Description of the Market Structure

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1 Data Updates:

In the previous reports, only the newspapers that were present in both the circulation and advertising datasets were included. However, for a more comprehensive analysis, the data has now been merged by performing an outer join on the two datasets. This ensures the inclusion of all newspapers that are present in either the circulation dataset or the advertising dataset, or both.

There are newspapers in the circulation dataset that are not included in the advertising dataset, and vice versa. Consequently, some newspapers lack advertising rates, while others lack circulation data. Nonetheless, including all newspapers is preferable when counting the number of newspapers in each Census Subdivision before and after the newspaper swap, as it ensures a broader range of newspapers is covered and reduces the likelihood of overlooking important ones.

Some of the newspapers swapped were dailies, and initially, they were not covered in either the advertising or circulation datasets. To ensure their inclusion in the analysis, these dailies were manually added to the dataset as part of the newspaper swap. This results in a more comprehensive representation of the newspaper landscape for the analysis, although it may be more appropriate to exclude these dailies when studying circulations, considering their potentially different business model.

Furthermore, some unusual addresses provided as circulation areas for certain observations in the data were manually corrected. Upon investigation, it appears that some of these addresses may be vague directions of a city, for example (northeast should be interpreted as the northeastern suburb of the city where the newspaper mainly circulates, while GPS located it somewhere in the center of northeast Ontario). These corrections impact the latitude and longitude coordinates of the circulation areas, thereby affecting the Census Subdivisions impacted by the newspaper swap.

After these corrections were made, a total of 33 Census Subdivisions are now affected by the newspaper swap.

The dataset now includes 625 newspaper editions, out of which 53 editions have been swapped, and 119 editions are affected by the swap as they circulate in the impacted census subdivisions. In terms of distinct newspapers, there are 490 newspapers covered in the dataset, with 39 of them being swapped and 95 newspapers being affected by the swap. It is worth noting that the two commuter newspapers that were swapped have been excluded from this count, as one of the commuter newspapers is not in Ontario, and they appear to be treated as separate entities from community newspapers according to the news reports covering the swap event.

2 Market Structure Change of The Affected Census Subdivisions:

In order to assess whether Metroland or Postmedia are avoiding competition, an analysis was conducted for each impacted census subdivision, counting the number of newspapers owned by Metroland, Postmedia, and other companies before and after the swap in these markets. The inference of newspaper existence is based on observations,so it is possible for newspapers to operate in a market without being observed in the data.

For example, based on the available data, it is indicated that Postmedia does not own any newspapers in the Ottawa census subdivision, both before and after the swap. However, news reports about the swap event suggest that Postmedia does own some newspapers in Ottawa, even though they are not included in the dataset. This discrepancy could be because these newspapers are not members of News Media Canada. Therefore, the interpretation of the analysis needs some caution.

Nevertheless, the data does indicate some evidence of the two companies avoiding competition. In many census subdivisions, there is only one newspaper operated by each company. After the swap, these markets are left with either Postmedia or Metroland as the sole operator. While this pattern is observed in many markets, it is not always the case. Some markets initially have only one newspaper owned by one of the two companies, but after the swap, neither company remains active in the market. Additionally, there are instances where certain markets have multiple newspapers owned by one of the two companies. Detailed information can be found in Table 1.

When the CEOs of the two companies discussed the newspaper swap, their intention may have been to reduce market contact in a general sense, rather than focusing on each specific census subdivision or completely avoiding market contact. This could be one possibility explaining why it is not consistently the case that each market has two newspapers operating, with only one company remaining after the swap. To further verify this, a similar analysis was conducted using census divisions as the market definition, as census divisions are larger in size. Although both definitions show evidence of avoiding market contact, it appears that defining markets as census subdivisions provides a better representation of the avoidance of market contact.

3   Rate Comparison with Control Market

The question at the core of this research is: How does the swap event influence the advertising rates of Postmedia and Metroland newspapers in the swapped markets, as compared to other similar markets? To address this, we pair swapped markets with control markets, utilizing demographic characteristics as the basis for comparison. These demopgraphc variables are selected according to Ying Fan (2013), which include population, median income, average age, and the proportion of the population with a bachelor's degree or higher. Each demographic variable undergoes a logarithmic transformation, followed by normalization to achieve a normal distribution, which is a commonly used normalization method. Subsequently, we match swap-affected markets with control markets based on the nearest Euclidean distance calculated using these variables.

An inherent potential bias is the possibility of Postmedia and Metroland discontinuing underperforming newspapers during the swap event, thereby leading to a higher post-swap average rate in the swap affected markets. To avoid this selection bias, we establish a criterion for the inclusion of newspapers in our analysis. Specifically, we require that a newspaper must have existed prior to the swap and continued to operate afterwards. By doing so, we aim to ensure a more representative sample. We then calculate the difference between the average rate for the years 2018-2019 and the rate in 2017 for each newspaper, in order to determine whether there was an increase in rates after the swap. Concurrently, we also assess the difference between the 2017 rate and the average rate from 2013-2016 to identify the pre-2017 time trend for each newspaper. This procedure is carried out for each market, and the average rate change is computed separately for newspapers owned by Postmedia and Metroland, adhering to the aforementioned inclusion criterion.

This process unavoidably excludes certain markets if there are no newspapers that satisfy the inclusion criterion. Additionally, due to the outer join between the advertising rate dataset and circulation dataset, some newspapers may lack available advertising rate data. Since our analysis necessitates the observation of advertising rates, newspapers without this data are excluded. Consequently, any market that has only one surviving newspaper with missing rate data is also excluded from our analysis.

The matching process is performed separately for Postmedia and Metroland. Let's consider Postmedia as an example. We categorize all markets that have at least one surviving Postmedia-owned newspaper into two groups: swap-affected and swap-unaffected. Each swap-affected market is then

CSDs	Before Swap			After Swap		
	Others	metroland	postmedia	Others	metroland	postmedia
Alnwick/Haldimand	0	0	1	0	0	0
Barrie	1	1	1	1	1	0
Belleville	1	1	1	1	0	1
Bradford West Gwillimbury	0	1	1	0	1	0
Brantford	0	1	1	0	0	1
Brockville	1	1	0	1	0	0
Cobourg	0	1	1	0	1	0
Collingwood	0	1	1	0	1	0
Cramahe	0	1	1	0	1	0
Fort Erie	0	1	1	0	1	0
Innisfil	0	1	1	0	1	0
Kingston	1	1	1	1	0	1
London	3	1	1	4	0	1
Meaford	1	1	0	1	0	0
Niagara-on-the-Lake	0	1	1	0	1	0
Norfolk County	2	1	1	2	0	1
Orillia	1	1	1	1	1	0
Ottawa	5	8	0	9	0	0
Pelham	2	1	2	2	2	0
Peterborough	1	1	1	1	2	0
Port Colborne	0	1	1	0	1	0
Port Hope	0	1	1	0	1	0
Quinte West	2	1	1	2	0	1
South Frontenac	0	1	1	0	0	1
South Huron	0	2	0	0	0	2
Southwold	0	1	0	0	0	0
St. Catharines	1	0	1	1	1	0
St. Marys	1	2	0	1	0	0
St. Thomas	0	1	0	0	0	0
Stirling-Rawdon	0	1	0	0	0	0
Stratford	0	1	1	0	0	1
Thorold	0	0	1	0	0	0
Welland	1	0	1	1	1	0
Sum of Each Column	24	38	26	29	17	10

Table 1: Market Structure: Number of Newspapers Owned by Metroland, Postmedia, and Other Companies Before and After the Swap for Each Census Subdivision Affected by the Newspaper Swap

| | Before Swap | | | After Swap | | |
CDs	Others	metroland	postmedia	Others	metroland	postmedia
Brant	1	1	2	1	0	2
Elgin	2	1	1	1	0	1
Frontenac	2	2	1	2	0	1
Grey	3	1	0	3	0	0
Haldimand-Norfolk	4	2	1	4	1	1
Hastings	7	3	2	7	0	2
Huron	1	3	4	1	1	6
Leeds and Grenville	4	2	1	4	1	1
Middlesex	6	1	2	8	0	2
Niagara	5	5	8	5	8	0
Northumberland	0	3	1	0	2	0
Ottawa	5	8	0	9	0	0
Perth	2	6	2	2	3	2
Peterborough	3	1	1	3	2	0
Simcoe	9	8	6	9	8	1
Sum of Each Column	54	47	32	59	26	19

Table 2: Market Structure: Number of Newspapers Owned by Metroland, Postmedia, and Other Companies Before and After the Swap for Each Census Division Affected by the Newspaper Swap

4

matched with a market that exhibits the closest demographic variables. This ensures that the compared markets are as similar as possible in terms of their demographic characteristics.

After the matching process, we proceed to compare the average rate patterns for the Postmedia-owned newspapers between the swap-affected and swap-unaffected markets. This analysis allows us to assess any differences in rate patterns specifically for Postmedia-owned newspapers. A similar analysis is performed for Metroland, following the same methodology.

Tables 3 and 4 present the results for Postmedia and Metroland, respectively. In the case of Postmedia, the analysis reveals that rates increased for newspapers in the swapped markets, although to a lesser extent compared to newspapers in the control markets, on average. Notably, newspapers operating in the swapped markets experienced a rate decline prior to the swap, suggesting potential pressures to decrease rates before 2017. However, the swap appears to have halted or even reversed this decline.

Conversely, for Metroland, the observed pattern is not statistically significant, as no variations are observed in either the swapped or control markets post-2017. However, both the swapped and control markets did experience a rate increase before 2017.

Based on these findings, it seems that Postmedia benefited more from the swap event. Without the swap, the surviving Postmedia-owned newspapers would likely have encountered further advertising rate losses.

4   Probit Model Regression

To analyze the reasons behind the newspaper swap between Postmedia and Metroland in specific markets, a probit model is employed.

In aggregate, there are 214 markets, out of which 33 experienced a swap in 2017. A binary variable is assigned a value of 1 for the swap affected markets and 0 for unaffected ones. The analysis is under market level.

However, it's important to note that the swaps occurred within a single year, specifically in 2017, rather than over an extended period of time. The dependent binary variable, which represents the occurrence of a swap, remains constant over time. On the other hand, some independent variables such as the mean advertising rate and mean circulation are time series data, posing a challenge when employing a probit model with time-variant independent variables and a time-invariant dependent variable.

To address this, we account for the time trend by controlling the mean advertising rate for each market from 2013 to 2017. Additionally, we control the mean advertising rate and mean circulation for the year 2017. To capture market structure, we also control for the number of newspapers in the market, the number of newspapers owned by Postmedia or Metroland, and the circulation share (representing the share of total circulations for Postmedia and Metroland) in 2017. Furthermore, we include time-invariant demographic variables.

	Swap Affected				Swap Unaffected	
Market	ΔRate 13-16 and 17	ΔRate 17 and 18-19	Control		ΔRate 13-16 and 17	ΔRate 17 and 18-19
Kingston	0.0175	0.0000	Sarnia		0.0000	-0.0750
South Frontenac	0.0175	0.0000	Kenora		-0.0100	0.0000
Belleville	-0.0975	0.0000	Chatham-Kent		0.0213	0.0226
Quinte West	-0.0675	0.0000	Strathroy-Caradoc		-0.0675	0.0000
Norfolk County	0.0200	0.0200	Sault Ste. Marie		0.0940	0.0900
Brantford	0.0000	0.0700	Chatham-Kent		0.0213	0.0226
London	-0.4425	0.0000	Windsor		0.1050	0.1400
Mean	-0.0789	0.0129			0.0234	0.0286

Table 3: Comparing the Rate Pattern: Postmedia

	Swap Affected			Swap Unaffected	
Market	ΔRate 13-16 and 17	ΔRate 17 and 18-19	Control	ΔRate 13-16 and 17	ΔRate 17 and 18-19
Cramahe	0.0425	0	Arnprior	-0.0150	0
Port Hope	0.0425	0	Bracebridge	0.1017	0
Cobourg	0.0425	0	Brighton	-0.2475	0
Peterborough	0.0925	0	Kawartha Lakes	0.0650	0
Pelham	0.2975	0	Scugog	0.0400	0
Bradford West Gwillimbury	0.0325	0	Orangeville	0.0837	0
Innisfil	0.0325	0	Georgina	0.0450	0
Collingwood	0.0317	0	Huntsville	0.2480	0
Barrie	0.1033	0	Cambridge	0.0862	0
Orillia	0.0675	0	Huntsville	0.2480	0
Mean	0.0785	0		0.0655	0

Table 4: Comparing the Rate Pattern: Metroland

	(1)	(2)	(3)
Intercept	-98.6999**	-108.8754**	-40.8171
	(44.6760)	(55.4442)	(65.4651)
Age	15.7093**	15.6940*	8.0722
	(6.6433)	(8.1943)	(9.5771)
Education	-0.5317	-0.4910	0.1355
	(0.4206)	(0.5584)	(0.6744)
Income	0.0021	0.0378	-0.9512
	(1.1415)	(1.4845)	(1.7835)
Mean Circulation 17		0.3834**	-0.5100
		(0.1647)	(2.9761)
Mean Rate 17		-0.0892	0.0341
		(0.1506)	(1.4897)
Rate Trend 13-17		0.1141	1.5921
		(0.0953)	(3.7839)
# of Newspapers	-0.0212	0.1464	-0.5131
	(0.0302)	(0.0995)	(0.3157)
P&M Mean Circulation 17			0.7193
			(2.9564)
P&M Mean Rate 17			-0.1410
			(1.4722)
P&M Rate Trend 13-17			-3.4547
			(4.0185)
P&M # of Newspapers			1.2583***
			(0.4865)
P&M Circulation Share			0.1742
			(1.6636)
Population	0.9485*	0.5453	-0.0476
	(0.4941)	(0.6445)	(0.7623)
Population Growth	3.1229	5.2331*	1.4198
	(2.2743)	(2.8168)	(3.4329)
N	210	157	98
Pseudo R2	0.10	0.17	0.27

Table 5: Probit Regressions for the Possibility for a Market to be Affected by Swap. P&M Represent Postmedia and Metroland. Any Observations with Missing Values Are Dropped in Order To Run the Regression.