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Christine Benesch, Simon Loretz, David Stadelmann, Tobias Thomas

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Media Coverage and Immigration Worries:
Econometric Evidence*

Christine Benesch[a,b]   Simon Loretz[c]
David Stadelmann[b,d]   Tobias Thomas[e]

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Abstract

This paper empirically explores the link between mass media coverage of migration and immigration worries. Using detailed data on media coverage in Germany, we show that the amount of media reports regarding migration issues is positively associated with concerns about immigration among the German population. The association is robust to the inclusion of time-variant individual control variables and individual fixed-effects. We employ media spillovers from the neighboring country of Switzerland, which occur due to referendum decisions on immigration as an instrumental variable to address endogeneity concerns. The IV estimates suggest that media coverage has a causal impact on immigration worries. Exploring heterogeneous effects between respondents, the results reveal that the link between media reports and immigration worries is particularly relevant for women and respondents active in the workforce.

Keywords: media, migration, news spillovers, political attitudes
JEL Classification: L8, D7, F2

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* Corresponding author: David Stadelmann, david.stadelmann@uni-bayreuth.de.
a University of St. Gallen, Bodanstrasse 8, St. Gallen, Switzerland.
b CREMA – Center for Research in Economics, Management and the Arts, Zurich, Switzerland.
c Austrian Institute of Economic Research, Wien, Arsenal Object 20, Vienna, Austria.
d University of Bayreuth, Universitätsstraße 30, Bayreuth, Germany.
e EcoAustria – Institute for Economic Research, Am Heumarkt 10, Vienna, Austria and Düsseldorf Institute for Competition Economics (DICE), Heinrich-Heine-Universität, Universitätsstraße 1, Düsseldorf, Germany.

I. INTRODUCTION

At the peak of the refugee crisis in 2015, European countries received more than 1.5 million asylum applications (Dustmann et al. 2017). This flow of migrants is associated in public discourses today with worries about immigration, negative attitudes towards foreigners, and the rise of right-wing political parties (Halla et al. 2017).

We explore the role of mass media reporting on attitudes and investigate how media coverage of migration issues can affect immigration worries. More specifically, we link the number of news items about migration – that is, pieces of media reports containing new information on migration – to immigration opinion in Germany, using detailed data on media coverage and individual level information from the German Socio-Economic Panel (SOEP). We find a positive association between the daily number and share of news items about migration and immigration worries by exploiting the exact timing of media coverage and the individual interviews carried out in the SOEP. Accounting for individual fixed effects and individual level time-variant control variables, variation in the number of news items or the share of media coverage is positively and statistically significantly associated with a change in immigration worries among respondents.

Arguably, media coverage may depend on media consumers' attitudes, unobserved issue salience, and political agendas. Moreover, media coverage and individual attitudes can be driven simultaneously by current developments in immigration. To address such endogeneity concerns, we examine referendum decisions on migration bills in Switzerland (see, e.g., Brunner and Kuhn 2018) as a driver of media coverage of migration issues in Germany. Referendum decisions that are made in Switzerland may become newsworthy events in neighboring Germany, or may trigger German journalists to write about migration issues, even if the issues are not related to the referendum. This can sometimes lead to intensive media coverage, as in the case of the 2014 Swiss initiative against "mass-migration". Referendum dates are the result of a drawn-out administrative process and are therefore independent of short-term fluctuations in attitudes. News spillovers due to referendums in Switzerland introduce exogenous variation in German media reports. Thus, we employ referendum dates as an instrumental variable to analyze how news reports that emerged due to an exogenous event (that is, a referendum) in one country affect attitudes in a neighboring country. Using this strategy, we find evidence for a positive impact of instrumented media coverage of migration issues on Germany immigration worries, although the results are statistically less robust than the pure associations. When investigating the impacts of an exogenous increase in media coverage on different population subgroups, the results suggest that media reports affect the attitudes of women and people in the workforce to a larger extent.

Most of the existing studies on public attitudes towards immigration have considered socio-economic factors, economic conditions, social and cultural values, or sociotropic concerns as explanatory factors (for a review, see Hainmüller and Hopkins 2014). The role of the media has received limited attention. Most studies have been experimental and have analyzed framing and priming effects of specific aspects of media stories, or studies have investigated associations between long-term exposure to certain types of media and immigration attitudes (cultivation) (for a recent review, see Meltzer et al. 2017). For Germany, using monthly time-series data, Boomgaarden and Vliegenthart (2009) showed that the frequency and tone of newspaper coverage of immigration is related to public opinion about immigration.

The present study is also related to the literature that explores the impact media coverage may have on attitudes, decisions, and the behavior of individuals in numerous situations in their economic and political life. Those studies usually exploit the timing of media reports and analyze how they affect future outcomes. The contributions link media coverage to, for instance, economic expectations and forecasts (e.g., Kholodilin et al. 2017, Lamla and Maag 2012, Nadeau et al. 2000, Soroka 2006, van Raaij 1989, Williams and Reade 2016), the consumer climate (e.g., Alsem et al. 2008, Doms and Morin 2004), job market perceptions (Garz 2012), risk attitudes (Tausch and Zumbuehl 2018), or purchasing decisions (Dewenter et al. 2016). In the political context, a number of studies have explored the links between media coverage and attitudes or voters' decisions (e.g., Bernhardt et al. 2008, D'Alessio and Allen 2000, Druckman and Parkin 2005, and Entman 2007). Beckmann et al. (2017) analyzed the connection between media and terrorism.[1]

To circumvent endogeneity concerns, a number of contributions have used exogenous variation in media access or penetration to investigate the effects of the media on a diverse set of outcome variables (e.g., Besley and Burgess 2002, DellaVigna and Kaplan 2007, Enikolopov et al. 2011, Gerber et al. 2009, Gentzkow 2006, Gentzkow et al. 2011, Oberholzer-Gee and Waldfogel 2009, Strömberg 2004, Yanagizawa-Drott 2014; and, for a review of this type of literature, Della Vigna and Gentzkow 2010, Prat and Strömberg 2013, and Strömberg 2015). Only a few studies have been able to analyze exogenous variation in actual media coverage. For instance, Snyder and Strömberg (2010) showed that the number of newspaper articles on politicians react to the quality of the geographic match between media markets and voting districts. This match is exogenous to media coverage and can be used to analyze the impact of media coverage on voter turnout and accountability. In their seminal work, Eisensee and Strömberg (2007) showed that media coverage of natural disasters causally affects US disaster relief. The authors used news pressure from other newsworthy events, such as the Olympic Games,

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[1] In this context, Frey and Lüchtinger (2008), as well as Frey and Osterloh (2017), concluded that reducing media attention is one strategy for dealing with terrorism.

as an instrument for whether the disaster was in the news and found evidence that natural disasters are less likely to be covered during Olympic Games, which leads to lower disaster relief. Similarly, Jetter (2017) instrumented media coverage of terrorist attacks in the *New York Times* with natural disasters and showed that news on attacks leads to further terrorist activities.[2]

Our setting makes it possible to combine the two main empirical approaches by exploiting the exact timing of referendums, media reports, and survey interviews. Thus, we can link individual immigration worries directly to media reports issued prior to the survey date, as well as use news spillovers due to referendums as a source of exogenous variation in these media reports. In addition, individual data from the SOEP allows us to account for individual fixed-effects such that we can explore how variation in media reports change individual immigration worries. A further advantage of our empirical setting is that we can rely on high-quality human-coded media data, which enables us to measure the amount of coverage of migration issues in a broad set of media outlets, including television, radio news, newspapers, and magazines.

By analyzing the impact of media coverage on worries about immigration, our study may also shed some light on a potential mechanism of how the media affects public and political agendas (see McCombs and Shaw 1972).

The remainder of this paper is structured as follows: Section II presents our data and details the empirical strategy, the results are presented in Section III, and Section IV concludes.

II.   DATA AND EMPIRICAL STRATEGY

Media coverage of immigration issues

We draw on detailed data of media coverage provided by Media Tenor International for our main independent variables of interest. Media Tenor analyzes media outlets based upon over 700 characteristics, which are defined in a binding coding manual ("code-book"). The analysts code each report by type of media outlet (TV news shows, daily newspapers, etc.), covered topic (immigration, unemployment, etc.), region of reference (for example, Germany, Switzerland), time reference, and a number of other categories. Media Tenor checks the validity and reliability of the coding on an ongoing basis, both with standard tests and random spot checks, based on the code-book, and guarantees a minimum accuracy of 0.85, which is substantially higher than alternative (such as

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[2] Durante and Zhuravskaya (2015) showed that news pressure can also be used strategically. In the Israeli-Palestinian conflict, Israeli attacks are more likely to occur when US news on the following day is dominated by newsworthy and predictable events and hence the attacks receive less media coverage.

computer linguistic) approaches. As a high accuracy of coding is essential, Grinner and Steward (2013) concluded that, in political text analysis, there is no substitute for human analysis. This is particularly relevant for topical contexts, such as immigration.

Our dataset consists of 26 different opinion-leading media outlets from Germany, including private TV news shows (1), public service TV news shows (4), public service TV political magazines (12), public service radio news shows (1), daily newspapers (1), business magazines (2) as well as weeklies and magazines (5). The coders analyzed media reports news item by news item; that is, each time that a new topic, person, institution, region, time reference, or source was mentioned, an additional news item was coded. During the period from January 2009 to December 2014, 363,408 news items form the basis of the analysis. Excluding items that did not refer to foreigners, migration, and related issues resulted in a total of 3369 news items. In particular, we picked up all news items that were dedicated to (a) foreigners and migrants as protagonists (such as asylum seekers, foreigners, migrants, or refugees), and (b) migrations, asylum, and related topics (such as asylum, human trafficking, migration, or people-smuggling). Information on the outlets is provided in Table A1 in the Appendix to this paper. Knowing the total number of news items per medium, the day of the report, as well as the number of news items linked to immigration per medium and day enables us to calculate the share of media coverage per day (or per week) that the media dedicated to foreigners and migration. The daily number of news items on immigration in the analyzed outlets varies between 0 and 19 and the share of media coverage dedicated to immigration ranges from 0–14 percent.[3]

Data on attitudes towards immigration

For our dependent variable we employ attitudes towards immigration, which we draw from the German Socio-Economic Panel (SOEP 2015).[4] The use of a unique identifier enables us to track individuals over time. Among the many measures included in the survey are information about income, wealth and occupation, closeness to political parties, and political concerns. We employ the answers to the question "*How concerned are you about the following issues? ... Immigration to Germany*" as our dependent variable, which we recode such that "*not concerned at all*" takes the value -1, "*somewhat concerned*" the value 0, and "*very concerned*" the value 1. Hence, a positive value for our dependent variable of interest implies that the individual respondent is considerably worried about immigration.

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[3] There are two outliers in the dataset. On December 25, 2013 and December 25, 2014, the share of media reports on immigration is 21 percent and 29 percent, respectively. Since there are no interviews in the SOEP on those two days, the outliers are not relevant for our analysis.

[4] For a comprehensive description of the German Socio-Economic Panel (SOEP), see Wagner et al. (2007).

A relevant feature of the SOEP data is that the interviews take place on different days of the year and the date of interview is available. This allows us to link individual responses to media exposure on a daily level. Our analysis extend from 2009 through to 2014. The first date of an interview was January 25, 2009, while the last interview date was November 14, 2014. As summarized in Table 1, we have an overall sample of 35,211 individuals, resulting in a total of 118,066 observations over time.

	N. obs.	Average immigration worries		N. obs.	Average immigration worries
State			**Party preference**		
Baden-Wuerttemberg	13,734	-0.219	CDU	17,362	-0.077
Bavaria	17,981	-0.172	CSU	3525	-0.029
Berlin	4625	-0.119	FPD	2171	-0.264
Brandenburg	5011	-0.049	Green party	7671	-0.621
Bremen	832	-0.218	Linke	3654	-0.180
Hamburg	1898	-0.299	SPD	16,551	-0.236
Hesse	8130	-0.191	others (or n.a.)	67,132	-0.073
Mecklenburg-Vorpommern	2874	-0.053	**Year**		
Lower Saxony	11,091	-0.147	2009	19,139	-0.147
North Rhine-Westphalia	23,265	-0.092	2010	18,039	-0.135
Rhineland-Palatinate	5513	-0.205	2011	19,937	-0.103
Saarland	1133	-0.214	2012	19,925	-0.224
Saxony	8392	-0.100	2013	18,449	-0.162
Saxony-Anhalt	4821	-0.008	2014	22,577	-0.067
Schleswig-Holstein	3628	-0.217	**Gender**		
Thuringia	5138	-0.019	Male	55,595	-0.148
Income			Female	62,471	-0.129
Below 1500	20,177	-0.036	**Age**		
1500 to 3500	62,373	-0.077	Below 35	26,380	-0.221
Above 3500	35,516	-0.302	35 to 65	63,462	-0.139
			Above 65	28,226	-0.057
Total	**118,066**	**-0.138**	**Total**	**118,066**	**-0.138**

Notes: Overall there are 35,211 individuals in 16,627 distinct households. Data source: SOEP.

Table 1: Differences in immigration worries

Next to the number of observations, Table 1 also reports the average of our main variable of interest immigration worries, broken down according to relevant characteristics of the respondents. Splitting the sample along different characteristics shows plausible variation regarding immigration worries: Respondents who report higher incomes report lower concerns about immigration on average. Regarding political preferences, supporters of left-wing parties (notably the Greens) are less concerned about immigration than supporters of center-right parties (such as the CDU or CSU). The difference between male and female respondents regarding immigration worries is

minor, with men being slightly less worried about immigration. Younger respondents are less worried than older respondents.[5]

News spillovers through referendum decisions

The third ingredient of our data are Swiss referendum decisions. Accepted legislative proposals by Parliament do not directly turn into law in Switzerland (e.g., Portmann et al. 2012, Hessami 2016). Any constitutional change is subject to a referendum and, in addition, citizens may demand a popular referendum before laws are enacted or propose constitutional amendments by a popular initiative by collecting 50,000 signatures within 100 days (referendum), or 100,000 signatures within 18 months (initiative).[6]

We employ three referendum decisions on migration in Switzerland: the initiative on the "deportation of criminal foreigners," which was subject to vote in 2010; a referendum of a law change on "asylum rights" in 2013; and the initiative against "mass migration" in 2014.

The referendum process is accompanied by media attention within Switzerland and referendum results are often reported in the media of neighboring countries. On February 9, 2014, for example, Swiss citizens voted on a constitutional initiative to restrict migration. An intensive discussion in and beyond media outlets in Switzerland followed. Numerous TV channels and newspapers in other European countries not only reported on the initiative against "mass-migration," but sometimes took the opportunity to discuss migration issues and policies in their own country.

Figure 1 shows the average number of daily media reports about immigration in the two weeks before and after the referendums. Media coverage of immigration issues spiked on the day of the referendums and the following day, and increased significantly by an average of 5.7 articles a day and the share of media reports increased by 3.3 percentage points a day on these two days compared to the rest of the two weeks around the referendums. In the week after the referendums (including the referendum days), the average daily number of media reports was increased by 1.6 and the share of media reports was 1 percentage point higher than in the week before the referendums (see Table A2 in the Appendix).

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[5] All of the mentioned differences are statistically significant with p<0.01.
[6] In the following, we subsume referendums and popular initiatives under the term referendums.
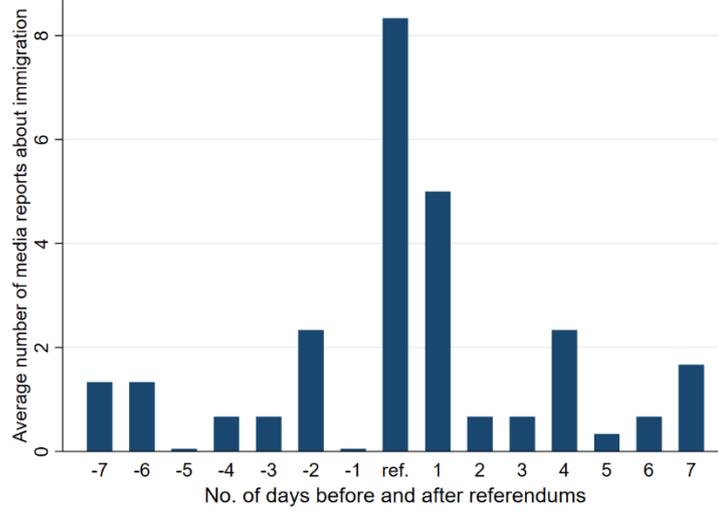
Figure 1: Swiss referendums and daily media coverage of immigration issues in Germany

Empirical strategy

We aim to explore the relationship between media coverage of migration issues and stated immigration worries.

In equation (1) we start with a basic empirical specification that regresses immigration worries ($Worries_{i,t}$) of individual i at time t on media coverage ($MediaCoverage_{t-1}$) prior to the interview:

$$Worries_{i,t} = \alpha\, MediaCoverage_{t-1} + \beta' \theta_{i,t} + \upsilon_t + \varepsilon_{i,t} \tag{1}$$

The unit of observation is the individual respondent on day t. We lag the variable *MediaCoverage* by a day (and a week) in order to allow a predictive interpretation of the coefficient α and as a first step to address endogeneity. Control variables $\theta_{i,t}$ include characteristics of the respondents that may influence their immigration worries, such as gender, age, region of residence, household income, employment status, or political party preferences. Furthermore, we include year and month fixed effects υ_t to account for general time trends and seasonal variation. $\varepsilon_{i,t}$ is the error term.

In a refined version of (1), we include in equation (1') individual fixed effects η_i, to capture all time-invariant individual characteristics of respondents that could be correlated with immigration worries:

$$Worries_{it} = \alpha\, MediaCoverage_{t-1} + \beta' \theta_{i,t} + \upsilon_t + \eta_i + \varepsilon_{i,t} \tag{1'}$$

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Essentially, we thereby capture how changes in the frequency of media reports affect the attitudes of the same individual. $\theta_{i,t}$ then only comprises time-variant individual controls, which include income, political party preferences, region of residence, and employment status.

The use of fixed effects accounts for a large array of potential factors that could affect migration worries. Nevertheless, media coverage of migration issues and immigration worries can still be correlated due to unobserved issue salience. Moreover, media coverage itself can depend on general attitudes towards immigration. Equation (1') does not account for time-variant unobservable shocks to immigration worries that are correlated with issue salience, and therefore with potential media coverage. In an attempt to solve this issue and to investigate the exogenous impacts of media coverage of migration, we use the occurrence of Swiss referendum decisions on immigration as an instrumental variable for media coverage in Germany. In particular, we estimate the following equations using 2SLS:

$$Worries_{i,t} = \alpha \, MediaCoverage_{t-1} + \beta' \theta_{i,t} + v_t + \eta_i + \varepsilon_{i,t}$$
with $\quad MediaCoverage_{t-1} = \beta_1 \, Referendum_{t-1} + \beta' \theta_{i,t} + v_t + \eta_i + \sigma_{i,t}.$ (2)

$Referendum_{t-1}$ is a dummy variable that takes the value 1 if a Swiss referendum on immigration took place on the day of media coverage or the previous day.

Using referendums as an instrumental variable rests on the assumption that the timing of Swiss referendum decisions is exogenous to unobserved political attitudes $\varepsilon_{i,t}$ and unobserved newsworthiness in Germany $\sigma_{i,t}$. The identifying assumption would be violated if the timing of the referendum depended on issue salience in Germany or if the Swiss referendum had a direct effect on political attitudes in Germany.

Referendum committees often take up topics that are salient in the Swiss public discourse. If issue salience is correlated across countries (for example, because economic shocks or refugee streams affect neighboring countries simultaneously), the launch of a Swiss referendum might not be independent of public perceptions of the topic in Germany. However, such endogeneity issues are unlikely. The referendum process is a lengthy procedure. Usually, several months to years pass between the launch of a referendum and the actual vote (33 months, eight months, and 24 months for our three referendums, respectively). Referendum decisions take place four times a year on predetermined dates and the allocation to these dates follows a set of administrative rules. Hence, the dates of the referendums are exogenously set with respect to the discourse in the Swiss and certainly the German media, and particularly from the point of view of individual German SOEP respondents. Nevertheless, the referendum decisions can be newsworthy events in Germany or may prompt German journalists to write

reports about migration issues unrelated to the referendum. Thus, Swiss referendum decisions create short-term variation in media coverage that is plausibly exogenous to unobserved issue salience in Germany. In other words, we exploit news spillovers from Switzerland to Germany. While a public discourse prior to the referendum decisions takes place in Switzerland, increased salience prior to the actual decisions remains national (that is, Switzerland-specific) until the actual decision takes place.[7]

III.   MEDIA COVERAGE AND IMMIGRATION WORRIES

The link between media coverage and immigration worries

Table 2 shows the link between media reports on migration and immigration worries. In specifications (1)–(4), we explore the frequency of media reports, while in specifications (5)–(8) we look at the share of media reports on migration.[8]

We find positive and statistically significant associations between media coverage on the day prior to the interview and immigration worries throughout all specifications. In particular, the association is positive when accounting for individual fixed effects (columns 3 and 4 for the number of news items; columns 7 and 8 for the share of news coverage). Thus, an increase in media reports on immigration is associated with an increase in immigration worries among respondents.

Quantitatively, the coefficients point to a small but non-negligible link between coverage and worries; for example, an increase in the share of media coverage of migration by 10 percentage points on the day prior to the interview increases immigration worries by 0.04–0.11 points on a three-point scale. Such an increase is comparable to the difference between average worries of the group of respondents above 65 years and those between 35 and 65, and is higher than the difference between women and men (see Table 1). These associations are relevant, but can only be interpreted as causal if we assume that there are no time-variant unobservable factors that affect media reports and immigration worries simultaneously beyond factors that we control for (such as income or party preference).

To shed some more light on the potential issue of a reversed causality, we include in the regressions the media coverage of migration in the week prior to the interview and in the week after the interview (columns 2 and 4 for the frequency; columns 6 and 8 for the share of news coverage). If the causality runs strictly from media reports to worries, the coefficients for the media reports before the interview should have a positive sign, while

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[7] While it is unlikely that many individuals in Germany would be aware of a Swiss referendum if it was not covered by the German media, we cannot fully exclude spillovers prior to the referendum date.

[8] We report two-way clustered standard for individuals and interview days. Less conservative clustering strategies systematically yield lower standard errors.

the coefficient for media reports after the interview should not be statistically significant. On the other hand, if worries affect media coverage, the effect of media reports after the interview date should be statistically significant. Empirically, we observe that the coefficient for the media reports just one day before the interview is positive and significant. The coefficient for media reports in the week prior to the interview is also positive. However, the coefficient for media coverage after the interview date is also positive, albeit systematically smaller than the coefficient for media reports in the week prior to the interview. While this suggests that there may be simultaneity, it is also consistent with a causal link between media coverage of migration and changes in immigration worries.

	No. of media reports about immigration				Share of media reports about immigration			
	[1]	[2]	[3]	[4]	[5]	[6]	[7]	[8]
Media coverage on the day prior to the interview	0.006***	0.003**	0.006***	0.003***	1.054***	0.443**	1.064***	0.508***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.241)	(0.190)	(0.195)	(0.161)
Media coverage 2–8 days before the interview		0.003***		0.003***		2.826***		3.391***
		(0.000)		(0.000)		(0.390)		(0.339)
Media coverage in the week after the interview		0.002***		0.002***		2.580***		2.455***
		(0.000)		(0.000)		(0.417)		(0.324)
Male respondent	-0.014**	-0.014**			-0.014**	-0.014*		
	(0.007)	(0.007)			(0.007)	(0.007)		
Age	0.003***	0.003***			0.003***	0.003***		
	(0.000)	(0.000)			(0.000)	(0.000)		
Employed	0.000	-0.001	-0.002	-0.003	-0.000	-0.001	-0.003	-0.002
	(0.008)	(0.008)	(0.006)	(0.006)	(0.008)	(0.008)	(0.006)	(0.006)
Monthly income	-0.000***	-0.000***	0.000**	0.000**	-0.000***	-0.000***	0.000**	0.000*
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Preference for Green party	-0.501***	-0.502***	-0.013	-0.014	-0.501***	-0.502***	-0.013	-0.016
	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)	(0.012)
Preference for SPD	-0.177***	-0.178***	0.013	0.010	-0.177***	-0.178***	0.013	0.009
	(0.010)	(0.010)	(0.009)	(0.009)	(0.010)	(0.010)	(0.009)	(0.009)
Preference for FDP	-0.151***	-0.147***	0.008	0.016	-0.150***	-0.144***	0.009	0.022
	(0.026)	(0.026)	(0.021)	(0.021)	(0.026)	(0.026)	(0.021)	(0.021)
Preference for CDU	-0.013	-0.013	0.030***	0.028***	-0.013	-0.013	0.030***	0.026***
	(0.011)	(0.011)	(0.010)	(0.010)	(0.011)	(0.011)	(0.010)	(0.010)
Preference for CSU	0.083***	0.083***	0.038*	0.037*	0.083***	0.083***	0.037*	0.035*
	(0.022)	(0.022)	(0.020)	(0.020)	(0.022)	(0.022)	(0.020)	(0.020)
Preference for Die Linke	-0.169***	-0.169***	0.018	0.016	-0.169***	-0.170***	0.017	0.014
	(0.021)	(0.021)	(0.017)	(0.017)	(0.021)	(0.021)	(0.017)	(0.017)
State fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year and month fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	No	No	Yes	Yes	No	No	Yes	Yes
Observations	116'635	116'635	106'043	106'043	116'635	116'635	106'043	106'043

Notes: OLS ([1], [2], [5], [6]) and fixed-effects regressions ([3], [4], [7], [8]). The dependent variable is worries about immigration on a three-point scale. Time span is from 2009 to 2014. Two-way clustered standard errors at day and individual level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 2: The link between media coverage and immigration worries

Effects of an exogenous increase in media coverage

To address the endogeneity concerns, we implement our instrumentation strategy using Swiss referendum decisions. Specifications (1) and (2) in Table 3 employ the frequency of media reports about immigration, while specifications (3) and (4) use the share of media reports.[9] We instrument the media reports on migration with a dummy variable that equals 1 if there was a referendum in Switzerland on the day of the media reports or on the previous day (that is, during the two days prior to the interview).

	No. of media reports about immigration		Share of media reports about immigration	
	[1]	[2]	[3]	[4]
Media coverage on day prior to interview	0.005 (0.004)	0.009*** (0.003)	0.702 (0.755)	1.314** (0.622)
First stage:				
Referendum one or two days prior to interview	10.431*** (1.341)	10.657*** (1.058)	0.070*** (0.017)	0.072*** (0.014)
F-test of excluded instruments	60.55	101.38	16.02	24.71
Individual control variables	Yes	Yes	Yes	Yes
Party preferences	Yes	Yes	Yes	Yes
State fixed-effects	Yes	Yes	Yes	Yes
Year and month fixed-effects	Yes	Yes	Yes	Yes
Individual fixed effects	No	Yes	No	Yes
Observations	116'635	106'043	116'635	106'043

Notes: IV regressions ([1] and [3]) and fixed-effects IV regressions ([2] and [4]). The dependent variable is worries about immigration on a three-point scale. Time span is from 2009 to 2014. The instrumental variable takes the value of 1 if a referendum took place one or two days prior to the interview (i.e., on the day of or before lagged media coverage) and 0 otherwise. Standard errors two-way clustered at individual and day level in parentheses. $^{*}p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 3: IV regressions of the effect of media coverage on immigration worries

The coefficients for instrumented media coverage are positive. However, they are only statistically significant in specifications (2) and (4), which employ individual fixed-effects. First-stage F-tests of the excluded instruments suggest that the instrument is statistically relevant (Stock and Yogo 2005). Given the identifying assumptions, the coefficients of the number of news items and the share of media coverage can be interpreted as giving the impact of an exogenous increase in media coverage of migration due to Swiss referenda on immigration worries in Germany. Compared to Table 3, the coefficients that capture the influence of news coverage are an order of magnitude larger in the fixed effects instrumental variable regressions.

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[9] Again, we report two-way clustered standard errors for individuals and interview days.

It is important to note that while the results in Table 3 can be interpreted as causal under the identifying assumptions, identification is based on three distinct Swiss referendums. While this is sufficient to generate variation in media reports that can be exploited statistically, it is also obvious that exploiting more media spillovers would be desirable.[10]

Heterogeneous effects of media coverage on immigration worries

In Table 4 we continue to employ our instrumental variable strategy for the number of media reports but focus on heterogeneous effects of media coverage.

We split our dataset according to three characteristics of the respondents – age, gender, and employment status – and run separate instrumental variable regressions for each subsample. All specifications also include individual fixed effects.

Comparing specifications (1) and (2) indicates that the link between media coverage of migration and immigration worries is similar for individuals below 52 years of age (median age in dataset) and those above 52 years of age. Interestingly, women seem to be more affected by the media regarding immigration worries than men (comparing specifications 3 and 4), and those respondents who are employed are more affected than people who are not active in the labor market (comparing specifications 5 and 6).

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[10] We opted to use the referendums with a clear and direct link to migration.

Dependent variable: No. of media reports about immigration	Elderly vs young		Women vs men		In workforce vs not in workforce	
	[1 - elderly]	[2 - young]	[3 - women]	[4 - men]	[5 – in workforce]	[6 – not in workforce]
Media coverage on the day prior to the interview	0.008*	0.009***	0.011**	0.007***	0.011***	0.008***
	(0.005)	(0.003)	(0.004)	(0.002)	(0.004)	(0.003)
First stage:						
Referendum one or two days prior to interview	10.193***	10.827***	10.556***	10.771***	10.781***	10.384***
	(1.256)	(0.973)	(1.077)	(1.046)	(0.0903)	(1.165)
F-test of excluded instruments	65.83	123.84	96.14	105.97	142.70	79.47
Individual control variables	Yes	Yes	Yes	Yes	Yes	Yes
Party preferences	Yes	Yes	Yes	Yes	Yes	Yes
State fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Year and month fixed-effects	Yes	Yes	Yes	Yes	Yes	Yes
Individual fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Observations	51'731	53'315	55'916	50'127	34'292	61'830

Notes: Fixed-effects IV regressions. The dependent variable is worries about immigration on a three-point scale. Time span is from 2009 to 2014. The instrumental variable takes the value of 1 if a referendum took place one or two days prior to the interview (i.e., on the day of or before lagged media coverage) and 0 otherwise. Standard errors two-way clustered at individual and day level in parentheses. $^*p < 0.10$, $^{**}p < 0.05$, $^{***}p < 0.01$.

Table 4: Heterogeneous effects – Media reports and immigration worries for different subgroups or respondents (IV regressions)

IV. CONCLUSIONS

It is often argued that the media influence citizens' attitudes, but it is difficult to test this notion empirically, since attitudes may shape how and what the media reports. We have studied the link between media coverage of migration and immigration worries expressed by German citizens. Using individual data from the German Socio-Economic Panel and detailed daily media coverage data on migration issues, we find a statistically relevant association between the number of news items and the share of media coverage of migration and expressed immigration worries. This association prevails when accounting for individual fixed effects such that a change in news coverage of migration is associated with a change in immigration worries among respondents.

We have also explored whether an exogenous increase of media coverage of migration has an impact on attitudes towards immigration by analyzing media spillovers between Switzerland and Germany. More precisely, we use an exogenous increase in media coverage of migration in German media that originated due to Swiss referendum decisions. Swiss referenda are, arguably, not directly related to issue salience in Germany. The empirical results suggest that such an increase in media coverage tends to affect immigration worries and point to the relevance of the media in shaping public attitudes on heavily debated topics such as immigration.

Our analysis pertains to the immediate short-term effects of media coverage in a period (2009–2014) during which immigration was not particularly salient on the political and public agenda. The analysis of long-term effects would be even more difficult since public opinion and media coverage might evolve simultaneously over time. Furthermore, salience and media coverage of immigration issues increased dramatically with the refugee crisis in the second half of 2015. Whether our results can be extrapolated to such a period with more extensive media coverage remains a question for further research.

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VI.   APPENDIX

Media outlet	No. of new items on foreigners and/or migration	No. of news items on all protagonists and topics
TV news shows (private)		
RTL aktuell	124	33,882
TV news shows (public broadcasting service)		
Tagesthemen (ARD)	669	53,154
Tagesschau (ARD)	553	43,312
heute (ZDF)	478	49,643
heute journal (ZDF)	549	51,545
TV magazines (public broadcasting service)		
Fakt (MDR)	7	541
Frontal 21 (ZDF)	29	4928
Kontraste (SFB)	22	781
Monitor (WDR)	24	1209
Panorama (NDR)	27	928
Plusminus (ARD)	0	2817
Report (BR)	16	910
Report (SWR)	25	1044
WISO (ZDF)	2	6212
Bericht aus Berlin (ARD)	9	2891
Berlin direkt (ZDF)	14	2988
Börse vor Acht (ARD)	0	1695
Radio news shows (public broadcasting service)		
7 Uhr-Nachrichten (Deutschlandfunk)	132	14,359
Daily newspaper		
Bild	303	38,742
Magazines and weeklies		
Bild am Sonntag (BamS)	79	9990
Frankfurter Allgemeine Sonntagszeitung (FAS)	20	2902
Focus	87	14,721
Spiegel	139	12,284
Welt am Sonntag (WamS)	52	3677
Business magazines		
Capital	9	5722
Manager Magazin	0	2531
Total		
Number of observations	3369	363,408

Table A1: The analyzed media set 2009–2014

	No. of media reports		Share of media reports	
	[1]	[2]	[3]	[4]
Swiss Referendum in previous week	1.554* (0.831)		0.010* (0.005)	
Swiss Referendum on same or previous day		5.692*** (2.097)		0.033** (0.014)
Year fixed effects	Yes	Yes	Yes	Yes
Observations	45	45	45	45
R²	0.12	0.48	0.15	0.41

Notes: OLS regressions with robust standard errors in parentheses. *p < 0.10, **p < 0.05, ***p < 0.01.

Table A2: Swiss referendum decision and daily media coverage of immigration issues in Germany