TABLE 7—DETERMINANTS OF EQUILIBRIUM DIVERSITY

	Markets with diverse papers	Share of households in markets with diverse papers	Share of households reading diverse papers
Baseline	143	0.22	0.029
Ignore competitors' choices	68	0.11	0.014
Ignore household ideology	211	0.31	0.038
Ignore idiosyncratic cost shocks	110	0.18	0.024

Notes: Table shows averages over five counterfactual simulations at the parameters reported in Tables 5 and 6. A market has diverse papers if it has at least one Republican and one Democratic paper, and a household reads diverse papers if it reads at least one Republican and one Democratic paper. "Baseline" is simulation of the estimated model. "Ignore competitors' choices" is a counterfactual in which each paper chooses its affiliation as if it will be the only paper in the market. "Ignore household ideology" is a counterfactual in which each paper chooses its affiliation as if its market were 50 percent Republican ($\rho = 0.5$). "Ignore idiosyncratic cost shocks" is a counterfactual in which each paper chooses its affiliation as if $\xi = 0$. The number of newspapers is fixed at its baseline value in all counterfactuals.

In the online Appendix, we present estimates of the main regression specifications in Tables 3 and 4 using data simulated from the model at the estimated parameters. We also present a figure illustrating the fit of the entry model. These regressions and figure show that the estimated model fits key features of the data well on the whole. An important exception is that the model underpredicts the number of large markets with two papers relative to the number with one or three, possibly due to the functional form imposed by the symmetric logit error in the demand system. The online Appendix also presents evidence on the model's out-of-sample fit to the distribution of subscription prices across market configurations, and to the effect of long-term changes in marginal cost on newspaper market structure.

To interpret the magnitude of the parameter estimates and to study the drivers of ideological diversity, Table 7 shows the estimated model's prediction of the level of diversity at baseline and under three counterfactual scenarios. We measure diversity in three ways: the number of markets with diverse papers (at least one paper of each type), the share of households in a market with diverse papers, and the share of households reading at least one paper of each type.

In our first counterfactual, we assume that each entering newspaper chooses its affiliation as if it expected to be the only newspaper in the market. In our second counterfactual, we assume that each newspaper chooses its affiliation as if its market had equal numbers of Republican and Democratic households. In our third counterfactual, we assume that each entering newspaper chooses its affiliation as if there are no idiosyncratic affiliation-specific cost shocks ξ. These counterfactuals can be thought of as measuring the importance of competition, consumer tastes, and idiosyncratic factors, respectively, in determining equilibrium diversity.

We find that competition exerts a large effect on diversity: when competitive effects are absent, diversity falls by half. Eliminating catering to consumer tastes increases diversity by about as much as competition reduces it. Eliminating the role of idiosyncratic factors matters less than eliminating competition.

Table 8—Equilibrium and Surplus-Maximizing Outcomes

	Baseline	Chosen to maximize total surplus	
		Post-entry outcomes	Entry and post-entry outcomes
Markets with newspapers	951	951	1,910
Markets with multiple newspapers	256	256	1,845
Share of households reading a newspaper	0.39	0.53	0.91
Average price in multipaper markets	5.48	0.04	0.05
Average ad revenue per reader in multipaper markets	11.24	11.55	11.31
Per household			
Consumer surplus	3.44	6.55	15.69
Newspaper profit	0.41	−6.27	−17.51
Advertiser profit	0.39	6.86	10.39
Total surplus	4.24	7.15	8.56
Diversity			
Markets with diverse papers	143	175	1,370
Share of households in markets with diverse papers	0.22	0.27	0.84
Share of households reading diverse papers	0.029	0.091	0.334

Notes: Table shows averages over five counterfactual simulations at the parameters reported in Tables 5 and 6. The distribution of profits between newspapers and advertisers is indeterminate in the two counterfactuals shown; we assume that advertisers capture all surplus from advertising. A market has diverse papers if it has at least one Republican and one Democratic paper, and a household reads diverse papers if it reads at least one Republican and one Democratic paper. "Baseline" is simulation of the estimated model. In column 2, the number of newspapers is fixed at its baseline value and a social planner chooses affiliations, ad prices, and circulation prices to maximize total surplus, with the constraint that all prices must be weakly positive. In column 3, the social planner also chooses the number of papers in each market. Average price is an annual subscription price. Average ad revenue is reported per reader per year. Surplus and profit numbers are reported in annual dollars per household.

B. *Equilibrium and Welfare-Maximizing Outcomes*

In the first column of Table 8, we report market structure, prices, and welfare for our baseline model.[32] As in Table 7, each reported value is the average over five simulations. We also repeat the baseline diversity statistics from Table 7 in the final three rows for comparison with what follows.

Of the 951 markets in our baseline simulation with at least one newspaper, 256 have two or more. Thirty-nine percent of households read at least one newspaper. In multipaper markets, the average annual subscription price of competitive newspapers is \$5.48 (in 1924 dollars), and the average advertising revenue per reader per year is \$11.24. Total surplus is \$4.24 per household per year, which breaks down into \$3.44 of consumer surplus, \$0.41 of newspaper profit, and \$0.39 of advertiser profit.

[32] We define consumer surplus in market m as total realized utility divided by the marginal utility of money:

$$\sum_{i=1}^{S_m} u_{im}(\mathcal{B}_i)/\alpha, \tag{15}$$

where $\mathcal{B}_i$ is the utility-maximizing bundle for household i and α is the price coefficient in our demand system. We define advertiser surplus in market m as the total value of advertisements placed less total advertising expenditures

$$S_m\left((1-q_{0m})(a_h-a_l)+\sum_{j=1}^{J_m} q_{jm}(a_l-a_{jm})\right), \tag{16}$$

where q_{0m} is the share of households purchasing no newspaper. We define total surplus as the sum of consumer surplus, advertiser surplus, and newspaper profits.

In the final two columns of Table 8, we compare these equilibrium outcomes to those that would be chosen by a social planner whose goal is to maximize total surplus. Importantly, we do not assume that the social planner internalizes any political externalities associated with ideological diversity. These simulations therefore allow us to evaluate whether there is any trade-off between the objectives of maximizing economic welfare and preserving diversity in the marketplace of ideas. As these simulations ignore many practical difficulties of implementation, they should not be thought of as policy analysis, but rather as framing for the policy experiments which we consider below.

The second column of Table 8 holds the number of newspapers fixed at baseline values, but allows the social planner to choose affiliations, circulation prices, and advertising prices. Because we estimate that newspapers exercise substantial market power, the social planner chooses substantially lower prices than occur in market equilibrium, with an average price in multipaper markets of only \$0.04, leading the share of households reading newspapers to increase by about one-half. As in Steiner (1952), the social planner also chooses more ideological diversity than occurs in market equilibrium: the number of markets with diverse papers increases from 143 to 175. This occurs because newspapers do not capture the full surplus from greater diversity. We show in the online Appendix that this distortion is most important in markets in which consumers' affiliations are about evenly split. The combined effect of the reduction in prices and the increase in the diversity of newspapers is to increase the share of households reading diverse papers by a factor of three.

The third column of Table 8 allows the social planner to control newspapers' entry decisions as well as post-entry outcomes. The results show that in market equilibrium the number of newspapers falls well short of the social optimum. The social planner increases the number of markets with at least one paper from 951 to 1,910 and the number of markets with multiple papers from 256 to 1,845. Increased entry further increases diversity: the number of households in markets with diverse papers rises to 84 percent, and one-third of households read diverse papers on any given day.

The source of insufficient entry here is the distortion formalized by Spence (1975): in markets with fixed costs, entrants do not internalize the effect of entry on the surplus of inframarginal consumers.[33] The result is not mechanical. In the standard symmetric logit model, which our model nests as a limit case, the number of firms in the free entry equilibrium can be greater or fewer than the first-best (Anderson, de Palma, and Thisse 1992). Insufficient entry arises at the estimated parameters because consumers capture a large share of surplus and because the significant (and empirically realistic) amount of multiple readership means the business-stealing externality highlighted in Mankiw and Whinson (1986) is relatively small. This contrasts with the results of Berry and Waldfogel (1999) for radio, where the estimated business-stealing externality is large, and equilibrium entry is consequently found to be excessive.

Because the use of a symmetric logit error is known to exaggerate the benefits from additional variety, in the online Appendix we show that the gains from moving

[33] For early discussions of the tendency toward inefficient entry in concentrated markets see Hotelling (1938) and the work of Jules Dupuit as summarized in Ekelund and Hébert (1999, pp. 159–91).

Table 9—Policy Experiments

	Baseline	Allow price collusion	Allow advertising collusion	Allow joint operating agreements	Allow joint ownership	Optimal subsidy
Markets with newspapers	951	951	951	951	954	1,883
Markets with multiple newspapers	256	290	400	415	126	1,253
Share of households reading a newspaper	0.39	0.36	0.44	0.42	0.33	0.74
Average price in multipaper markets	5.48	7.53	5.07	6.61	6.13	3.21
Average ad revenue per reader in multipaper markets	11.24	11.60	12.14	12.30	12.54	10.60
Per household						
Consumer surplus	3.44	2.98	4.46	3.79	2.63	8.93
Newspaper profit	0.41	0.42	0.44	0.50	0.86	1.07
Advertiser profit	0.39	0.29	0	0	0	1.68
Cost of subsidy						5.63
Total surplus	4.24	3.69	4.90	4.29	3.49	6.05
Diversity						
Markets with diverse papers	143	157	225	238	62	704
Share of households in markets with diverse papers	0.22	0.24	0.31	0.32	0.11	0.57
Share of households reading diverse papers	0.029	0.021	0.052	0.039	0.011	0.133

Notes: Table shows averages over five counterfactual simulations at the parameters reported in Tables 5 and 6. A market has diverse papers if it has at least one Republican and one Democratic paper, and a household reads diverse papers if it reads at least one Republican and one Democratic paper. "Baseline" is simulation of the estimated model. Columns 2–4 are counterfactuals in which entering papers set prices, ad rates, or prices and ad rates, respectively, to maximize their total profits. Column 5 is a counterfactual in which all potential entrants in a given market are jointly owned. Joint ownership means that newspapers make entry, affiliation, pricing, and ad rate decisions to maximize joint profits subject to a common affiliation cost shock ξ. Column 6 is a counterfactual which provides a payment per copy sold to all papers. Average price is an annual subscription price. Average ad revenue is reported per reader per year. Surplus and profit numbers are reported in annual dollars per household. Cost of subsidy includes a 30 percent cost of public funds.

to the social optimum are large even when we severely cap the number of potential entrants to each market.

The results in Table 8 show that there is no conflict between the goal of maximizing economic welfare and the goal of maintaining diversity in the marketplace of ideas. Policies that increase entry, as well as policies which promote diversity conditional on entry, would likely increase economic welfare even if the political externalities to diversity were small.

C. *Policy Experiments*

Table 9 presents a series of policy experiments based on the model. The first column shows baseline results for reference. The second through fourth columns relax competition policy by allowing newspapers to collude on prices only, advertising only, and both prices and advertising.[34] In all of these columns newspapers continue to make noncooperative entry and affiliation decisions. Arrangements in which

[34] We define a collusive price of newspaper j as the jth element of a price vector $\mathbf{p}^*$ that solves

$$\mathbf{p}^* \in \arg\max_{\mathbf{p}} \sum_{j=1}^{J_m} \left(p_j + a_{jm}(\mathbf{p}, \boldsymbol{\tau}) - MC\right) q_{jm}(\mathbf{p}, \boldsymbol{\tau}). \tag{17}$$