Düsseldorf Institute
for Competition Economics

DISCUSSION PAPER

No 132

Media Bias and Advertising: Evidence from a German Car Magazine

Ralf Dewenter,
Ulrich Heimeshoff

February 2014

HEINRICH HEINE
UNIVERSITÄT DÜSSELDORF

d|u|p düsseldorf university press

IMPRINT

DICE DISCUSSION PAPER

Published by

düsseldorf university press (dup) on behalf of
Heinrich-Heine-Universität Düsseldorf, Faculty of Economics,
Düsseldorf Institute for Competition Economics (DICE), Universitätsstraße 1,
40225 Düsseldorf, Germany
www.dice.hhu.de

Editor:

Prof. Dr. Hans-Theo Normann
Düsseldorf Institute for Competition Economics (DICE)
Phone: +49(0) 211-81-15125, e-mail: normann@dice.hhu.de

DICE DISCUSSION PAPER

ISSN 2190-9938 (online) – ISBN 978-3-86304-131-1

Media Bias and Advertising: Evidence from a German Car Magazine[a]

February 2014

Ralf Dewenter[b] and Ulrich Heimeshoff[c]

Abstract:

This paper investigates the existence of a possible media bias by analyzing the impact of automobile manufacturer's advertisements on automobile reviews in a leading German car magazine. By accounting for both endogeneity and sample selection using a two-step procedure, we find a positive impact of advertising volumes on test scores. The main advantage of our study is the measurement of technical characteristics of cars to explain test scores. Due to this kind of measurement, we avoid serious biases in estimating media bias caused by omitted variables.

Keywords: Car magazines, Media bias, Selection model, Instrumental variable estimation

JEL classification: L150, L820

[a] We are grateful to Michael Berlemann, Dirk Czarnitzki, Stephen Martin, and the participants of the MSI Brown-Bag Seminar at KU Leuven. We also thank Stephanie Effern, Hagen Niehaus, Julia Rothbauer and Denise Weber for excellent research assistance.

[b] Ralf Dewenter, Chair of Industrial Economics, Helmut-Schmidt-University of Hamburg, Holstenhofweg 85, 22043 Hamburg, Germany, Mail: dewenter@hsu-hh.de.

[c] Ulrich Heimeshoff, DICE, Heinrich-Heine-University of Duesseldorf, Universitaetsstr. 1, 40225 Duesseldorf, Germany, Mail: heimeshoff@dice.hhu.de.

1 Introduction

Media bias has been an important research topic in economics as well as marketing science, political science, and journalism. The most important objective for a free press is unbiased information for citizens.[4] As Hamilton (1994: 7) puts it: "News is a commodity, not a mirror image of reality." There is a large literature on media bias not only from economics, which shows that biased coverage is far from being rare. Consequently, media bias from different sources is studied substantially and it is therefore not surprising that a substantial part of research on media bias deals with political biases. It is well known that many daily newspapers or TV channels are biased either to the left or the right of the political spectrum instead of being politically neutral. It is, e.g., a common complain that the New York Times has an explicit liberal viewpoint. As a result, coverage in the New York Times is not objective and consequently biased. Of course such biases can be found in both directions of the political spectrum, a prominent example is the Washington Post and its apparently conservative bias. These biases are not necessarily profit-oriented, but depend on the political opinions of the owners, the editors, and/or the journalists of the newspaper or magazine.

Another important source of media bias is profit-oriented and therefore also connected with the theory of two-sided-markets (see, e.g., Rochet & Tirole, 2003). It is well known, that recipients and advertising markets are not independent from each other (see Bagwell, 2007). Recipients may not like too much advertising in their favorite newspaper or magazine, but appreciate lower prices, as a substantial share of revenues is generated in the advertising market. Advertising customers on the other hand are only willing to spend their advertising budget if newspapers and magazines have large numbers of recipients. Otherwise advertising revenues would decrease and prices on recipients markets would increase. Advertising volumes are frequently the most important source of revenues for print media. As a result, newspapers or magazines might have sufficient incentives to increase the demand for advertising space in order to increase advertising revenues and also profits. Advertising customers might have incentives to increase their demand for advertising space in a given newspaper, if the newspaper provides benevolent coverage of the company's products, which is nothing else than biased coverage.

The effects of biased coverage in two-sided-markets are significantly different from one-sided-markets. In one-sided-markets assuming negligible cost, biased coverage would certainly have at least a non-negative effect on profits. In two-sided-markets predictions about the effects

[4] However, it is well known, that some consumers like to read coverage which is not the truth, but in line with their beliefs. See Xiang and Sarvary (2007) for an analysis of the effects of biases versus conscientious consumers on media bias.

of biased reporting are much more difficult. The effects can be weaker as well as stronger compared to one-sided-markets. The result depends on the size of the network effects from the advertising to the recipients market. Media bias will always have stronger effects than in one-sided-markets, if readers like advertising, or in other words if network effects are positive. This effect, which is based on the reinforcing impact of two-sided network effects, shows the interdependency of advertising and recipients markets. Increasing amount of advertising volume also fosters demand for copies which in turn lead to a stronger demand for advertising space. However, readers will not always like advertising in reality. Readers' dislike of advertising will produce a trade-off between advertising and demand for copies. An increase in the demand for advertising space would reduce the demand for copies. As a result, the incentives for biased coverage would be reduced when readers don't like advertising.

There is a number of non-economic studies dealing with political biases using data from the U.S., where much evidence on political biases has been collected. Biases have been reported on topics such as the U.S. quality press and climate change (see Boykoff and Boykoff, 2004) as well as tobacco-related diseases (see Baker, 1994 and Bagdikian, 2000). However, the concept and existence of media bias is not limited to political biases. Another source might be private information obtained by journalists (see Dyck & Zingales, 2003; Barron, 2006), which may persist even when media markets are competitive.

Studies on media bias are rather new in economics. Even though studies on media bias have a long tradition in journalism and political science (see Glasgow University Media Group, 1982 and Herman and Chomsky, 1988), there is also a number of economic studies dealing with this topic. A seminal theoretical paper is Mullainathan & Shleifer (2005) on political bias. The paper compares newspapers' incentives to distort the news coverage under both monopolistic and competitive market structures. The authors not only assume that contents are biased but also the readers are characterized by their subjective beliefs which they appreciate seeing confirmed. As a result, newspapers are likely to slant stories towards their readers' beliefs. The main finding is that competitive firms have stronger incentives to bias news coverage. However, there are also theoretical models which yield opposite results as in Anderson & McLaren (2007) and Gentzkow & Shapiro (2006a). Both papers find that competition is likely to reduce media bias if readers are able to judge the validity of the coverage.

Most of the existing theoretical studies on media bias focus on the bias toward preferences of the readership and only few analyze the incentives to slant content toward the advertising customers. Gal-Or et al. (2012) add to the work of Mullainathan & Shleifer (2005) and analyze media bias when advertising is included as an important source of revenues. Actually this is the case for many media products in the real world. In their analysis the concept of multihoming is

crucial. Multihoming means that customers use several platforms instead of only one platform in case of singlehoming. Advertising customers share their budget to several newspapers when multihoming. Gal-Or et al. (2012) show that newspapers slant their coverage to a rather extreme position when advertising customers choose to singlehome their marketing budget to a single newspaper. In contrast in case of multihoming advertisers newspapers choose rather moderate positions. Ellman & Germano (2009) compare the effects of monopoly versus competition in a two-sided-markets model induced by advertising revenues. The authors find that advertising leads to biased news coverage in monopolistic market structures but unbiased reporting under competition.

Political bias also dominates empirical studies on media bias, which is still a rather new field of media economics. Seminal studies are Gentzkow & Shapiro (2006b) and DellaVigna & Kaplan (2007) as well as George & Waldfogel (2003), which all analyze the existence of a political bias from different perspectives.

However, up to now, only few studies focus on the effects of advertising revenues on reporting. Boykoff & Boykoff (2000), for example, deals with the case of newspaper coverage of climate change topics and its relation to media-related budgets of think tanks and industry organizations of the U.S. oil industry. Moreover, there is a special kind of media bias which is directly related to specific products. In today's media markets we observe numerous magazines covering or even specializing on product reviews. It is reasonable to assume, that expert opinions and test results have significant influence on consumers' decisions (see Reinstein & Snyder, 2005). Product reviews are perfectly suited to analyze media biases, as the researcher can more or less directly measure the effects of advertising on the review of a company's product in the given magazine. Well known examples are the studies of wine ratings (see Reuter, 2009) and recommendations of investment funds (see Reuter & Zitzewitz, 2006).[5] Both studies find evidence for biased ratings or recommendations. Magazines seem to bias recommendations for mutual funds and their wine reviews towards their biggest advertising customers. These studies are most closely related to our analysis. The challenge of these studies, however, is to find good measures for product performances in order to evaluate the accuracy of reviews. Rating wines is, of course, always subjective to some degree. Financial products instead can be rated with regard to their performance, however, measured performance is not always identical to companies' real performance due to substantial noise in financial markets.

The problem of measuring product performance is a major advantage of our study. In order to measure a possible bias we use information on car reviews of a leading German car maga-

[5] There is now a whole field called "Wine Economics", which started mainly with the work of Ashenfelter. See e.g. Ashenfelter (1989) and Ashenfelter (2008).

zine, Auto, Motor und Sport, and at the same time we use information on manufacturers' advertising volumes. By these means a possible link between manufacturers' advertising volumes and the performance of the respective cars can be analyzed. Analyzing car reviews is advantageous for some reasons: We have substantial information on cars' characteristics and as a result of this information, we are able to filter the more or less objective part of a test score. Additionally, we can check where media bias due to advertising volumes steps in and are therefore able to identify which parts of the test scores are either based on technical characteristics or on the impact of advertising customers.

Mutual funds and wine are both products which face a major problem which is the evaluation of performance. It is rather easy to evaluate the performance of mutual funds, but it is always some sort of ex post evaluation. Additionally, the performance does not only depend on the fund managers' actions but also on general market conditions. Wine recommendations and reviews are always subjective in some sense. This is where our study adds to the literature. We use data on car reviews and manufacturers' advertising volumes from a leading German car magazine which enables us to control for technical characteristics of cars. As a result, we can explain to which extend technical features of the cars explain the test results and can also test the effect of advertising volumes on test results. Cars have the big advantage that there are several objective criteria as for example horse power, trunk capacity, and mileage we can observe and include into our regressions. This enables us to give a more precise statement on the size of media bias compared to other products whose performance is more difficult to evaluate. In addition we take into account the endogeneity of advertising volumes which result from the interdependency of both advertising and recipients markets. Using instrumental variable techniques, we compare our results to simple OLS estimates to get an impression of the bias. We also take into account possible selection biases, because there are significant differences between manufacturers' cars being reviewed. To solve this problem we estimate Heckman two step models, which estimate the probability of a given car to be reviewed and include this as the inverse Mills ratio into our second step regression, where we estimate the effects of advertising volumes on test results.

The paper proceeds as follows: In the next section we describe our data and several steps of aggregation. Section 3 discusses the estimation and identification strategy. In section 4 we present our results, several robustness checks, and provide some interpretations about the stability of media bias over time. Section 5 concludes and gives some suggestions for further research.

2 Data

To analyze the impact of car manufacturers' advertising expenditures on car reviews, we collected data on test results as well as a measure (or at least a proxy) for advertising expenditures. We also use several controls in order to prevent misspecification and omitted variable issues. Descriptions of the variables in our dataset as well as descriptive statistics can be found in tables A1, A2, and A3 in the appendix.

The data used in this study is extracted from different sources (see Table 1 in the appendix): information on car reviews as well as information on manufacturers' advertisements is taken from one of the most important German bi-weekly car magazines, *Auto, Motor und Sport (AMS)*, information on cars' characteristics is gathered from the Schwacke Car Index, new releases of passenger cars as well as new registrations of passenger cars in Europe is provided by the European Automobile Manufacturer Association (ACEA, 2013; see www.acea.be) and information on overall advertising volumes is provided by PZ-Online (www.pz-online.de), which is a platform informing potential advertising customers about the performance of magazines.

In order to measure the performance of manufacturers' cars being reviewed we collected the results of all comparative reviews, comparing at least two different models, in AMS from the first issue 1992 to the 26th issue in 2007. AMS is the second largest car magazine on the German market with an average circulation of about 370,000 in 2013 (see IVW.de for more information).

By these means, we observe both a ranking of cars reviewed in a specific test as well as respective test scores. Both measures could in principle be used as a degree of performance. Using comparative reviews instead of single car reviews is advantageous for our analysis as a potential bias can be directly implemented in case that models by different manufacturers are directly compared. We therefore rely on the results from comparative tests and do not consider single car reviews. Hence, during the whole period we observe comparative tests over a total of 1950 cars. However, as some of the tests were conducted without scores (but only with a ranking) the sample reduces to some degree. Our first left hand side variable is therefore SCORE which is the resulting score of a specific car (say Renault Clio 1.2 RN, built in 1993) achieved in a comparative review at time *t*.[6]

To analyze the impact of advertising expenditures on test results, we use the number of advertising pages in an issue placed by a manufacturer as a proxy for advertising expenditures. In

[6] Unfortunately, as each issue of AMS includes typically more than one comparative test using more than one model of a specific manufacturer and, furthermore, many models are tested only once over the whole period, we are not able to build a panel but must restrict our analysis to pooled time series.

order to prevent cyclical patterns and also in order to control for possible trends in the data we use relative advertising pages instead of absolute values. That is, ADS is the number of advertising pages by a manufacturer divided by all pages of other car manufacturers within an issue of AMS.

Controls

To account for a possible home bias we include a dummy variable GERMAN which is equal to one if a car is built by a German manufacturer. A home bias would exist in case, that German inhabitants are more likely to buy German cars than vehicles from other countries.
We use the issue size in PAGES, as the number of pages increases the potential amount of advertising in a magazine. Furthermore, the more pages a magazines the more tests can be reported in a single issue and the probability of given car to be reviewed might increase.

In order to prevent a possible spurious regression we use the technical characteristics of each car as control variables. Without these characteristics our results might be seriously biased. LNHP is the natural logarithm of horsepower, and DIESEL is a dummy variable which takes the value one if a given car is powered by a Diesel engine. Furthermore, LNCAPACITY is the natural logarithm of trunk size and we also include dummy variables for the number of doors (DOORS DUMMIES) and the bodywork a car has (BODYWORK DUMMIES), which might be for example a sedan or a sports car. Additionally, we include dummies for the corporations, which produced the cars. These dummies are group dummies, e.g., we have dummies for the Volkswagen Group or the General Motors Group. Finally, we also have issue dummies in our regressions which provide some control for time and help us to take account of seasonality and other changes in general conditions. LNPRICE is the natural logarithm of the cars' prices.

3 Empirical Analysis

3.1 Estimation Approach and Identification Strategy

Most studies of media bias do not account for the fact that it is by no means random whether a given product will be reviewed in a magazine. The likelihood of being reviewed depends on a number of explanatory variables, which we take into account in our analysis (see also Dewenter & Heimeshoff, 2012). Furthermore, the advertising variable is very likely to be endogenous which is also very rarely taken into account in earlier studies. The next sections provide an overview on our estimation strategy.

Identifying the impact of advertising expenditures on test scores, i.e. a possible media

bias, is no trivial task. A number of problems arise which will be discussed in the following:

We use the two-step procedure suggested by Heckman (1979) to account for possible selection biases of the following structure:

1. First step: We estimate the review probability of each manufacturer, using three different models:
   a. Using ordinary least squares regressions without advertising volumes as an explanatory variable,
   b. Using ordinary least squares treating advertising volumes as a exogenous explanatory variable,
   c. Using instrumental variable techniques to account for possible endogeneity of advertising volumes.
2. Second step: Estimating the effects of advertising on test results on a basis of cars being reviewed using instrumental variable techniques taking account of possible endogeneity problems with regard to advertising volumes. We furthermore include the inverse Mills ratios from step a. to c. to control for a possible selection bias in different specifications.

First, as only cars of some of the manufacturers available are reviewed in each issue of a magazine, the selection of these models is by no means random. It is rather likely that a number of factors determine the probability of a model being reviewed. It is, for example, more likely that new releases will enter a test than older models. Moreover, also the market share as well as the manufacturers' origin should play a role in the selection process. Ignoring such problems could result in a severe selection bias.

In order to prevent a selection bias when analyzing the impact of ad volumes on test scores we first determine the probability for each car manufacturer of being reviewed in a specific issue using probit regressions. For this purpose, we built a new dummy variable which is equal to one for manufacturer *i* in case that at least one of its models have been reviewed in issue *t* and zero otherwise. We then are able to calculate the inverse mills' ratio from this first regression.

Second, while we assume that advertising volumes are likely to have a positive impact on test scores, it is equally possible that test scores influence (future) advertising volumes as well. Manufacturers are likely to increase ad volumes in order to improve test scores or to decrease advertising expenditures as a response to poor results. In both cases however a problem of reverse causality arises which may result in a bias overestimating the impact of advertising volumes. Similarly, as test scores possibly influence advertising expenditures there might be a

connection between advertising volumes and the selection of models being reviewed as well. Therefore, equally when analyzing the review probability reverse causality could occur.

A possible solution to problems of endogeneity is to find adequate instruments in order to use instrumental variables techniques (see Wooldridge, 2010). However, instrumental variables have to meet two requirements at least, relevance and exogeneity. For the first step, the analysis of review probabilities, we instrument advertising volumes using the first lag of a manufacturer's new registrations as well as the first lead of a manufacturer's new releases. The reasoning behind these instruments is as follows: when new registrations fall behind manufacturers' expectations an increase in advertising volumes can be a possible answer to stimulate sales. Similarly, manufacturers announce new releases typically with advertising campaigns therefore future new releases, implemented as leads of the variable, might be good instruments for advertising volumes.[7] A possible shortcoming of the latter variable is however that it may be relevant but possibly not exogenous. Many new releases are reviewed in advance typically, therefore there might be a correlation with the error term. We use three different models to check the robustness of the results: (i) an ordinary probit regression using advertising volumes as an explanatory variable, (ii) a probit IV model instrumenting advertising volumes with $NEWREL_{t+1}$ and $NEWREG_{t-1}$ as well as an (iii) ordinary probit model neglecting a possible impact of advertising. The specification using advertising volumes as an explanatory variable is given exemplarily:

$$(1) \qquad REV_{i,t} = \alpha + \beta\, ADS_{i,t} + \boldsymbol{\gamma}\, \mathbf{X}_{i,t} + \varepsilon_{i,t},$$

where $REV_{i,t}$ equals one if a model by manufacturer *i* is reviewed in issue *t*. $\boldsymbol{X}_{i,t}$ includes a number of control variables (e.g., a Germany dummy, the number of new releases and time dummies) and $\varepsilon i,t$ is an error term. We use all of the above mentioned three models to calculate the respective inverse Mills' ratio.

Third, following Milgrom and Roberts (1986), a possible spurious regression problem can arise when advertising is used as a signal for quality. In case that manufacturers with higher quality vehicles also spend more on advertising, we would measure a positive impact of ADS too though a media bias would not exist. To account for a possible spurious regression we use characteristics of the reviewed passenger cars such as the type, the motor power, the type of fuel etc., when analyzing the impact of advertising volumes on test scores.

[7] This kind of advertising strategy is well known as pulsing campaign in the marketing literature. Usually advertising budgets are not used to have a constant stream of advertising on the relevant market but show some cyclical behavior. See for example Feinberg (1992).

Fourth, in case that a media bias exists it is unclear to what extend this bias is also induced by the readers of the car magazines. Customers may be influenced by advertisements or may simply prefer reviews of specific cars. Again, in that case the effect of advertising on test scores may be overestimated. We are not able to control for this problem but assume that it is not too severe. We expect the most important bias due to customers' preferences to occur with respect to German cars. However, as we use a dummy for German manufacturers we do not expect an additional bias.

For the second step regressions of our analysis, we get the following general specification:

(2) $SCORE_{i,t} = \alpha + \beta ADS_{i,t} + \gamma X_{i,t} + \phi IMR_{i,t} + v_{it}$.

SCORE is the number of points a manufacturers' car received in a given test. ADS is our measure of advertising volume bought by the given manufacturer and the matrix X includes important control variables as the technical characteristics of the cars. As a result, we estimate some sort of hedonic regression to explain the test score including ADS and the inverse Mills ratios from step 1 of our analysis in the regressions.

The next section presents the results of both steps of our analysis.

3.2 Results

3.2.1 Review Probability

We start with probit regressions of the Heckman selection models. As advertising volumes are likely to affect the probability of a manufacturer's model being reviewed as well as test scores, ADS should be considered as an explanatory variable. However, similarl to the following analysis of test scores, there might also be a problem of reverse causality. Put differently, in case that advertising volumes affect test probabilities, the selection of cars for reviews could also affect manufacturers' advertising expenditures.

Taking this endogeneity into account would require choosing adequate instruments which are probably quite hard to observe. However, as we are interested in the effect of ads on test scores primarily we use three different regressions: at first, we calculate a probit model neglecting a possible impact of ads. Second, we use a model with advertising volumes where we treat this variable being exogenous. Third, we use instrumental variable techniques to instrument manufacturers' advertising volumes. By using three different specifications we are able to check for the robustness of the results and to calculate three different inverse Mills' ratios at least.

As mentioned before, adequate instruments which are both relevant and exogenous are rather hard to find in this case. We consider the number of past new car registrations as well as the number of future releases of new models as good instruments as they should be correlated with advertising volumes and therefore relevant. The main idea choosing past new car registrations in Europe and future European releases of new models as instruments for advertising volumes is twofold: First, past registrations should have significant impact on current advertising volumes. If past registrations are below expected numbers, it is reasonable to assume, that advertising volumes will be increased. Past car registrations above expectations might cause constant or even lower advertising volumes. However, even if it is difficult to know the exact mechanism between past car registrations and advertising volumes, our instrument is clearly relevant. The same holds for future car releases. Generally, car manufacturers start large advertizing campaigns before new models are launched. As a result, a larger number of future releases of new cars will increase current advertising volumes, because campaigns start usually well before the actual release of a new model. We also include contemporaneous numbers of new releases, because advertising campaigns for new models will continue during its first weeks or month of appearance on the market.

The second condition which is necessary for valuable instruments is exogeneity. In our case finding completely exogenous instruments is rather difficult. Both variables could also be affected by reviews and are therefore possibly endogenous. However, due to the lead and lag structure of our instruments, these variables should not cause serious endogeneity problems. Furthermore, we use past car registrations not only in Germany but for Europe. This variable does not depend on the German market solely but on all national car markets in Europe. As a result, endogeneity problems should become less likely.

Table 2 includes the results of the probit regressions. Neglecting a possible impact of advertising volumes (Probit I), results in a strong impact of the Germany dummy. German cars are therefore more likely to be reviewed than cars form foreign manufacturers. Current and past new car releases have positive impacts on the test probabilities as well as the size of a magazine. The latter result is justified by the cyclical behavior of advertising volumes and therefore content.[8] A bigger magazine is also more likely to contain a higher number of reviews.

Using ads as an explanatory variable does not change the results substantially. While none of the coefficients change qualitatively, both simple probit regression as well as instrumental variable probit regressions show a positive and statistically significant impact of ADS.

[8] Readers of car magazines expect the magazines to review their favorite cars. Obviously car magazines cannot review each car on the markets, but they have to review a large fraction of cars available for sale. Generally speaking, as the number of available cars increases, car magazines tend to increase their numbers of pages per issue.

However, instrumenting advertising volumes increases the estimated coefficient of ADS considerably. Interestingly, the impact of GERMANY is considerably reduced in model Probit III. The first stage of our IV-probit regression shows significant coefficients for our instrumental variables and the Wald test statistic for the regression is also sufficient highly significant with a value of 200.06.

Table 2: Manufacturers' review probability

	Probit I	Probit II	Probit III
ADS	-	.1320	.6024
		(0.00)	(0.00)
GERMANY	.9865	.8676	.2721
	(0.00)	(0.00)	(0.00)
NEWREL	.0034	.0031	.0011
	(0.00)	(0.00)	(0.03)
NEWREL(t-1)	.0027	.0022	.0001
	(0.00)	(0.00)	(0.85)
NEWREL(t-2)	.0029	.0024	.0003
	(0.00)	(0.00)	(0.52)
SIZE	00180	.0008	-.0023
	(0.00)	(0.00)	(0.00)
Corporation Dummies	YES	YES	YES
Issue Dummies	YES	YES	YES
Constant	-1.7292	-1.5450	-.8391
	(0.00)	(0.00)	(0.00)
Pseudo R2	0.12	0.12	
Wald Chi	1080	1142	1706
	(0.00)	(0.00)	(0.00)
Nobs	11282	11282	11282
Instruments	-	-	NEWREL_t+1 NEWREG_t-1
No of Obs	11282	11282	11282
Pseudo R^2	0.11	0.12	-
Log Pseudo-likelihood	-5015	-5065	-21764

3.2.2 Determinants of Test scores

When analyzing the impact of ADS on test scores, the sample collapses to the number of reviews. That is, we now use information on cars being reviewed in a specific issue, exclusively. We therefore regress scores of each test on advertising volumes, the Germany dummy, the in-

verse Mills' ratios from the probit regressions and a number of controls. We use the number of new registrations (contemporary and lagged) as well as the number of new releases (contemporary and one lead) as instruments.

Our main finding is a statistically significant influence of advertising on test scores, which provides evidence that a media bias caused by manufacturers' advertising expenditures exists in car reviews. This finding is robust over several specifications, where the inverse Mills ratios from the first step of our analysis are included.

We furthermore find a selection bias for model I (stage 1 without advertising) and model II (stage 1 including advertising). However, we cannot provide evidence of selection bias including the inverse mills ratio from the instrumental variable probit model in model III. The effect of ADS on test scores does not differ very much between models II and III, so instrumenting advertising in step I does not change the results for ADS in step 2 of our analysis fundamentally.

The estimation results for the variables describing technical characteristics of the cars show that including these variables has a strong impact. Technical characteristics explain a large part of the variation in test scores, as product characteristics typically do in hedonic regressions. Without these characteristics our estimations would be seriously biased, which points us to one of the advantages of our analysis compared to earlier studies. The availability of technical data for cars allows us to avoid possible endogeneity bias due to missing variables as far as possible, which is much more difficult for products where characteristics are much more subjective as for wine.

The Hausman-Wu-test supports our assumption of the existence of an endogeneity problem. The results from the instrumental variables regressions are significantly different from standard OLS estimates. Furthermore, the first stages of our IV-regressions show rather high values of F-statistics between 82.54 and 121.31, indicating the relevance of our instruments.

Table 3: IV regressions of test scores

Variable	Model I	Model II	Model III
ADS	9.9319	21.1515	22.1821
	(0.00)	(0.02)	(0.02)
GERMANY	-.7842	-3.0184	-3.2151
	(0.00)	(0.01)	(0.01)
INVMILLS	.2163	.00020	-.0222
	(0.00)	(0.05)	(0.55)
LNPRICE	-.3116	-.4177	-.4303
	(0.00)	(0.00)	(0.00)
LNHP	.7774	.82015	.8122
	(0.00)	(0.00)	(0.00)
DIESEL	.2010	.1918	.1880
	(0.00)	(0.05)	(0.06)
LNCAPACITY	-.3172	-.4193	-.4102
	(0.00)	(0.00)	(0.19)
Doors Dummies	YES	YES	YES
Bodywork Dummies	YES	YES	YES
Issue Dummies	YES	YES	YES
Cooperation Dummies	YES	YES	YES
Constant	-3.1680	-14.8211	-15.7756
	(0.09)	(0.09)	(0.09)
Wu-Hausman F	15.96	16.21	16.54
	(0.00)	(0.00)	(0.00)
No of Obs	1,139	1,130	1,139

From an economic point of view the question is: Why does this phenomenon exist over time? Should rational car manufacturers not withdraw their advertising volumes and get test results for free? First, the manufacturers do not advertise because of possible media bias in test scores, but to foster demand for their cars. However, car magazines are important sources of information for consumers when thinking about purchasing a new car. As a result, having superior test scores, which exceed competitors' scores, might be important for a car manufacturer. There is some evidence that expert opinions or reviews in magazines have impact on consumers' buying decisions. Reinstein and Snyder (2005) show that positive reviews for some genre

of movies have significant impact on its success. Sirri and Tuffano (1996) find evidence for mutual funds gaining higher media attention receiving significantly higher capital inflows. It is also well documented that advertising fosters mutual fund flows (see Jaun and Wu, 2000 and Cronquist, 2004). However, Reuter and Zitzewitz (2006) provide some evidence of asymmetric effects of print and non-print advertising on funds flows. As non-print advertising drives funds flows significantly, print advertising does not show any significant effect on funds' inflows. Reuter and Zitzewitz (2006) conclude that firms' returns to print advertising are solely based on biased content in financial magazines. Expert opinions and test scores from newspapers, magazines or other types of media can have significant impact on consumers' demand. These findings confirm that media bias might be a serious problem, because consumers base their decisions on biased information. The main reason why consumers rely on such information is the complexity of many products as for example cars, where obtaining information is costly and from a consumer's point of view, it is rational to get some information from car magazines.

Besides advertising effects on consumers' purchasing decisions, car manufacturers are in a prisoner's dilemma type situation. When deciding to withdraw advertising from car magazines, incentives for single manufacturers are strong to deviate and advertise in a certain magazine to gain better test scores. As a result, it is not surprising that car manufacturers still advertise in car magazines because:

1. Advertising volumes have positive effects on their cars' test scores and
2. Advertising generally has positive effects on a manufacturer's car sales.

Gaining advantages via two channels, positive advertising effects and biased content, is the rationale why car manufacturers keep advertising in automobile magazines.

From a different point of view one could ask which incentives magazines have to publish biased test results. Following Reuter and Zitzewitz (2006), the most obvious danger for magazines is a negative effect of readers' perceptions about the magazine's quality. However, readers deciding to follow the recommendations of a certain car magazine are not likely to be suspect to the coverage. Additionally, there are also ethical costs for the journalists writing for the magazine. The profession expects its members to provide accurate information to the public and that is also what the recipients expect. Biased reports might be explained by the fact that, as in all professions, there is also some heterogeneity between members of the profession of journalists. As a result, due to a selection process, some journalists decide to work for publications, where the returns of biased coverage are less significant (see Reuter and Zitzewitz, 2006).

Finally, the question arises, whether the bias found is conscious or not. This question has been raised also in studies of media bias due to advertising for mutual funds in financial journals. Based on our data, we cannot decide, if this sort of bias is conscious or not. We just

report our statistical findings and the effects they might have on consumers. We have to leave further investigations of the question of consciousness open for future studies. The next section concludes the paper.

4 Conclusion

Diversity of opinion and unbiased coverage of news and facts are important concepts and tasks of a free press in democratic societies. However, studies in journalism, political science, and economics have shown that political bias often occurs in news reports. Such biases often depend on the political viewpoints of owners or staff of media companies, but are not related to the company's profits necessarily. Media bias related to advertising, which is easy to explain since the invention of the theory of two-sided-markets, instead is directly related to profits. Advertising revenues are a very important source of revenues if not the most important for media companies. As a result, there are strong incentives to distort coverage towards its own advertising customers. Earlier studies on this topic focus mostly on reviews of products as mutual funds and wine, where performance and characteristics are somewhat difficult to judge. We focus on reviews of cars in a leading German car magazine. The advantage of cars is that we are able to observe several technical characteristics which explain a large part of the variation of test scores and avoid endogeneity problems due to omitted variables. Furthermore, we estimate Heckman two-step models to avoid sample selection bias and instrument advertising volumes in both steps of our analysis, because with regard to the two-sidedness of markets a simultaneity problem may occur. We provide evidence for media bias in test scores showing several robustness checks.

Thus, media bias is not only a problem for reporting of political topics but also of profit-related biases, which are regularly based on advertising volumes. The insights from our study can be helpful for the evaluation of media markets and products alike. On the one hand, the existence of biased coverage should be a note of caution when relying on product reviews and test scores. On the other hand, the results are most interesting with respect to competition issues in media markets and the necessity of public service broadcasting. Several important research questions arise from our findings: One interesting topic for future research is to test whether customers really follow recommendations from car magazines or phrased differently: Do test scores drive manufacturers car sales? There is some evidence for other products that expert opinions drive demand, but a test of the effects of car reviews on demand is, to the best of our knowledge, still missing.

References

Anderson, S. and J. McLaren (2007): Media Mergers and Media Bias with Rational Consumers, *Mimeo*, Charlottsville: VA.

Ashenfelter, O. (1989): How Auctions work for Wine and Art, in: *Journal of Economic Perspectives*, Vol. 3, 23-36.

Ashenfelter, O. (2008): Predicting the Quality and Prices of Bordeaux Wine, in: *Economic Journal*, Vol. 118, 174-184.

Bagdikian, B. (2000): *The Media Monopoly*, Boston: MA.

Bagwell, K. (2007): The Economic Analysis of Advertising, in: M. Armstrong and R. Porter (Eds.): *Handbook of Industrial Organization*, Vol. 3, 1701-1844.

Baker, C. (1994): *Advertising and a Democratic Press*, Princeton: NJ.

Barron, P. (2006): Persistent Media Bias, in: *Journal of Public Economics*, Vol. 90, 1-36.

Boykoff, M. and J. Boykoff (2004): Balance as Bias: Global Warming and the US Prestige Press, in: *Global Environmental Change*, Vol. 14, 125-136.

Cronquist, Hnrik (2006): Advertising and Portfolio Choice, *Working Paper*, Shanghai.

DellaVigna, S. and E. Kaplan (2007): The Fox News Effect: Media Bias and Voting, in: *Quarterly Journal of Economics*, Vol. 122, 1187-1234.

Dewenter, R. and U. Heimeshoff (2012): More Ads More Revs? Is there a Media Bias to be Reviewed?, *DICE Discussion Paper No. 57*, Duesseldorf.

Dyck, A. and L. Zingales (2003): The Media and Asset Prices, *Working Paper*, Chicago: IL.

Ellman, M. and F. Germano (2009): What do Paper Sell?, A Model of Advertising and Media Bias, in: *Economic Journal*, Vol. 119, 680-704.

Feinberg, F. (1992): Pulsing Policies for Aggregate Advertising Models, in: *Marketing Science*, Vol. 11, 221-234.

Gal-Or, E., T. Geylani, and T.P. Yildirim (2012): The Impact of Advertising of Media Bias, in: *Journal of Marketing Research*, Vol. 49, 92-99.

Gentzkow, M. and J.M. Shapiro (2006a): Media Bias and Reputation, in: *Journal of Political Economy*, Vol. 114, 280-316.

Gentzkow, M. and J.M. Shapiro (2006b): What Drives Media Slant? Evidence from U.S. Daily Newspapers, *NBER Working Paper No. 12707*, Cambridge: MA.

George, L. and J. Waldfogel (2003): Who Affects Whom in Daily Newspaper Markets?, in: *Journal of Political Economy*, Vol. 61, 765-784.

Glasgow University Media Group (1982): *Really Bad News, Writers and Readers*, Glasgow.

Hamilton, J.T. (2004): *All the News that fit to Sell*, Princeton: NJ.

Heckman, J. (1979): Sample Selection Bias as a Specification error, in: *Econometrica*, Vol. 47, 153-161.

Herman E.S. and N. Chomsky (1988): *Manufacturing Consent: The Political Economy of the Mass Media*, New York City.

Jaun, Prem C. and Joanna S. Wu (2000): Truth in Mutual Fund Advertising: Evidence on Future Performance and Fund Flows, in: *Journal of Finance*, Vol. 55, 937-958.

Milgrom, P. and J. Roberts (1986): Price and Advertising Signals of Product Quality, in: *Journal of Political Economy*, Vol. 94, 796-821.

Mullainathan, S. and A. Shleifer (2005) The Market for News, in: *American Economic Review*, Vol. 95, 1031-1053.

Reinstein, D. and C. Snyder (2005): The Influence of Expert Reviews on Consumer Demand for Experience Goods: A Case Study of Movie Critics, in: *Journal of Industrial Economics*, Vol. 53, 27-51.

Reuter, J. (2009): Does Advertising Bias Product Reviews? Evidence From Wine Ratings, in: *Journal of Wine Economics*, Vol. 4, 125-152.

Reuter, J. and E. Zitzewitz (2006): Do Ads Influence Editors? Advertising and Bias in the Financial Media, in: *Quarterly Journal of Economics*, Vol. 121, 197-227.

Rochet, J.C. and J. Tirole (2003): Platform Competition in Two-sided Markets, in: *Journal of the European Economic Association*, Vol. 1, 990-1029.

Schmalensee, R. (1972): *The Economics of Advertising*, North-Holland, Amsterdam.

Sirri, Erik and Peter Tufano (1998): Costly Search and Mutual Fund Flows, in: *Journal of Finance*, Vol. 53, 1598-1622.

Wooldridge, J. (2010): *Econometric Analysis of Cross Section and Panel Data*, MIT Press, 2. Ed.

Xiang, Y. and M. Sarvary (2007): News Consumption and Media Bias, in: *Marketing Science*, Vol. 26, 611-628.

Data Sources

ACEA: European Automobile Manufacturers' Association, http://www.acea.be/

PZ-Online: Media database of German publishing companies, http://www.pz-online.de/

Schwacke Car Index Databse: , http://www.schwacke.de/SP/index.html

Appendix

Table A1: Description of Variables

Variable	Description	Source
SCORE	Natural logarithm of points a car received in a review	AutoMotor und Sport
REV/TEST	Dummy variable taking the value 1 if a given car is tested in an issue of AutoMotor&Sport	AutoMotor und Sport
ADS Step 1	Number of advertising pages per issue for each manufacturer	AutoMotor und Sport
ADS Step2	Fraction of a manufacturer's advertising pages on the number of all advertising pages in an issue	AutoMotor und Sport
SIZE	Number of pages of an issue of AutoMotor&Sport	AutoMotor und Sport
GERMAN	Dummy variable for cars of German manufacturers	Schwacke Database
NEWREG	Number of newly registered cars in Europe	ACEA
NEWREL	Number of releases of new cars in Europe	ACEA
LNPRICE	Natural logarithm of price	Schwacke Database
LNHP	Natural logarithm of horsepower	Schwacke Database
DIESEL	Dummy variable for cars powered by Diesel engines	Schwacke Database
LNCAPACITY	Natural logarithm of engine displacement in ccm	Schwacke Database
CORPORATION DUMMIES	Dummy variables for different groups of car manufacturers	AutoMotor&Sport

ISSUE DUMMIES	Dummy variable for issues of AutoMotor&Sport	AutoMotor&Sport
DOORS DUMMIES	Dummy variables for number of doors	Schwacke Database
BODYWORK DUMMIES	Dummy variables for different kinds of bodywork	Schwacke Database

Table A2: Descriptive Statistics for Dataset Step 1

Variable	Obs.	Mean	Std. Dev.	Min	Max
ADS	11,287	0.250	0.404	0	1
GERMANY	11,287	0.260	0.440	0	1
NEWREG	11,287	7.970	28.080	0	834
NEWREL	11,287	219.745	47.320	101.2	384
SIZE	11,287	0.869	1.238	0	20
TEST	11,287	40,727.980	41,141.550	0	199,121

Table A3: Descriptive Statistics for Dataset Step 2

Variable	Obs.	Mean	Std. Dev.	Min	Max
ADS	1,220	0.054	0.058	0	0.389
IM1	1,220	4.141	3.065	1.001	36.158
IM2	1,220	-5.500	114.718	-3641.432	511.510
IM3	1,220	4.190	3.005	1.000	33.612
LNCAPACITY	1,869	7.682	0.380	6.395	9.855
LNHP	1,869	4.971	0.486	3.689	6.273
LNPRICE	1,950	10.707	0.604	8.243	13.975
NEWREG	1,220	62,422.890	41,386.530	0	188,965.000
NEWREL	1,220	12.827	40.628	0	834.000
DIESEL	1,950	0.280	0.449	0	1
GERMANY	1,950	0.560	0.497	0	1

PREVIOUS DISCUSSION PAPERS

132 Dewenter, Ralf and Heimeshoff, Ulrich, Media Bias and Advertising: Evidence from a German Car Magazine, February 2014.
Forthcoming in: Review of Economics.

131 Baye, Irina and Sapi, Geza, Targeted Pricing, Consumer Myopia and Investment in Customer-Tracking Technology, February 2014.

130 Clemens, Georg and Rau, Holger A., Do Leniency Policies Facilitate Collusion? Experimental Evidence, January 2014.

129 Hottenrott, Hanna and Lawson, Cornelia, Fishing for Complementarities: Competitive Research Funding and Research Productivity, December 2013.

128 Hottenrott, Hanna and Rexhäuser, Sascha, Policy-Induced Environmental Technology and Inventive Efforts: Is There a Crowding Out?, December 2013.

127 Dauth, Wolfgang, Findeisen, Sebastian and Suedekum, Jens, The Rise of the East and the Far East: German Labor Markets and Trade Integration, December 2013.
Forthcoming in: Journal of European Economic Association.

126 Wenzel, Tobias, Consumer Myopia, Competition and the Incentives to Unshroud Add-on Information, December 2013.
Published in: Journal of Economic Behavior and Organization, 98 (2014), pp. 89-96.

125 Schwarz, Christian and Suedekum, Jens, Global Sourcing of Complex Production Processes, December 2013.
Forthcoming in: Journal of International Economics.

124 Defever, Fabrice and Suedekum, Jens, Financial Liberalization and the Relationship-Specificity of Exports, December 2013.
Published in: Economics Letters, 122 (2014), pp. 375-379.

123 Bauernschuster, Stefan, Falck, Oliver, Heblich, Stephan and Suedekum, Jens, Why Are Educated and Risk-Loving Persons More Mobile Across Regions?, December 2013.
Published in: Journal of Economic Behavior and Organization, 98 (2014), pp. 56-69.

122 Hottenrott, Hanna and Lopes-Bento, Cindy, Quantity or Quality? Knowledge Alliances and their Effects on Patenting, December 2013.

121 Hottenrott, Hanna and Lopes-Bento, Cindy, (International) R&D Collaboration and SMEs: The Effectiveness of Targeted Public R&D Support Schemes, December 2013.
Forthcoming in: Research Policy.

120 Giesen, Kristian and Suedekum, Jens, City Age and City Size, November 2013.

119 Trax, Michaela, Brunow, Stephan and Suedekum, Jens, Cultural Diversity and Plant-Level Productivity, November 2013.

118 Manasakis, Constantine and Vlassis, Minas, Downstream Mode of Competition With Upstream Market Power, November 2013.

117 Sapi, Geza and Suleymanova, Irina, Consumer Flexibility, Data Quality and Targeted Pricing, November 2013.

116 Hinloopen, Jeroen, Müller, Wieland and Normann, Hans-Theo, Output Commitment Through Product Bundling: Experimental Evidence, November 2013.
Published in: European Economic Review 65 (2014), pp. 164-180.

115 Baumann, Florian, Denter, Philipp and Friehe Tim, Hide or Show? Endogenous Observability of Private Precautions Against Crime When Property Value is Private Information, November 2013.

114 Fan, Ying, Kühn, Kai-Uwe and Lafontaine, Francine, Financial Constraints and Moral Hazard: The Case of Franchising, November 2013.

113 Aguzzoni, Luca, Argentesi, Elena, Buccirossi, Paolo, Ciari, Lorenzo, Duso, Tomaso, Tognoni, Massimo and Vitale, Cristiana, They Played the Merger Game: A Retrospective Analysis in the UK Videogames Market, October 2013.
Forthcoming in: Journal of Competition and Economics under the title: "A Retrospective Merger Analysis in the UK Videogames Market".

112 Myrseth, Kristian Ove R., Riener, Gerhard and Wollbrant, Conny, Tangible Temptation in the Social Dilemma: Cash, Cooperation, and Self-Control, October 2013.

111 Hasnas, Irina, Lambertini, Luca and Palestini, Arsen, Open Innovation in a Dynamic Cournot Duopoly, October 2013.
Published in: Economic Modelling, 36 (2014), pp. 79-87.

110 Baumann, Florian and Friehe, Tim, Competitive Pressure and Corporate Crime, September 2013.

109 Böckers, Veit, Haucap, Justus and Heimeshoff, Ulrich, Benefits of an Integrated European Electricity Market, September 2013.

108 Normann, Hans-Theo and Tan, Elaine S., Effects of Different Cartel Policies: Evidence from the German Power-Cable Industry, September 2013.
Forthcoming in: Industrial and Corporate Change.

107 Haucap, Justus, Heimeshoff, Ulrich, Klein, Gordon J., Rickert, Dennis and Wey, Christian, Bargaining Power in Manufacturer-Retailer Relationships, September 2013.

106 Baumann, Florian and Friehe, Tim, Design Standards and Technology Adoption: Welfare Effects of Increasing Environmental Fines when the Number of Firms is Endogenous, September 2013.

105 Jeitschko, Thomas D., NYSE Changing Hands: Antitrust and Attempted Acquisitions of an Erstwhile Monopoly, August 2013.

104 Böckers, Veit, Giessing, Leonie and Rösch, Jürgen, The Green Game Changer: An Empirical Assessment of the Effects of Wind and Solar Power on the Merit Order, August 2013.

103 Haucap, Justus and Muck, Johannes, What Drives the Relevance and Reputation of Economics Journals? An Update from a Survey among Economists, August 2013.

102 Jovanovic, Dragan and Wey, Christian, Passive Partial Ownership, Sneaky Takeovers, and Merger Control, August 2013.

101 Haucap, Justus, Heimeshoff, Ulrich, Klein, Gordon J., Rickert, Dennis and Wey, Christian, Inter-Format Competition Among Retailers – The Role of Private Label Products in Market Delineation, August 2013.

100 Normann, Hans-Theo, Requate, Till and Waichman, Israel, Do Short-Term Laboratory Experiments Provide Valid Descriptions of Long-Term Economic Interactions? A Study of Cournot Markets, July 2013.
Forthcoming in: Experimental Economics.

99 Dertwinkel-Kalt, Markus, Haucap, Justus and Wey, Christian, Input Price Discrimination (Bans), Entry and Welfare, June 2013.

98 Aguzzoni, Luca, Argentesi, Elena, Ciari, Lorenzo, Duso, Tomaso and Tognoni, Massimo, Ex-post Merger Evaluation in the UK Retail Market for Books, June 2013.

97 Caprice, Stéphane and von Schlippenbach, Vanessa, One-Stop Shopping as a Cause of Slotting Fees: A Rent-Shifting Mechanism, May 2012.
Published in: Journal of Economics and Management Strategy, 22 (2013), pp. 468-487.

96 Wenzel, Tobias, Independent Service Operators in ATM Markets, June 2013.
Published in: Scottish Journal of Political Economy, 61 (2014), pp. 26-47.

95 Coublucq, Daniel, Econometric Analysis of Productivity with Measurement Error: Empirical Application to the US Railroad Industry, June 2013.

94 Coublucq, Daniel, Demand Estimation with Selection Bias: A Dynamic Game Approach with an Application to the US Railroad Industry, June 2013.

93 Baumann, Florian and Friehe, Tim, Status Concerns as a Motive for Crime?, April 2013.

92 Jeitschko, Thomas D. and Zhang, Nanyun, Adverse Effects of Patent Pooling on Product Development and Commercialization, April 2013.

91 Baumann, Florian and Friehe, Tim, Private Protection Against Crime when Property Value is Private Information, April 2013.
Published in: International Review of Law and Economics, 35 (2013), pp. 73-79.

90 Baumann, Florian and Friehe, Tim, Cheap Talk About the Detection Probability, April 2013.
Published in: International Game Theory Review, 15 (2013), Art. No. 1350003.

89 Pagel, Beatrice and Wey, Christian, How to Counter Union Power? Equilibrium Mergers in International Oligopoly, April 2013.

88 Jovanovic, Dragan, Mergers, Managerial Incentives, and Efficiencies, April 2013.

87 Heimeshoff, Ulrich and Klein Gordon J., Bargaining Power and Local Heroes, March 2013.

86 Bertschek, Irene, Cerquera, Daniel and Klein, Gordon J., More Bits – More Bucks? Measuring the Impact of Broadband Internet on Firm Performance, February 2013.
Published in: Information Economics and Policy, 25 (2013), pp. 190-203.

85 Rasch, Alexander and Wenzel, Tobias, Piracy in a Two-Sided Software Market, February 2013.
Published in: Journal of Economic Behavior & Organization, 88 (2013), pp. 78-89.

84 Bataille, Marc and Steinmetz, Alexander, Intermodal Competition on Some Routes in Transportation Networks: The Case of Inter Urban Buses and Railways, January 2013.

83 Haucap, Justus and Heimeshoff, Ulrich, Google, Facebook, Amazon, eBay: Is the Internet Driving Competition or Market Monopolization?, January 2013.
Forthcoming in: International Economics and Economic Policy.

82 Regner, Tobias and Riener, Gerhard, Voluntary Payments, Privacy and Social Pressure on the Internet: A Natural Field Experiment, December 2012.

81 Dertwinkel-Kalt, Markus and Wey, Christian, The Effects of Remedies on Merger Activity in Oligopoly, December 2012.

80 Baumann, Florian and Friehe, Tim, Optimal Damages Multipliers in Oligopolistic Markets, December 2012.

79 Duso, Tomaso, Röller, Lars-Hendrik and Seldeslachts, Jo, Collusion through Joint R&D: An Empirical Assessment, December 2012.
Forthcoming in: The Review of Economics and Statistics.

78 Baumann, Florian and Heine, Klaus, Innovation, Tort Law, and Competition, December 2012.
Published in: Journal of Institutional and Theoretical Economics, 169 (2013), pp. 703-719.

77 Coenen, Michael and Jovanovic, Dragan, Investment Behavior in a Constrained Dictator Game, November 2012.

76 Gu, Yiquan and Wenzel, Tobias, Strategic Obfuscation and Consumer Protection Policy in Financial Markets: Theory and Experimental Evidence, November 2012.
Forthcoming in: Journal of Industrial Economics under the title “Strategic Obfuscation and Consumer Protection Policy”.

75 Haucap, Justus, Heimeshoff, Ulrich and Jovanovic, Dragan, Competition in Germany’s Minute Reserve Power Market: An Econometric Analysis, November 2012.
Published in: The Energy Journal, 35 (2014), pp. 139-158.

74 Normann, Hans-Theo, Rösch, Jürgen and Schultz, Luis Manuel, Do Buyer Groups Facilitate Collusion?, November 2012.

73 Riener, Gerhard and Wiederhold, Simon, Heterogeneous Treatment Effects in Groups, November 2012.

72 Berlemann, Michael and Haucap, Justus, Which Factors Drive the Decision to Boycott and Opt Out of Research Rankings? A Note, November 2012.

71 Muck, Johannes and Heimeshoff, Ulrich, First Mover Advantages in Mobile Telecommunications: Evidence from OECD Countries, October 2012.

70 Karaçuka, Mehmet, Çatik, A. Nazif and Haucap, Justus, Consumer Choice and Local Network Effects in Mobile Telecommunications in Turkey, October 2012.
Published in: Telecommunications Policy, 37 (2013), pp. 334-344.

69 Clemens, Georg and Rau, Holger A., Rebels without a Clue? Experimental Evidence on Partial Cartels, April 2013 (First Version October 2012).

68 Regner, Tobias and Riener, Gerhard, Motivational Cherry Picking, September 2012.

67 Fonseca, Miguel A. and Normann, Hans-Theo, Excess Capacity and Pricing in Bertrand-Edgeworth Markets: Experimental Evidence, September 2012.
Published in: Journal of Institutional and Theoretical Economics, 169 (2013), pp. 199-228.

66 Riener, Gerhard and Wiederhold, Simon, Team Building and Hidden Costs of Control, September 2012.

65 Fonseca, Miguel A. and Normann, Hans-Theo, Explicit vs. Tacit Collusion – The Impact of Communication in Oligopoly Experiments, August 2012.
Published in: European Economic Review, 56 (2012), pp. 1759-1772.

64 Jovanovic, Dragan and Wey, Christian, An Equilibrium Analysis of Efficiency Gains from Mergers, July 2012.

63 Dewenter, Ralf, Jaschinski, Thomas and Kuchinke, Björn A., Hospital Market Concentration and Discrimination of Patients, July 2012.

62 Von Schlippenbach, Vanessa and Teichmann, Isabel, The Strategic Use of Private Quality Standards in Food Supply Chains, May 2012.
Published in: American Journal of Agricultural Economics, 94 (2012), pp. 1189-1201.

61 Sapi, Geza, Bargaining, Vertical Mergers and Entry, July 2012.

60 Jentzsch, Nicola, Sapi, Geza and Suleymanova, Irina, Targeted Pricing and Customer Data Sharing Among Rivals, July 2012.
Published in: International Journal of Industrial Organization, 31 (2013), pp. 131-144.

59 Lambarraa, Fatima and Riener, Gerhard, On the Norms of Charitable Giving in Islam: A Field Experiment, June 2012.

58 Duso, Tomaso, Gugler, Klaus and Szücs, Florian, An Empirical Assessment of the 2004 EU Merger Policy Reform, June 2012.
Published in: Economic Journal, 123 (2013), F596-F619.

57 Dewenter, Ralf and Heimeshoff, Ulrich, More Ads, More Revs? Is there a Media Bias in the Likelihood to be Reviewed?, June 2012.

56 Böckers, Veit, Heimeshoff, Ulrich and Müller Andrea, Pull-Forward Effects in the German Car Scrappage Scheme: A Time Series Approach, June 2012.

55 Kellner, Christian and Riener, Gerhard, The Effect of Ambiguity Aversion on Reward Scheme Choice, June 2012.

54 De Silva, Dakshina G., Kosmopoulou, Georgia, Pagel, Beatrice and Peeters, Ronald, The Impact of Timing on Bidding Behavior in Procurement Auctions of Contracts with Private Costs, June 2012.
Published in: Review of Industrial Organization, 41 (2013), pp.321-343.

53 Benndorf, Volker and Rau, Holger A., Competition in the Workplace: An Experimental Investigation, May 2012.

52 Haucap, Justus and Klein, Gordon J., How Regulation Affects Network and Service Quality in Related Markets, May 2012.
Published in: Economics Letters, 117 (2012), pp. 521-524.

51 Dewenter, Ralf and Heimeshoff, Ulrich, Less Pain at the Pump? The Effects of Regulatory Interventions in Retail Gasoline Markets, May 2012.

50 Böckers, Veit and Heimeshoff, Ulrich, The Extent of European Power Markets, April 2012.

49 Barth, Anne-Kathrin and Heimeshoff, Ulrich, How Large is the Magnitude of Fixed-Mobile Call Substitution? - Empirical Evidence from 16 European Countries, April 2012.

48 Herr, Annika and Suppliet, Moritz, Pharmaceutical Prices under Regulation: Tiered Co-payments and Reference Pricing in Germany, April 2012.

47 Haucap, Justus and Müller, Hans Christian, The Effects of Gasoline Price Regulations: Experimental Evidence, April 2012.

46 Stühmeier, Torben, Roaming and Investments in the Mobile Internet Market, March 2012.
Published in: Telecommunications Policy, 36 (2012), pp. 595-607.

45 Graf, Julia, The Effects of Rebate Contracts on the Health Care System, March 2012,
Forthcoming in: The European Journal of Health Economics.

44 Pagel, Beatrice and Wey, Christian, Unionization Structures in International Oligopoly, February 2012.
Published in: Labour: Review of Labour Economics and Industrial Relations, 27 (2013), pp. 1-17.

43 Gu, Yiquan and Wenzel, Tobias, Price-Dependent Demand in Spatial Models, January 2012.
Published in: B. E. Journal of Economic Analysis & Policy, 12 (2012), Article 6.

42 Barth, Anne-Kathrin and Heimeshoff, Ulrich, Does the Growth of Mobile Markets Cause the Demise of Fixed Networks? – Evidence from the European Union, January 2012.

41 Stühmeier, Torben and Wenzel, Tobias, Regulating Advertising in the Presence of Public Service Broadcasting, January 2012.
Published in: Review of Network Economics, 11/2 (2012), Article 1.

Older discussion papers can be found online at:
http://ideas.repec.org/s/zbw/dicedp.html

Heinrich-Heine-University of Düsseldorf

Düsseldorf Institute for Competition Economics (DICE)

Universitätsstraße 1 _ 40225 Düsseldorf
www.dice.hhu.de

ISSN 2190-9938 (online)
ISBN 978-3-86304-131-1