principles of identifying input foreclosure. Section III discusses the interaction between different vertical effects. Section IV describes the use of economic models in vertical analyses. Finally, Section V characterizes specific settings where anti-competitive effects are likely to outweigh potential benefits of integration.

4 E.g. see Michael A. Salinger, Comments on the DOJ and FTC Draft Vertical Merger Guidelines (February 2020).
5 In EU antitrust practice, price increases are usually referred to as “partial foreclosure,” whereas refusals to supply are referred to as “total foreclosure.” The U.S. Guidelines instead use the terms “raising rivals’ cost” (“RRC”) and “foreclosure.” As total foreclosure is equivalent to an infinite price increase, it is ultimately a special case of partial foreclosure. I therefore sometimes use the terms “raising price” or “RRC” as a shorthand for more general foreclosure strategies.
II. PRINCIPLES OF VERTICAL MERGER ANALYSIS

The basic principles of assessing vertical mergers are set out in the Commission’s Non-Horizontal Merger Guidelines. When these Guidelines were issued in 2007, they marked a material departure from a relatively strict and form-based prior case practice. In its place, the Guidelines established a significant standard of proof based on effects-based analysis. Moreover, they expressly acknowledged the potential pro-competitive benefits of vertical integration. Even so, the Commission did not switch from one extreme to the other. While vertical intervention cases remain appreciably rarer today than horizontal cases, the Commission has continued to actively pursue vertical merger enforcement.

When assessing whether a merger may lead to anti-competitive foreclosure, three conditions have to be established: First, whether the merged entity will have the ability to foreclose. Second, whether it will have an incentive to foreclose. And, finally, whether foreclosure would lead to competitive harm in the downstream market.

**Ability to foreclose.** The ability to foreclose downstream rivals requires that the merged entity control a critical input. I.e. the input must be important for downstream competition, and the merged entity must have significant market power over it. Besides a material share of value, critical inputs are often characterized by high profit margins, which reflect the fact that customers cannot easily switch to alternative providers. Other, less direct, indicators of upstream market power may include high market shares or limited spare capacity of competing suppliers.

**Incentive to foreclose.** Vertical integration may create an incentive to raise input prices toward third parties, since this makes the merged downstream unit more competitive against those firms. Put differently, RRC exerts a positive externality on the new downstream partner, who will recapture some of the lost sales after a price increase targeting rivals.

Therefore, a vertical merger is likely to cause material upward pricing pressure toward a rival if: (i) losing access to the input would cause a significant diversion of sales to the merged downstream business and (ii) if such downstream recapture would be profitable for the merged entity. As in horizontal mergers, the main drivers of vertical price pressure are therefore high diversion ratios and profit margins.

Yet, measuring vertical diversion ratios (i.e. switches to the merged downstream business after an input price increase) can be more complex than in the horizontal case. E.g. vertical price pressure may not only induce switching in the downstream market but also in the upstream market (if foreclosed rivals can partially or fully substitute away from the critical input). Therefore, it is necessary to determine to which extent such upstream diversion might dilute the downstream diversion to the merged entity. This is not always straightforward.

In some cases, firms’ internal documents contain estimates of customers’ propensity to switch. E.g. in Telia/Bonnier Broadcasting, the Commission was able to rely on internal quantifications of expected departure rates after a black-out. In other cases, there may be evidence of past switching after price increases or loss of access to a critical input. In the absence of such direct evidence, the size of firms’ margins can provide an indication of the likely direction of switching. E.g. when downstream margins are low, whereas upstream margins are high, then this indicates that downstream demand is elastic, whereas upstream demand is inelastic. In that case, foreclosure is likely to cause significant downstream diversion with only limited upstream dilution.

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6 European Commission, Guidelines on the assessment of non-horizontal mergers under the Council Regulation on the control of concentrations between undertakings, 2008 O.J. (C 265) 6 [hereinafter Guidelines].
7 Id. ¶¶ 29, 32.
8 Id. ¶¶ 11-14.
9 Recent case examples are discussed in Sections IV and V below.
10 Guidelines, supra note 6, ¶ 32. See more generally Carl Shapiro, Testing Vertical Mergers for Input Foreclosure, OECD (June 7, 2019).
11 Id. ¶¶ 34-35.
12 Id. ¶¶ 41-42.
13 Case M.9064 Telia Company/Bonnier Broadcasting Holding (Commission decision of November 12, 2019).
14 E.g. in Telia/Bonnier Broadcasting, the Commission also assessed diversion ratios after a contemporaneous supply shock, as Telia had made the distribution of some of its premium content exclusive.
Competitive harm. For foreclosure to be a concern, it must cause competitive harm in the downstream market. In other words, there must not merely be harm to competitors, but to competition and hence consumers. This requires (i) that the merged entity will face only limited competition from rivals that are not subject to foreclosure (e.g. other integrated firms) and (ii) that the upward pricing pressure caused by RRC is not overturned by downward pricing pressure from the elimination of double marginalization (“EDM”) or other efficiencies.

Indeed, the merged downstream unit may have an incentive to compete more aggressively post-merger, since additional downstream sales will also tend to increase demand for the upstream input. Such EDM is likely to be material if (i) incremental downstream sales would generate significant new demand for the upstream input (e.g. because of untapped demand for the integrated product among previous non-consumers) and (ii) if upstream margins are significant, so such additional sales would materially contribute to profits.

II. VERTICAL EFFECTS INTERACT

The approach described in the previous section allows structuring the assessment of vertical mergers in a practical way. Even so, it is important to realize that ability, incentive, and harm are not independent elements that can be regarded in strict isolation. As the Guidelines point out, the assessment of vertical effects is ultimately an integrated analysis, as different components of the test may affect each other. This section therefore discusses some of those interactions.

Interaction between EDM and RRC. Note that the pro-competitive incentive for EDM derives from the same externality consideration as the anti-competitive incentive for RRC. Just as raising upstream prices tends to benefit the merged downstream unit, lowering downstream prices tends to benefit the merged upstream unit. Contrary to horizontal mergers, efficiencies in vertical mergers are therefore not a structurally separate element from unilateral effects but are merely the flipside of the same optimization mechanism.

As a result, EDM and RRC can appreciably affect one another. Recent literature has emphasized that when EDM is significant, then this tends to reduce RRC incentives, because lower own prices render downstream diversion less profitable for the merged entity. The authors show that if EDM is sufficiently strong, then not only the merged entity’s downstream prices may decrease in equilibrium, but even its upstream prices toward rivals. I.e. there is no trade-off between pro- and anti-competitive effects in equilibrium as all prices decrease.

While this is an important insight, there are also limits to its applicability. E.g. the result is based on models that assume a particularly strong form of double marginalization. Specifically, the above papers consider markets where double mark-ups are so large that pre-merger prices are even higher than the integrated monopoly price. As a result, EDM is very large in those models to bring prices back toward monopoly levels.

However, in less extreme situations, the reverse outcome is equally possible: If RRC is sufficiently strong, then a vertical merger may not only increase the upstream prices charged to rivals but may also raise the merged entity’s downstream prices. I.e. in equilibrium there is again no trade-off between pro- and anticompetitive effects as all prices increase. This reverse result may arise because significant RRC incentives tend to weaken EDM, since RRC softens the competitive pressure the merged downstream unit is exposed to. In short, the relation between RRC and EDM is a two-way interaction in which either effect may suppress the other if it is sufficiently strong. While EDM is often substantial in standard economic models, its concrete significance in a given transaction must therefore be assessed on a case-by-case basis.

15 Guidelines, supra note 6, ¶¶ 16, 32.
16 Id. ¶¶ 50, 52.
17 Id. ¶¶ 21, 32.
19 We discuss concrete examples in Section V below. See also Das Varma & De Stefano, supra note 18, Table 2 (showing that less pronounced double mark-ups increase the scope for competitive harm in their bargaining model).
**Interaction between ability and effects.** There is also an important interaction between the ability to foreclose and the likely effects of a vertical merger. Indeed, a greater ability to foreclose tends to entail larger competitive risks. From a purchaser’s perspective, there is a considerable difference whether that firm merely risks facing somewhat higher input costs or whether it could be put out of business by losing access to an indispensable input. Unsurprisingly, therefore, businesspeople tend to be highly wary about such dependencies when their supplier starts competing with them in the downstream market.

A large ability to foreclose may thereby also act as a significant barrier to entry, since potential entrants may be reluctant to expose themselves to a risk of foreclosure (even if such foreclosure might not eventually materialize). Such considerations can be particularly important in industries with important scale effects, such as technology markets, where foreclosure concerns are often motivated by dynamic considerations.20

From an error-cost perspective, a greater ability to foreclose therefore affects the standard of evidence against which foreclosure risks should be assessed. Since a greater economic dependency involves larger competitive risks, the evidence required to dismiss vertical concerns should arguably be more demanding when the merged entity controls a dominant input. Indeed, the social costs of false acquittals are particularly large in that case.

**Interaction between margins and diversion.** Finally, a frequently misunderstood interaction in vertical mergers is the relationship between profit margins and diversion ratios. As the Guidelines correctly observe, “Other things constant, the lower the margins upstream, the lower the loss from restricting input sales.”21 In other words, if the merging upstream firm is not very profitable, then losing some input sales from the foreclosure of rivals will not be too damaging for the merged entity.

Merging parties sometimes (conveniently) interpret this passage as suggesting that the overall foreclosure risk must be low if the merging upstream firm has significant margins. However, as indicated by the qualifier “other things constant,” the opportunity cost of lost sales is not the only parameter that matters for foreclosure incentives.

Instead, high upstream margins also suggest that demand for the foreclosed input is inelastic (i.e. that it faces limited competition). Higher upstream margins therefore indicate that it is easier for the merged entity to divert sales to its downstream unit, as purchasers cannot easily replace the critical input. On balance, problematic vertical mergers thus tend to involve non-negligible upstream margins.22 This reflects the fact that foreclosure requires some upstream market power that can be leveraged into the downstream market.

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20 E.g. see Case M.8394 Essilor/Luxottica (Commission decision of 1 March 2018) where the Commission investigated whether the merged entity might have an incentive to foreclose third parties to undermine their ability to exploit scale economies.

21 Guidelines, supra note 6, ¶ 41.

IV. USING MODELS TO ASSESS FORECLOSURE INCENTIVES

Since vertical effects are often complex, it can sometimes be instructive to use economic models to help assess their competitive impact. In recent case practice, the Commission has considered different economic models, depending on data availability and suitability in the context of a given case.

**Vertical arithmetic.** Vertical arithmetic (“VA”) is the simplest form of quantitative analysis in vertical mergers and is regularly submitted to the Commission in vertical cases. VA considers whether total foreclosure of rivals would be profitable given the margins earned by the merging firms and the expected diversion ratio from foreclosed rivals to the merged entity.

The great benefit of VA is that it is easy to apply. But unfortunately, it also has significant limitations. In particular, VA only considers total foreclosure, although it is typically more profitable for a merged firm to engage in partial foreclosure. Moreover, VA takes price levels as given, although vertical mergers may change equilibrium prices considerably (e.g. due to EDM). As a result, VA can only provide indicative evidence about foreclosure incentives.

VA may nonetheless convey useful insights, as it can be thought of as a simplified version of more comprehensive economic models that require more extensive information. E.g. VA can be expressed as a simple vGUPPI test with a specific safe harbor. VA can therefore be useful to identify clearly unproblematic transactions (if the test is passed by a large margin) or to provide a first quantification for potentially problematic mergers that can later be supplemented (or replaced) with more extensive qualitative and/or quantitative analyses.

**vGUPPIs.** In order to capture pricing incentives more accurately, the vGUPPI model was developed. This model was recently considered, for instance, in EssilorLuxottica/GrandVision and in the UK Tesco/Booker decision. vGUPPIs are an extension of the well-known price pressure methodologies that are commonly used in horizontal mergers. As in the horizontal case, vGUPPIs can be very helpful to identify and measure the main factors that determine post-merger pricing incentives. But since vertical transactions involve an interaction across upstream and downstream markets, such price pressure analyses can be appreciably more involved than in the horizontal case.

In contrast to VA, vGUPPIs also incorporate a direct measure of potential pro-competitive incentives resulting from EDM. As vGUPPIs measure incentives for RRC and EDM separately, however, a potential limitation of the model is that it abstracts from feedback effects between RRC and EDM (see Section III).

**Bargaining leverage.** In cases that involve bargained rather than posted wholesale prices, one can instead use the bargaining leverage model to calibrate the potential for upward pricing pressure resulting from a vertical merger. Such a model was prominently applied in the recent AT&T/Time Warner case in the U.S.

24 E.g. see Telia/Bonnier Broadcasting, supra note 13 and Case M.8900 Wieland/Aurubis Rolled Products (Commission decision of February 5, 2019) for recent examples.
25 Concretely, VA will tend to be too permissive if EDM is moderate (as VA underestimates partial foreclosure incentives). Conversely, VA will tend to be too strict if EDM is large (as it does not account for EDM).
27 Id.
The bargaining leverage model provides a simple yet instructive way of gauging RRC incentives. A potential limitation of the model is that it is not straightforward to integrate a complete analysis of EDM (short of extending it to a fully-fledged merger simulation). However, as in the case of vGUPPi, it is possible to separately measure the downward pricing pressure caused by EDM (thus abstracting from possible feedback effects between RRC and EDM).\footnote{33 See Shapiro, supra note 31.}

\textit{Full merger simulation.} Vertical merger simulation fully accounts for the interaction between upward and downward pricing pressures in vertical mergers. Such an analysis was considered, for example, in \textit{ASL/Arianespace}:\footnote{34 E.g. see Gloria Sheu & Charles Taragin, Simulating Mergers in a Vertical Supply Chain with Bargaining (Working Paper, 2020); Gregory S. Crawford, Robin S. Lee, Michael D. Whinston & Ali Yurukoglu, \textit{The Welfare Effects of Vertical Integration in Multichannel Television Markets}, 86 \textit{Econometrica} 891 (2018).} However, this comes at the price that such analyses are often highly complex and can be sensitive to seemingly innocuous assumptions (e.g. on demand form) which can be hard to verify in merger control proceedings. The use of vertical simulation models therefore remains relatively rare in antitrust practice.

\textit{Use of economic models.} In summary, when sufficient data is available, the use of quantitative models can be instructive to identify and measure key determinants of the competitive effects of integration. Given the complexity of vertical effects, such models are best viewed as supportive tools that aim to quantify relevant factors for foreclosure incentives. Their results can then be combined with other quantitative and qualitative evidence to support or reject the investigated theory of harm.

In many cases, already simple models such as VA can be helpful, e.g. to weed out implausible theories. In more contested cases, one can build on simple quantifications, e.g. by expanding them into more complex analyses, such as bargaining models or vGUPPi. As we will discuss in the next section, such price pressure analyses can be particularly instructive when EDM is expected to be relatively moderate. This avoids a complex weighing of pro- and anti-competitive effects, thereby permitting a particularly robust inference.

\section*{V. ANTICOMPETITIVE VERTICAL MERGERS}

As discussed in the previous section, vertical simulation can be sensitive to details of the economic context. Moreover, in standard economic models, EDM is often significant and may overturn (or substantially attenuate) RRC incentives in many cases.\footnote{35 Case M.7724 \textit{ASL/Arianespace} (Commission decision of July 20, 2016).} This theoretical prediction seems broadly in line with the empirical evidence on vertical integration. While ex-post studies show that vertical mergers can be an important source of anti-competitive effects, they also indicate that a significant proportion of vertical mergers does not cause competition problems.\footnote{36 E.g. see Sibley & Domnenko and Akgün, Caffarra, Etro & Stillman, supra note 18.}

Even so, a number of important economic settings exist where anticompetitive effects are likely to dominate the potential benefits from integration. Theories of vertical harm are particularly compelling in settings with little or no EDM, as the need for a complex balancing can then be avoided (and feedback effects are likely to be negligible). This section will therefore provide examples of such classes of cases, based on recent European case practice.

\textit{Diagonal mergers.} An important class of cases where incentives for RRC tend to dominate EDM arises when the foreclosed input is used more intensively by rivals than by the merging downstream firm itself. Such transactions are sometimes called “diagonal mergers,” because there is only a limited vertical link between the merging firms. Accordingly, the scope for EDM is also small.

For instance, the Commission pursued such a case in \textit{Deutsche Börse/LSEG}, a transaction that was ultimately blocked.\footnote{37 Francine Lafontaine & Margaret Slade, \textit{Vertical Integration and Firm Boundaries: The Evidence}, 45 J. Econ. Lit. 629 (2007); Marissa Beck & Fiona M. Scott Morton, Evaluating the Evidence on Vertical Mergers (Working Paper, April 8, 2020).} In one of the affected markets, Deutsche Börse was acquiring a clearing house that served as an indispensable input for competing stock exchanges. Since Deutsche Börse was already vertically integrated into clearing, the transaction would have allowed the merged entity to substantially raise the costs of competing exchanges without generating any price-reducing efficiencies in return.

\footnote{38 Case M.7995 \textit{Deutsche Börse/London Stock Exchange Group} (Commission decision of March 29, 2017).}
Full market coverage. A second situation where EDM is likely to be minor arises when the input in question is already used by most potential customers. In that case, the merging downstream firm will not be able to significantly expand demand for its upstream partner by lowering prices. Instead, any newly won downstream sales would merely cannibalize upstream sales via third parties. Hence, the incentive for EDM is small or absent in such settings.\(^{39}\)

An example for this class of cases is the recent Telia/Bonnier Broadcasting merger, which was approved only subject to significant access remedies.\(^{40}\) In this case, Telia, an important distributor of TV services, acquired TV4, the leading commercial TV channel in Sweden, as well as various other important channels owned by Bonnier Broadcasting. Since the market coverage of those channels was already close to ubiquitous, the Commission considered that EDM was unlikely to overcome the significant incentives for price increases that were predicted by a calibrated bargaining model.

Contractual reasons for lack of EDM. In some cases, EDM can also be ruled out because the merging parties were able to implement contractual solutions to overcome double marginalization pre-merger. This argument has to be handled with some caution, since such contractual solutions may equally eliminate the incentive to engage in RRC.\(^{41}\) Even so, in a significant number of cases, contractual provisions may rule out EDM but not RRC.

For instance, in Wieland/Aurubis, a case that was ultimately prohibited, the merging parties were already in a joint venture pre-merger.\(^{42}\) The Commission found that the JV’s pre-merger price structure ensured that double marginalization would not be an issue, as Wieland received incremental inputs at cost. Sales to third parties, however, had a fundamentally different price structure which did not attenuate the significant scope for RRC identified by the Commission.\(^{43}\)

Horizontal concerns undermining EDM. Finally, EDM can also be ineffective in cases where vertical concerns are aggravated by horizontal overlaps. In such cases, horizontal upward pricing pressure may offset the vertical downward pricing pressure caused by EDM. Wieland/Aurubis is also a relevant example for this setting, since the transaction caused appreciable horizontal overlaps in the downstream market in addition to the vertical link discussed above.

In conclusion, these examples show that there are important classes of cases where the complexity of weighing RRC and EDM does not arise, since efficiencies are unlikely to be significant.\(^{44}\) While many — indeed most — vertical mergers do not raise significant competition concerns, these classes of cases show that anti-competitive vertical mergers are neither intellectual aberrations, nor do they lack a potential for robust identification.

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39 Strong market saturation is more likely to occur in settings with negotiated prices than in settings with posted prices. In the latter, an upstream firm with full market coverage would typically find it profitable to increase prices pre-merger and sacrifice some sales until demand becomes more elastic.

40 Telia/Bonnier Broadcasting, supra note 13.

41 E.g. while the use of two-part tariffs may prevent double marginalization, such schemes may also allow to effectively extract rents from downstream competitors, thus obviating the need to engage in RRC (at least with sufficient information on demand).

42 Wieland/Aurubis, supra note 24.

43 Specifically, the JV had operational independence as concerns the pricing toward third parties pre-merger. This independence would have been eliminated through the transaction, thus permitting Wieland to set wholesale prices that maximize the profits of the integrated firm.

44 The list was guided by recent intervention cases at the Commission and is not meant to be exhaustive. E.g. anti-competitive incentives will also tend to dominate EDM in cases with dynamic foreclosure concerns. See Jay Pil Choi, Mergers with Bundling in Complementary Markets, 56 J. Ind. Econ. 553 (2008).
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