10. Assessing unilateral merger effects in the Dutch daily newspaper market

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10.1 INTRODUCTION

The newspaper market is a typical example of a so-called two-sided market: publishers sell content to readers and advertising slots to advertisers, while taking into account that the demand for advertisements in a newspaper depends positively on its circulation and the demand of readers might be affected by the number (or concentration) of ads in the newspaper (Anderson and Gabszewicz, 2006).

When it comes to assessing a proposed merger, competition authorities are, as a rule, required to establish whether a horizontal merger is likely to raise concerns with respect to unilateral or non-coordinated effects (that is, whether the merger might increase the market power of the merging firms) and with respect to coordinated or collusive effects (that is, whether the merger might make collusion more likely). With regard to the assessment of unilateral merger effects, competition authorities have devised different methods to address the issue. For instance, initial screening has traditionally been based on the analysis of the market shares of the merging parties and of (the changes in) the Herfindahl-Hirschman Index (HHI). Hence mergers among firms with market shares below a given threshold and mergers characterized by a post-merger HHI and a change in the HHI below certain thresholds have been almost automatically approved. For mergers judged to be worthy of further investigation, full merger simulations have only seldom been conducted. More often, preference has been given to a small but significant non-transitory increase in price (SSNIP)-type test, where it is asked whether the merging firms would find it profitable to raise prices post merger by a given threshold, usually 5 or 10 per cent, assuming rivals would not react.[2]

These tools for assessing unilateral merger effects have mainly been developed for single-sided markets. As explained in Wright (2004), analysing a two-sided market as if it were a single-sided market may lead to mistakes and unintended consequences in the application of competition policy. This is mainly because firms' pricing decisions do not only depend on own- and cross-price elasticities of demand on both sides of the market, as they would in a single-sided market with a multi-product firm, but also on the own- and cross-elasticities of demand on one side with respect to demand on the other side, that is, the network effects.

For example, in the newspaper market, when considering to increase the subscription prices after a merger, newspapers will take into account that such an increase will not only have a negative effect on subscription revenues through its negative effect on circulation, but also a negative effect on advertising revenues, as decreased circulation leads to a decline in the demand for advertising. For the same reason, such an increase in price might lead to a decline not only in readers' welfare but also in advertisers' welfare (the former effect is partly offset if readers are ad-averse, and enhanced if instead they are ad-loving). This not only makes a price increase less likely, but it also has an impact on the social desirability of the merger.

The theoretical literature on two-sided markets distinguishes between the price level (roughly the sum of the two prices) and the price structure (roughly their ratio) and shows that, in general, in such a market a merged firm will tend to raise the price level, but it is also likely to change the price structure.[3] In fact, a two-sided market is often defined as a market in which not only the price level, but also the price structure matters for the profits of the firm. Consequently, not only the price level, but also the price structure determines (consumer) welfare. The literature shows that more concentration leads in general to a less efficient price level, but not necessarily a less efficient price structure. As a result, it is not clear whether higher concentration and more market power lead to a welfare loss, not even if one focuses attention on consumer welfare.

Hence, merger assessment in a two-sided market is more complex than the analysis of mergers in a one-sided market. A natural question to ask is thus to what extent traditional methods to assess unilateral effects, albeit adapted, remain valid instruments for competition policy in two-sided markets. In this chapter, we compare different ways to assess unilateral merger effects in a two-sided market by applying them to a hypothetical merger in the Dutch newspaper market. For this, we specify a structural model of demand for differentiated products on both the readers' and the advertisers' side of the market. We use it to recover price elasticities, indirect network effects and, following Filistrucchi et al. (2010), also marginal costs. We then compare, in a typical two-sided setting as the newspaper

one, different approaches to the assessment of unilateral merger effects: an analysis based on the HHI, a SSNIP-type test and a full merger simulation based on the structural model.

The empirical literature on mergers involving two-sided platforms is still scarce. Evans and Noel (2008) point out that, as the Lerner pricing formula does not hold in such markets, traditional merger simulation models are wrongly specified if applied without modifications to two-sided or multi-sided platforms. They also perform an analysis of the merger between Google and DoubleClick, which is the first empirical analysis in the literature of a merger in a two-sided industry. They show that relying on conventional methods would have led to significantly different results than using methods that explicitly incorporate the two-sided nature of this market. Nevertheless, they only perform a calibration exercise due to a lack of data. Chandra and Collard-Wexler (2009) assess mergers in the Canadian newspaper market, but their analysis is mainly an *ex post* evaluation of the effects of the merger. They use a two-sided Hotelling model to explain their finding that greater concentration did not lead to higher prices for either readers or advertisers. Yet, they do not build and estimate a structural econometric model and, therefore, their framework cannot be used to simulate mergers.

In our merger simulation, we follow Filistrucchi et al. (2010), who build a structural econometric framework to simulate the effects of mergers among two-sided platforms selling differentiated products and competing à la Bertrand on each side of the market. Their framework extends the supply model of Argentesi and Filistrucchi (2007) to the more general case of a two-sided market with two network effects. For this reason it differs also from Van Cayseele and Vanormelingen (2009), who assume no effect of advertising on readership when analysing mergers in the Belgian newspaper market. Jeziorski (2011) studies instead mergers between US radio stations. In his model, listeners do not pay a monetary price to listen to the radio but advertising generates a nuisance cost. Our model is more general as customers on both sides, readers and advertisers, pay a price to access the platform. Finally, Fan (2011) analyses mergers among US newspapers. Whereas the framework of Filistrucchi et al. (2010) is more general than hers when it comes to analysing merger effects on prices, as it allows for advertising to affect readers, her model allows for endogenous changes in the quality of the newspapers due to the merger. As we do not have data on quality, we abstract from quality changes due to the merger.[4]

This chapter is organized as follows. In Section 10.2 we identify the main features of the Dutch market for daily newspapers. Section 10.3 describes the data set. In Section 10.4, we specify a model of demand for both sides of the market and report estimation results. In Section 10.5, we

turn to the hypothetical merger and present results from a concentration analysis, a SSNIP-type test and results from the full merger simulation. Section 10.6 summarizes our findings and concludes.

10.2 THE DUTCH MARKET FOR DAILY NEWSPAPERS

There are eight important national-level newspapers: *Algemeen Dagblad*, *De Telegraaf*, *de Volkskrant*, *Het Financieele Dagblad*, *Het Parool*, *NRC Handelsblad*, *nrc.next* and *Trouw*. In addition, there are two important free newspapers: *Metro* since the second quarter of 1999 and *Sp!ts* since the fourth quarter of 2001.[5]

Since 2009, the publishing company PCM has been the sole owner of the *Algemeen Dagblad* and its regional editions. In the same year, De Persgroep Nederland, also owning *de Volkskrant*, *Het Parool*, *NRC Handelsblad*, *nrc.next* and *Trouw*, bought 51 per cent of PCM. This acquisition needed to be approved by the Dutch competition authority (NMa). The NMa imposed as a condition on De Persgroep Nederland to sell *NRC Handelsblad* and *nrc.next*. Otherwise, PCM would dominate the market for quality newspapers in Amsterdam as it owns *de Volkskrant*, *Het Parool* and *Trouw*.

In the merger simulation below we first simulate the effect of this remedy and then, starting from this, the effect of a merger between *NRC Handelsblad*, *nrc.next* and *De Telegraaf*, *Gooi- en Eemlander*, *Haarlems Dagblad*, *Leidsch Dagblad* and *Noordhollands Dagblad*.[6]

10.3 DATA

Our most important data source on the readership side is yearly circulation data at the level of 512 municipalities, which we obtained from Cebuco. These are merged with data on subscription prices. We use subscription prices because, unlike in other countries, almost all of the copies (91 per cent according to our data) are sold in the form of subscriptions.

For the advertising side, we obtained quarterly data from Nielsen on the amount of advertising, which is measured in column millimetres, and the advertising revenues of each newspaper according to list prices. From these, we calculate the (weighted) average list price per column millimetre. Nielsen also provided us with data on the total number of pages of the newspapers, and information on the format, which is measured by the number of column millimetres per page.

We allow the demand for advertising in a newspaper to depend on the

characteristics of the readers of this newspaper. For this, we obtained Nederlands Onderzoek Media (NOM) Print Monitor national level data on reach by age, gender, income and wealth, being a breadwinner or not, shopping for groceries or not, as well as reach by region.[7]

The market size is given by the total population over 13 years of age in the Netherlands. Data on this are provided by Statistics Netherlands (CBS). CBS also provided data on the consumer price index, which we use to express prices in year-2002 euros.

10.4 DEMAND ESTIMATION

As argued above, when predicting merger effects in a two-sided market, key inputs into the economic analysis are price elasticities and indirect network elasticities on each side of the market, or equivalently diversion ratios.

Lacking other sources of information on diversion ratios, we proceed to estimate the responsiveness of readership demand to changes in newspaper prices and advertising intensity and the responsiveness of advertising demand to changes in advertising prices and the circulation of a newspaper.

We use a model of demand for differentiated products on each side of the market. The next section introduces a model of advertising demand, the subsequent section then specifies a model of readership demand. Throughout, the superscript 'r' stands for 'readership' (as in the cover price of that newspaper) and the superscript 'a' stands for 'advertisement' (as in the price of an advertisement).

10.4.1 Advertising Demand

We specify advertising demand to be linear in the log of the advertising price per reader. That is,

$$\log q_{jt}^{a} = \alpha^{a}\log(p_{jt}^{a}/q_{jt}^{r}) + \beta^{a}x_{jt}^{a} + \xi_{jt}^{a} + \varepsilon_{jt}^{a},$$

where q_{jt}^{a} is the quantity of advertising in newspaper j at time t, which is measured in column millimetres, p_{jt}^{a} is the advertising price per column millimetre and x_{jt}^{a} are characteristics of the newspaper j that matter to advertisers, such as the demographics of readers of newspaper j at time t.

Such a reduced form is natural in a model in which readers buy at most one newspaper and advertisers buy advertising slots from all platforms. It is similar to the one proposed by Rysman (2004), which is used also by Van Cayseele and Vanormelingen (2009) and Fan (2011), in that it

assumes that there are no direct cross-price effects and no direct network effects. So that the decision to advertise in a newspaper only depends on the costs and benefits of advertising in that newspaper and is independent of the decision to advertise in other newspapers. We follow them in imposing that the reduced form is of the constant elasticity form and additionally assume that the network effect enters the demand function in such a way that it is the price per reader that matters to advertisers.

In our reduced form, the elasticity of demand with respect to the advertising price per column millimetre is equal to α^{a}, and the elasticity with respect to the number of readers is given by the negative of that, $-\alpha^{a}$. We use an instrumental variables estimator to estimate α^{a}, and at the same time control for newspaper fixed effects to capture the effect of unobserved (to the econometrician) characteristics of the newspapers in the eyes of advertisers. We also control for quarter dummies in order to account for changes in overall demand for print advertising. So, to summarize, we assume that $\xi_{jt}^{a} = \xi_{j}^{a} + \xi_{t}^{a}$. Our instrument is the total number of pages of content in the newspaper, which is related to the endogenous variable, p_{jt}^{a}/q_{jt}^{r}, through the increased value of the newspaper to readers, which translates into an increased circulation. It is unrelated to advertising demand if newspaper companies decide on this without knowing the realization of ε_{jt}^{a}, which is plausible as we already control for time effects and newspaper fixed effects. From the obtained estimate of α^{a}, marginal effects can be calculated by multiplying it by q_{jt}^{a}/p_{jt}^{a} and $-q_{jt}^{a}/q_{jt}^{r}$, respectively.

We obtained estimates for four different specifications, which differ by the variables in x_{jt}^{a}. Throughout, we control for newspaper fixed effects and quarter dummies. Using our preferred specification that we then also use for the subsequent analysis below, we estimate the elasticity of advertising demand with respect to the price per reader to be 0.702, with a standard error of 0.085. We obtain very similar estimates when we control for age, gender, income, region and the fraction of breadwinners and grocery shoppers.

10.4.2 Readership Demand

On the readership side, we estimate a Berry (1994) type logit model of demand for newspapers. However, departing from the usual practice, we do so on the municipality level. The advantage of this is that the substitution patterns that are implied for the national level are much more realistic. This is because we add up cross effects over municipalities. If then, for example, two regional level newspapers never compete because there is no municipality in which both are available, then added-up cross effects will be zero, whereas they will not if we use national level data with a standard

logit model. In the following, however, we suppress the municipality subscript m, for ease of exposition.

We assume the potential market size to be the population above 13 years of age and that each consumer buys at most one newspaper. The utility from buying a newspaper depends, among other things, on the price of that newspaper and the amount of advertising in that newspaper. Formally, the utility of consumer i from buying newspaper j in t is given by

$$u^r_{ijt} = \alpha^r p^r_{jt} + \beta^r q^a_{jt} + \xi^r_{jt} + \varepsilon^r_{ijt},$$

where p^r_{jt} is the price of the newspaper, q^r_{jt} is the amount of advertising content in the newspaper, ξ^r_{jt} captures unobserved characteristics and ε^r_{ijt} is the part of the utility derived from buying newspaper j that is specific to individual i at time t. We assume that ε^r_{ijt} is distributed according to the type 1 extreme value distribution independently across j and t. Individuals buy one newspaper or choose the outside good, $j = 0$, buying no newspaper. The outside good yields average utility 0, so that $u^r_{i0t} = \varepsilon^r_{i0t}$.

Under these assumptions, following Berry (1994), we obtain the estimation equation

$$\log(s^r_{jt}) - \log(s^r_{0t}) = \alpha^r p^r_{jt} + \beta^r q^a_{jt} + \xi^r_{jt},$$

in which the difference between the natural logarithm of the market share of good j and the natural logarithm of the market share of the outside good is equal to the utility from observed characteristics p^r_{jt}, q^a_{jt} and unobserved characteristic ξ^r_{jt}. The left hand side of this equation is observed because s^r_{jt} and s^r_{0t} are observed, and the coefficients α^r and β^r can be consistently estimated if ξ^r_{jt} is uncorrelated with p^r_{jt} and q^a_{jt}. For this to be plausible we control for a flexible time trend by means of year dummies to capture the increased importance of outside options such as online news and free newspapers and also control for newspaper region fixed effects.[8] It is important to allow for different fixed effects per region as a national level newspaper with a focus on Amsterdam, such as *Het Parool*, will be valued differently, on average, in the region around Amsterdam, as opposed to in the south of the country.

We estimate mean utility to decrease significantly in the subscription price (–0.00771 per 2002 euro, with a standard error of 0.00014), to increase in the amount of advertising in the newspaper (0.00918 per million column millimetres, with a standard error of 0.00117) and the amount of content (0.00264 per billion column millimetres, with a standard error of 0.00021), and we find that readers value newspapers of small format (the effect is 0.08838 with a standard error of 0.00346). Following Filistrucchi et al. (2010) we calculate the implied marginal effects and elasticities from the model. The average own-price elasticity is about –1.75 and the average advertising elasticity is about 0.05. This means that readers are ad-loving, but this is not very pronounced. This is plausible in our case as it is possible to skip advertisements, unlike when watching a movie on TV, some advertisements may be informative and hence valued by readers, and the percentage of advertising content is relatively low.

10.5 A HYPOTHETICAL MERGER

As explained earlier, competition authorities are required to assess whether a horizontal merger is likely to raise concerns with respect to unilateral or non-coordinated effects and with respect to coordinated or collusive effects. In order to assess unilateral effects a competition authority needs to predict, at least to some extent, whether prices are likely to rise as a result of the merger.

From the point of view of economics, the correct way to evaluate whether a merger is likely to lead to higher prices is to specify a model of the market in question, estimate demand in order to recover values for the parameters of the model, and then use the models and the estimated parameters to predict the price chosen by the firms post merger. One can then compare the prices, consumer surplus and/or total welfare in the new equilibrium with those in the old equilibrium. In Section 10.5.3, we show the results of such a full merger simulation.

Merger simulation can be very time consuming. As a result, it is often not performed in practice. In many cases a SSNIP-type test is used to predict the effects of a merger. Specifically, such a test is often performed by using Critical Loss Analysis and Critical Elasticity Analysis formulas derived under the assumption of constant marginal costs and either linear or iso-elastic demand. In merger evaluation, the formulas are not used to set an (implicit) benchmark on when substitution across products is enough to consider that they are in the same relevant market (which is what is done for market definition). Instead, they are used to measure the likelihood of a substantial non-transitory increase in price by the merging parties. That means that instead of simulating the effects of a price increase by a hypothetical monopolist above the current (competitive) level, practitioners simulate the effects of a price increase above the current level by the merging parties, assuming rivals do not change their prices and check whether that price increase is profitable or not. In either case, the size of the price increase is given beforehand and is not chosen optimally by the firms.[9] The simplification of the SSNIP test comes at the cost of

the assumption that rivals' prices remain unchanged after the merger. We report the results from such a test in Section 10.5.2.

According to the European Union (EU) merger guidelines, a first screening of mergers can be done based on the concentration they lead to in the relevant market. Although requiring market definition as a previous step in the analysis, such an assessment is per se the quickest and easiest one. It is well known, however, that the relationship between market power as measured by the Lerner index and the HHI Index holds perfectly only in case of Cournot competition with homogeneous products. Thus, once again, simplicity comes at the cost of often unrealistic assumptions. We perform a market concentration analysis in Section 10.5.1.

In order to illustrate the different methods to assess unilateral merger effects, we apply them to the analysis of the effects of a hypothetical merger between *NRC Handelsblad* and *nrc.next*, on the one hand, and *De Telegraaf*, *Gooi- en Eemlander*, *Haarlems Dagblad*, *Leidsch Dagblad* and *Noordhollands Dagblad*, on the other hand. Given our data set, we assess the merger as if it were to take place in 2009 and therefore use the market shares, market sizes, prices and ownership structure of 2009 as the pre-merger situation. We do so in the context of the demand model we described in Section 10.4. Again following Filistrucchi et al. (2010), we recover the marginal costs that would rationalize observed behaviour of profit maximizing firms that compete in prices with differentiated products on each side of the market.[10] These estimates are then used for the SSNIP test and the merger simulation. As explained in Section 10.2, we first simulate the equilibrium in what we take as the initial situation in which *NRC Handelsblad* and *nrc.next* are independent after having belonged to De Persgroep.

10.5.1 Herfindahl-Hirschman Index

One of the most common ways to asses market power is to use the HHI, which is given by the sum of the squared market shares in a market (usually multiplied by 10,000 to facilitate the reader). On the advertising side, assuming the relevant product market is the one for advertising in paid daily newspapers in Dutch (thus excluding free newspapers) and the relevant geographic market is the national one, the pre-merger HHI is 2174 and the post-merger one is 2366, which means that the change that is due to the merger ΔHHI is 192.[11]

Likewise, on the readership side of the market, assuming the relevant product market is the one for copies of paid daily newspapers in Dutch (once more excluding the free press) and the relevant geographic market is the whole of the Netherlands, the pre-merger HHI is 2571, the post-merger one is 3099, and hence ΔHHI is 528.[12]

Applying the thresholds of the EU merger guidelines, the merger would thus be investigated because of concerns of unilateral effects on both sides of the market, but particularly on the readers' side.

One of the major criticisms against the use of the HHI in screening mergers is that it is highly dependent on the definition of the relevant market. The above conclusion regarding the readership side may change drastically if we define the relevant geographic market as the municipality one. In our case, concentration is much higher at the municipality level, as indicated by a pre- and post-merger HHI of more than 5000 on average, because many newspapers are regional. Moreover, concentration would change considerably more due to the merger so that the merger would be scrutinized because of competitive concerns in many municipalities.

In addition, the use of the HHI leads to another potential fallacy in a two-sided market, namely the failure to account for the existence of indirect network effects. If these network effects are strong enough, the conclusions drawn from looking at concentration on each side of the market might be wrong even if the market definition on the two sides of the market is the correct one.

10.5.2 SSNIP-type Test

As explained above, the SSNIP test is often used in the assessment of unilateral merger effects. In particular, practitioners use it to simulate a given price increase (usually 5 or 10 per cent) above the current level by the merging parties, assuming rivals do not change their prices, and to check whether that price increase is profitable or not. If the price increase is profitable, it is judged to be likely to take place.

We use the extension of the SSNIP test to two-sided markets developed in Filistrucchi (2008) for market definition. On each side of the market, the SSNIP test asks whether an increase of the subscription prices by the merging parties of 5 per cent is profitable, assuming rivals keep their prices unchanged. The test is modified in such a way as to account for the presence of the indirect network effects in order to correctly assess the competitive constraints faced by the merged firm and therefore the profitability of a price increase. Positive indirect network effects between the different sides of the platform reduce the profitability of any price increase.

We implement both the US and the EU versions of the test and for the EU, implement it either allowing or not allowing the merged firm to optimally adjust the price on the advertising side when the cover price is raised. Throughout, we present the most complete version of the test, using the profit functions to numerically find optimal prices given the prices of the rivals and possibly own prices on one side of the market.[13] As a result, the

Table 10.1 SSNIP test

	Average advertising price	Average subscription price	Profit change
Initial situation	4.42	244.14	0.00
5% increase in p^a, no adjustment of p^n	4.64	244.14	3.05
5% increase in p^n, no adjustment of p^a	4.42	256.35	−2.43
5% increase in p^a, optimal adjustment of p^n	4.64	196.37	8.94
5% increase in p^n, optimal adjustment of p^a	8.83	256.35	35.36
Optimal adjustment of both prices	8.83	157.34	61.99

Note: This table shows results of different variants of the SSNIP test. These are average prices and profit changes when only the merging parties adjust prices. Profit changes are in percentage and relative to the initial situation.

only difference with respect to the full merger simulation is not allowing rivals to react to the price increase.

Table 10.1 shows the results of the different versions of the SSNIP test. It reports (estimated) advertising tariffs, subscription prices and profit changes (in percentages). The first row refers to the status quo, the last row to the US test. The latter shows that performing the US version of the SSNIP test to assess the merger would lead to the merger raising competitive concerns not on the readers' market (as post merger the optimal price is lower), but on the advertisers' market (as the optimal price increase exceeds 5 per cent). Rows two to four refer instead to two different versions of the EU test (with or without the optimal adjustment of the price structure) for each market (advertising and readership). Comparing the second row to the fourth and the third row to the fifth shows that allowing the firms to optimally adjust the price on the other side of the market increases profitability of the price rise. In addition, a comparison of row one to row four and five shows, respectively, that when exogenously forced to raise prices on the reader side of the market by 5 per cent the merged firm would increase prices also on the advertising side of the market, while when forced to raise the advertising tariff by 5 per cent the merged firm would lower the cover price. The latter result moves in the same direction as the US test.

Overall, results from a SSNIP-type test would thus suggest that, contrary to what is predicted by a HHI analysis, the merger raises concerns of

Table 10.2 Effects of the hypothetical merger

	Merged	Not merged
Advertising price	0.000	0.000
Column millimetres sold	−1.713	0.063
Subscription price	1.524	0.052
Circulation	−2.430	0.090
Advertising profits	−1.713	0.063
Readership profits	0.076	0.180
Total profits	−0.604	0.135

Note: This table shows the effects of the merger between the *NRC Handelsblad*, *nrc.next* and the Telegraaf group. Numbers are percentage changes.

unilateral effects on the advertisers' side of the market and less so on the readers' side of the market.

10.5.3 Full Simulation and Welfare Analysis

As argued above, from the point of view of economics, the correct way to evaluate whether a merger is likely to lead to higher prices would be a merger simulation that uses a model of the market in question and the estimated demand parameters to predict the price chosen by the firms after the merger. If cost data are not available, it is possible to recover estimates for them from the first order conditions of the model, as first proposed by Rosse (1970), and also use these estimates to predict the post-merger prices. One can then compute the change in prices, consumer surplus and/or total welfare from the pre-merger to the post-merger equilibrium.

In a two-sided market all of the above is possible but there are additional technical complications involved, particularly in the presence of two indirect network effects. We follow Filistrucchi et al. (2010) who propose a framework to recover the marginal costs and simulate the new equilibrium in two-sided markets. Table 10.2 summarizes the estimated effects of the merger on average prices, average quantities and profits. Unweighted averages are taken. The table shows that advertising prices per column millimetre would not be affected by the merger (a result of our specification of advertising demand), while subscription prices would rise by 1.5 per cent.[14] As a result, circulation would decline by 2.4 per cent, which in turn would lower advertising demand by 1.7 per cent. Overall, advertising profits would decline by 1.7 per cent, while subscription profits would only marginally increase.[15] The merging parties would even lose in terms of profits, while outsiders would marginally gain.

Table 10.3 Welfare

	Advertisers	Readers
All newspapers independently owned	0.00	112.55
Ownership as at the end of 2009	−102.88	111.60
As before, only *NRC* and *NRN* independently owned	−81.85	111.94
As before, but *NRC* and *NRN* joined Telegraaf group	−115.48	111.64

Note: This table shows advertiser and reader welfare for different ownership combinations. The former is relative to the situation in which all newspapers are independently owned. Both are measured in euros per year and reader. *NRC* stands for *NRC Handelsblad* and *NRN* stands for *nrc.next*.

Contrary to the results of the HHI-based analysis but consistent with the results of the SSNIP-type test, the merger would seem to raise only modest concerns on the readers' market and a big concern on the advertising market. The latter is due to the fact that as subscription prices are raised after the merger, readership declines and advertisers pay a much higher price per reader, although the price per column millimetre is unchanged. Clearly, the two-sided nature of the market plays a role here. Finally, Table 10.3 shows the effects of the merger on advertisers' and readers' welfare. For the former, we report the sum of the welfare changes, over all newspapers, relative to the situation in which all firms are independently owned. This is given by the negative of the sum of the integral over the demand functions (1), where the integral is taken from the advertising price per reader under the respective ownership situations to the advertising price per reader when newspapers are independently owned.[16] For the readers, we report average welfare per person over 13 years of age per year, as implied by the estimated price coefficient and the well-known log-sum welfare formula for the logit model.

The table shows that readers' welfare is almost unaffected by the hypothetical merger. Overall, results from the full merger simulation suggest that, contrary to what is predicted by a HHI analysis but consistently with a SSNIP-type test, the merger raises concerns of unilateral effects more on the advertisers' side of the market and less on the readers' side of the market.

10.6 SUMMARY AND CONCLUSIONS

We investigate different ways to assess unilateral merger effects in a two-sided market by applying them to a hypothetical merger in the Dutch newspaper industry.

Lacking other sources of information on diversion ratios and profit margins, we first specify and estimate a structural model of demand for differentiated products on both the readership and the advertising side of the market. In particular, we estimate a log-linear demand for advertising slots and a logit demand for newspaper copies. This allows us to recover price elasticities, indirect network effects and marginal costs.

We use these estimates to compare different methods used to evaluate merger effects: a concentration analysis based on the HHI, a SSNIP-type test and a full merger simulation. The results are consistent with the newspaper market being characterized by a positive indirect network effect of readership on advertising demand higher than the positive indirect network effect of advertising demand on readership. In other words, advertisers care more about readers than readers care for advertising. Since raising the newspaper price is likely to lead not only to a loss in readers but also a loss in advertising, the post-merger tendency to increase subscription prices will be lower than in the absence of network effects.

Overall, in our case, the effects of the hypothetical merger on subscription prices and readers' welfare are found to be small. The merger has a larger and negative impact on the advertising side. To this regard, with the exception of market concentration analysis, there does not seem to be a significant difference between the different methods used to assess the unilateral effects of the hypothetical merger we analysed. This is not surprising as we used a SSNIP formula adjusted for two-sided platforms, so that the HHI-based analysis was the only one that did not take the two-sided nature of the market into account.

NOTES

1. This chapter is based on a previous empirical study performed for the Dutch competition authority (NMa). The views expressed are not necessarily the ones of the NMa. We appreciate financial support by the NMa and comments received at seminar presentations in Bergen and Düsseldorf, as well as conference presentations at the 2011 CRESSE conference in Rhodes, at the EARIE conference in Stockholm and at the Media Economics workshop in Moscow. We thank Ron Kemp, Bastiaan Overvest, Lars Sorgard, Frank Verboven and Björn Vroomen for useful suggestions and Pauline Affeldt for her research assistance. For the additional work leading from the above report to this chapter, we acknowledge financial support from a NET Institute (http://www.netinst.org) summer grant and a Microsoft grant to TILEC. Such grants were provided in accordance with the KNAW Declaration of Scientific Independence. All remaining errors are ours.
2. Originally, the SSNIP test was devised for market definition and as such asks the question of whether a hypothetical monopolist would find it profitable to raise the price by 5 or 10 per cent. This is why the test is sometimes called the Hypothetical Monopolist test. Note that in the original context of the test it is somewhat more natural to assume that the prices of the products not owned by the hypothetical monopolists remain unchanged.

3. We use the word 'roughly', because in a two-sided market without a transaction among users of the platform one needs to reduce the two prices to the same unit of measurement by appropriate weights. In a newspaper market, the price level is equal to the per copy revenues from both the readership and the advertising side, while the price structure is the ratio of the revenues from both sides.
4. In practice, although in many circumstances it would probably be relevant, the assessment of unilateral merger effects does not tackle the issue of product repositioning or, if it does, the analysis is mainly qualitative.
5. We model them as part of the outside good when estimating readership demand and allow the value of the outside good to increase with time. Also the increased value of not buying a newspaper and reading news online is captured by the dependence of the value of the outside good on time.
6. *Sp!ts* is also part of the Telegraaf group, but we treat it as part of the outside good for the entire analysis. This is not likely to alter our conclusions on the readership side, as long as it remains a free newspaper. In Section 10.4 we discuss our use of a model for the advertising side in which newspapers do not directly compete with one another. Given that we use this model also, conclusions for the advertising market are likely to be unaffected.
7. Reach differs from circulation in that reach is the number of people reading a newspaper, whereas circulation is the number of copies that are distributed. Circulation can be divided into paid and unpaid circulation. Most of the circulation is paid, and as already pointed out above, most of the paid circulation is paid subscriptions.
8. There are five regions with on average about three million people living in each region. These regions are reasonably small in terms of geographical distance.
9. This is the test in the European Union. In the USA, the formulas are often used to calculate the optimal price increase above the current level by the merging parties keeping rivals' prices constant. Also in the USA, the formulas for Critical Loss Analysis (CLA) or Critical Elasticity Analysis (CEA) assume constant marginal costs and either linear or iso-elastic demand. As with market definition, the difference between the SSNIP and the HM test appears to be very small at first sight and it is a matter of debate whether this difference is in practice relevant or not. In Section 10.5.2 we present the results from both versions of the test.
10. As explained in Filistrucchi et al. (2010), this involves first finding the derivatives of both demands with respect to prices on all sides of the market in order to write the first order conditions, then inverting the set of first order conditions, one for each newspaper and each price. Here, we incorporate the ownership structure in the industry. We find margins to be about 60 per cent on the readership side and 40 per cent on the advertising side. This is somewhat different from Kaiser and Wright (2006) and Song (2011), who find that often margins are negative on the readers' side for German magazines.
11. Here and in the following, we first aggregate the market shares by newspaper company, then square them and finally add them up. This is necessary as newspaper publishing companies are multi-product firms.
12. Absent a price, we do not have a straightforward way to estimate cross-price elasticities or diversion ratios for the free press. Therefore, even though it is straightforward to calculate HHIs without doing so, we prefer to abstract from them also in this section in order to be consistent in our comparison of the different methods for assessing unilateral effects.
13. We constrain the merged firm to set prices that are not negative and that do not exceed twice the prices we observe in our original data. In practice, both in the EU and in the USA, the test is often conducted using formulas derived under the assumption of constant marginal costs and either linear or iso-elastic demand. See Filistrucchi (2008) for a discussion of these formulas and their extension to two-sided markets.
14. Intuitively, the assumption of no direct cross-price effects on the advertising side implies that there are no price effects that could be internalized in addition by the merging parties. At the same time, changes in the optimal subscription prices will affect circulation and this will shift the advertising demand, but because of the constant elasticity specification for advertising demand it is the case that advertising prices will be unaffected by those shifts in demand, unless there are efficiency gains from the merger on the advertising side. Note, however, that advertising prices per reader will change.
15. Note that the decline in advertising demand and therefore in advertising profits would not take place in the absence of an indirect network effect from readers to advertisers.
16. We do not report absolute levels of welfare here, because the area under the demand function is not finite.

REFERENCES

Anderson, S. and J. Gabszewicz (2006), 'The media and advertising: a tale of two sided markets', in Victor A. Ginsburgh and David Throsby (eds), *Handbook of the Economics of Art and Culture*, Amsterdam: Elsevier, pp. 567–614.

Argentesi, E. and L. Filistrucchi (2007), 'Estimating market power in a two-sided market: the case of newspapers', *Journal of Applied Econometrics*, **22**(7), 1247–66.

Berry, S. (1994), 'Estimating discrete-choice models of product differentiation', *RAND Journal of Economics*, **25**(2), 242–62.

Chandra, A. and A. Collard-Wexler (2009), 'Mergers in two-sided markets: an application to the Canadian newspaper industry', *Journal of Economics and Management Strategy*, **18**(4), 1045–70.

Evans, D. and M. Noel (2008), 'The analysis of mergers that involve multisided platform businesses', *Journal of Competition Law and Economics*, **4**(3), 663–95.

Fan, Y. (2011), 'Ownership consolidation and product characteristics: a study of the U.S. daily newspaper market', mimeo, University of Michigan.

Filistrucchi, L. (2008), 'A SSNIP test for two-sided markets', NET Institute Working Paper No. 08–34.

Filistrucchi, L., T.J. Klein and T. Michielsen (2010), 'Merger simulation in a two-sided market: the case of the Dutch daily newspapers', NET Institute Working Paper No. 10–15.

Jeziorski, P. (2011), 'Merger enforcement in two-sided markets', mimeo, Johns Hopkins University.

Kaiser, U. and J. Wright (2006), 'Price structure in two-sided markets: evidence from the magazine industry', *International Journal of Industrial Organization*, **24**, 1–28.

Rosse, J. (1970), 'Estimating cost functions parameters without using cost data: illustrated methodology', *Econometrica*, **38**(2), 255–75.

Rysman, M. (2004), 'Competition between networks: a study of the market for yellow pages', *Review of Economic Studies*, **71**(2), 483–512.

Song, M. (2011), 'Estimating platform market power in two-sided markets with an application to magazine advertising', The Bradley Policy Research Center Financial Research and Policy Working Paper No. FR 11–22.

Van Cayseelse, P. and S. Vanormelingen (2009), 'Merger analysis in two-sided markets: The Belgian newspaper industry', mimeo, University of Leuven.

Wright, J. (2004), 'One-sided logic in two-sided markets', *Review of Network Economics*, **3**(1), 44–64.