Reform Chatter and Democracy

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Abstract: We explore the dynamics of media chatter about economic reforms using text analysis from about a billion newspaper articles in 28 languages. We show that the intensity of reform chatter increases during economic downturns. This increase is more significant in democracies. Using instrumental variable techniques, we find the relationship to be causal. We also document that reform chatter is followed by actual reforms, suggesting that democracies benefit from a "self-correcting" mechanism stemming from changing popular attitudes towards reform.

Keywords: Reform, Chatter, Media, Business Cycle, Democracy.

JEL Codes P1; P4; D7; E3.

1. Introduction

The debate over the relative benefits of democracies over autocracies has become heated. Democracies are often criticized for being less responsive. The above-mentioned quote epitomizes the apparent trade-off between legitimacy and efficiency in democracies. But is it really so? In the present paper we provide evidence against that trade-off. Indeed, we uncover one important channel through which democracies display a built-in mechanism for self-correction that is "reform chatter". We find that reform chatter peaks during economic downturns, followed by improved popular attitudes in turn leading to actual reforms.

The political debate over reforms had traditionally revolved around their timing and consequences. The pioneering work on the political economy of reforms steered the debate toward the determinant of reforms and issues of political feasibility (Alesina and Drazen 1991). Yet little is known about attitudes towards reform in the public square. Arguably, understanding public chatter illuminates the presence of support for public policy.

This paper uses text analysis from about a billion newspaper articles to explore the dynamics of reform chatter. Our measure of chatter intensity uses Dow Jones FACTIVA, a global repository of newspaper articles. The approach is akin to Baker et al. (2016) who use the same data to construct an index of economic policy uncertainty. We refine the search method in several directions, beyond the search of keywords like "economic reform" in press articles. In particular, we distinguish between international and local media sources; and across media in 28 different languages. Also, we use machine learning techniques such as topic modelling to ascertain the informational content of reform chatter (Blei et al. 2003).

We compute a measure of attitudes around reform to get a sense of whether or not reform is put forth with a positive lens. This paper contributes to the large and growing economic literature using text analysis and machine learning techniques to analyze data (see Gentzkow et al, 2019 for a review). The existing literature on sentiment focuses mostly on the United States and on the predictive power of sentiment on economic activity. An example of use of sentiment analysis in finance is Tetlock (2007) who considers the sentiment of the Wall Street Journal's "Abreast of the Market" column as a predictor of market fluctuations in the United States. A more recent paper is Shapiro et al. (2019), who show that sentiment shocks have a positive effect on consumption, output, and real interest rates.

We show that the intensity of reform chatter increases during economic downturns. This increase is more significant in democracies. We find that the relationship between downturns and reform chatter is causal, using instrumental variable techniques. We finally document that reform chatter is followed by actual reforms suggesting that democracies benefit from a "self-correcting" mechanism stemming from media chatter.

Our paper is also related to the literature on media and economics. Besley and Burgess (2002) show that having a more informed and politically active electorate strengthens incentives for governments to be responsive. Djankov et al. (2003) find that government ownership in media undermines political and economic freedom. Besley and Prat (2006) develop a model of democratic politics in which media capture is endogenous. The model offers insights into the features of the media market that determine the ability of the government to exercise such capture

and hence to influence political outcomes. Our paper is the first to use media data to account for the intensity of and attitudes in reform chatter.

Lastly, our paper is linked to the literature on economic reforms and the political business cycle. Fernandez and Rodrik (1991) provide a theory to explain the "status quo bias" against efficiency enhancing reforms. In their model, individual-specific uncertainty about distributional gains creates a bias against reform. Early work on the political business cycle dating back to Nordhaus (1975) show that macroeconomic cycles could be induced by electoral cycles. Brender and Drazen (2005) provide evidence that political budget cycles are stronger in weaker democracies (citizens in more established democracies do not get fooled by promises made by politicians). Our paper presents evidence on the importance of polity in mediating reform chatter over the business cycle, including during crises.

The remainder of the paper is organized as follows. Section 2 presents the data. Section 3 lays out the empirical strategy and main results around the evolution of the intensity of reform chatter. Section 4 presents several extensions around sentiment analysis and the nexus between reform chatter and actual reforms. Section 5 concludes.

2. Data

This section describes the main sources of data used in this paper. The discussion focuses first and foremost on reform chatter given the novel nature of the data, while other, more established, sources are discussed briefly.

2.1 Reform chatter

We make use of text in the form of newspaper articles as our main data source. The data are extracted from Dow Jones FACTIVA via the Dow Jones Data, News and Analytics Platform. Dow Jones FACTIVA is a global repository of newspaper articles covering over one billion articles published in 28 different languages. The full list of languages is listed in Appendix Table A1. Beyond the date of publication and the text, Dow Jones provides several classifiers to navigate searches. These classifiers include language codes, subject codes, country/region codes, industry codes, and publisher information.

The search in each language is conducted so that at least one of the words relating to the economy and at least one relating to reforms appear. For example, in English, the precise query is: *[("economy" OR "economic") AND ("reform" OR "reforms")]*. This search is performed for each country and each language, over the period from January 1, 1980 to December 31, 2018. The search yields 9.3 million (unique) reform articles. In addition, we obtain the number of total articles for each country and each year. The count of articles broken down by world regions are presented in Table 1.[1]

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[1] In Appendix Figure A1, article counts are reported by language codes. Reform chatter using English language dominates the sample—with more than 5 million articles. The most prevalent languages in the reform article data are European ones along with Chinese language.

Table 1: Article Count

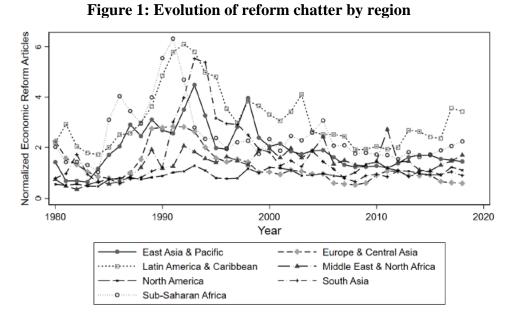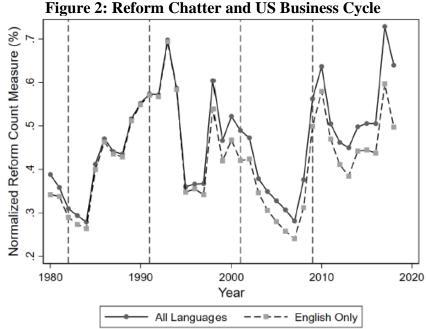| Region	Reform Articles All Languages	Reform Articles English	Total Articles All Languages	Total Articles English
East Asia & Pacific	3,500,314	1,175,823	352,563,913	138,617,246
Europe & Central Asia	4,122,797	1,410,412	738,535,949	222,592,653
Latin America & Caribbean	763,613	204,056	57,263,777	15,266,344
Middle East & North Africa	479,158	334,911	55,675,457	27,709,664
North America	1,909,878	1,476,013	412,543,976	366,091,216
South Asia	394,358	350,026	61,500,403	56,818,065
Sub-Saharan Africa	318,308	244,649	24,359,146	16,992,789
Total	11,488,426	5,195,890	1,702,442,621	844,087,977

The measure of the intensity of reform chatter denotes the percentage of articles which mention country *i's* economic reforms in year *t* as follows:[2]

$$ReformChatter_{i,t} = 100 \times \frac{reform\ article\ count_{i,t}}{total\ article\ count_{i,t}}$$

A look at the intensity of reform chatter indicates that it is negatively correlated with the business cycle. Figures 1 and 2 respectively present the evolution of reform chatter by region and for the United States. Reform chatter appears to spike during the 1990s for developing regions such as Latin America and East Asia suggesting that during the time of financial crises reform chatter increases significantly. In Figure 2, recession years (the years that immediately follow) are associated with a higher intensity of reform chatter-- the vertical dashed lines denote recession years identified by the NBER Business Cycle Dating Committee.

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[2] In Appendix Figure A2, article counts are presented for the 25 countries (out of 217) with the highest number of articles. These account for around 78% of the total article counts in the data. Appendix Figure A3 presents the 25 most prevalent subject categories discussed in the context of "economic reform" articles. Appendix Figure A4 presents the evolution of reform chatter broken down by regions.

Figure 1: Evolution of reform chatter by region
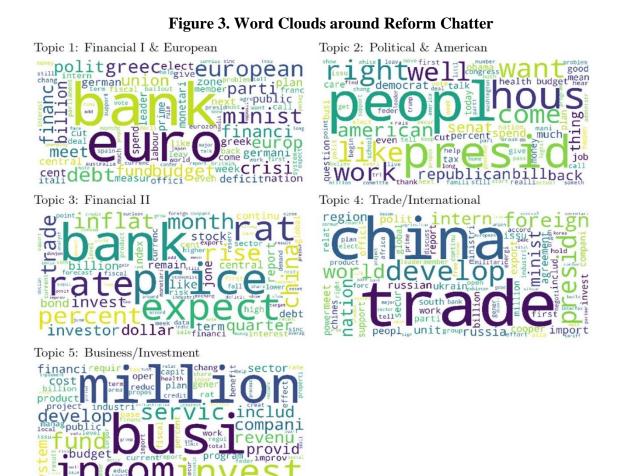

Figure 2: Reform Chatter and US Business Cycle

Notes: This figure presents the trends in two measure of normalized reform articles in the United States over the period 1980-2019. The line connected by circles denotes economic reform articles in all languages divided by total articles in all languages. The line connected by squares only considers articles published in English. Articles relating to the US are identified by Dow Jones' country codes assignment to articles. Vertical dashed lines represent recession years as defined by the NBER's Business Cycle Dating Committee.

To further explore the informational content of the reform chatter we use a learning algorithm to uncover the underlying topics in the media coverage. Topic models are a class of algorithms which can be used to understand the content of large corpora of text. The core insight is that distinct topics use different vocabularies and keywords. For example, a topic that discusses budget is likely to use words such as "expenditures", "tax", and "deficit" with high frequency, whereas a topic

discussing financial markets is more likely to refer to terms such "interest rate", "stocks", and "bonds".

Word clouds are one convenient way to summarize the data, where the relative size of each word corresponds to its weight in a topic. Figure 3 presents word clouds for the five distinct clusters that emerged from the learning algorithm. Clusters 1 and 3 relate to reform chatter around finance. Indeed, words such as 'bank', 'rate', 'inflation', and 'euro' have a higher frequency. Cluster 2 captures reform chatter around US politics. Cluster 4 relates to reform chatter around trade and investment with a China leaning. Cluster 5 captures reform chatter around business and investment. These clusters give a global perspective on the informational content of the data. Our econometric analysis takes a country-level perspective.

Figure 3. Word Clouds around Reform Chatter

Sources: Factiva Dow Jones and authors' own calculations.
Notes: The word clouds are obtained using a learning algorithm to uncover the underlying topics in the media coverage of reform chatter articles. The relative size of each word corresponds to its weight in a topic.

To capture the cyclical component of economic activity we use annual growth in GDP at constant prices. The data are from the IMF's World Economic Outlook, April 2018 update (IMF 2018). The data are available for 193 nations over the period 1980-2018. The identification strategy

consists of instrumenting economic growth with commodity terms of trade shocks. Data on commodity prices are obtained from the IMF's database for a basket of 45 commodities (see Gruss and Kebhaj, 2019).

To measure the level of democracy, we use the Polity IV database from the Center of Systemic Peace (Marshall et al., 2018). We use the following three measures: political competition, constraints to the executive and a composite measure of democracy. The first measure (POLCOMP) combines measures of the regulation of participation and the competitiveness of participation in the political arena. This variable takes values between 1 (suppressed) and 10 (institutionalized electoral) political competition. The second measure (XCONST) captures the extent to which there are executive constraints in a polity. The measure refers to the presence or absence of formal checks on the power of the executive branch. It takes values between 1 (unlimited authority) and 7 (executive parity or subordination). The third measure (POLITY2) captures the level of democracy. The composite index combines data on the (i) competitiveness and openness of executive recruitment, (ii) constraints on executive power, and (iii) political competition. This variable takes values between -10 (strongly autocratic) and +10 (strongly democratic).

We consider a country as having: i) strong (weak) political competition if the country's average political competition index is greater or equal to (strictly lower than) 7; ii) strong (weak) executive constraints if its average executive constraint index is greater or equal to (strictly lower than) 5; and iii) a democratic (autocratic) political system, if the average Polity2 index is greater or equal to (strictly lower than) 0. For example, the United States is coded as having a high level of political competition, with an average score of 9.8 over the sample period 1980 to 2018. We find that 77 countries have strong political competition and 88 have weak competition; 79 countries have strong executive constraints and 86 have weak ones; there are 111 democratic countries and 55 autocratic ones.

In section 3 we use alternative cutoff points for the various measures. We also use an alternative measure of democracy from Freedom House.

Data on education attainments are from Barro and Lee (2013) dataset, obtained from the 2018 Update July 4. Structural reforms are from Ostry et al. (2009). The dataset captures reforms along 6 dimensions: (i) domestic finance; (ii) capital account (iii) current account transactions; (iv) trade (v) agricultural regulation (vi) network reforms. Each of these indicators is normalized to take values between 0 and 1, where higher values denote more liberalization. In our analyses, the variables are organized into three groups using principal component analysis, where the first principal component is used in the analysis. Indicators (i),(v),(vi) are grouped as 'domestic' indices; indicators (ii),(iii),(iv) are termed 'international' indices. Finally, an aggregate index is used. Note that reforms are defined as changes in the indices.

We also use Doing Business data from World Bank (2020) to capture regulatory reforms. Doing Business benchmarks aspects of business regulation based on work on the regulation of entry (see Djankov et al., 2002) and operations. The strength of the business environment is scored on the basis of an economy's performance in each of the ten areas included in the ease of doing business ranking. The ten areas are: Starting a business; Getting electricity; Dealing with construction

permits; Registering property; Getting credit; Protecting minority investors; Employing workers; Enforcing contracts; Resolving insolvency; Paying taxes; Trading across borders (Djankov 2016). We use a version of *Doing Business* database ranging from 2003 to 2019 and each of the 10 components takes the value of 1 if a reform has been implemented and 0 otherwise.

3. Main results

This section presents the empirical strategy and our results using the intensity of reform chatter measure. The empirical specification is as follows:

$$ReformChatter_{i,t} = \alpha_i + \beta_t + \lambda GDPGrowth_{i,t} + \gamma GDPGrowth_{i,t} \times Democracy_i + \varepsilon_{i,t} \quad (1)$$

Where the subscripts *i,t* refer to country-year observations. On the left-hand side, $ReformChatter_{i,t}$ refers to the news-based measure of reform chatter. On the right-hand, the coefficients of interest are λ and γ, which capture respectively how the cyclical component of economic activity affects the intensity of reform chatter and how the interaction between the cyclical component and the level of democracy affects the intensity of reform chatter.

The time-variant variable for democracy is constructed using Polity IV dataset. For autocracies, the effect is given by the coefficient λ, while for democracies, the sum of $\lambda + \gamma$ gives the relevant effect. Country fixed effects are captured by α_i. Additionally, β_t captures yearly fixed effects, and controls for global shocks that induce secular trends and/or spikes in reform chatter (e.g. an increase in reform chatter stemming from the global financial crisis). Finally, standard errors are clustered at the country level.

The main issue with the chosen specification is the endogeneity of GDP growth. If an unobserved variable is correlated with both GDP growth and media coverage of economic reforms, the relationship between the cyclical component of economic activity and reform chatter will not be causal. To ascertain causality, GDP growth is instrumented using changes in commodity terms of trade, as in Arezki and Bruckner (2012) and Bazzi and Blattman (2014). In particular, GDP growth and its interaction with democracy are instrumented as follows:

$$\widehat{GDPGrowth}_{i,t} = \hat{\alpha}_i + \hat{\beta}_t + \hat{\delta_1}\Delta\ln(ComPI_{export})_{i,t} + \hat{\delta_2}\Delta\ln(ComPI_{export})_{i,t-1} + \hat{\beta_1}\Delta\ln(ComPI_{export})_{i,t} \times Polity_i + \hat{\beta_2}\Delta\ln(ComPI_{export})_{i,t-1} \times Polity_i \quad (2)$$

and

$$\widehat{GDPGrowth_{i,t} \times Polity_i} = \hat{\alpha}_i + \hat{\beta}_t + \hat{\delta_1}\Delta\ln(ComPI_{export})_{i,t} + \hat{\delta_2}\Delta\ln(ComPI_{export})_{i,t-1} + \hat{\beta_1}\Delta\ln(ComPI_{export})_{i,t} \times Polity_i + \hat{\beta_2}\Delta\ln(ComPI_{export})_{i,t-1} \times Polity_i \quad (3)$$

where export commodity price shock is calculated as follows:

$$\Delta\ln(ComPI_{export})_{i,t} = \sum_{j=1}^{J} \omega_j \times \Delta\ln(P_{j,t}) \quad (4)$$

8

$P_{j,t}$ denotes the international price of commodity j in year t. The weight, ω_j, is time-invariant and country-commodity specific. It is calculated as the average of a country's gross exports of commodity j over GDP over the sample period. The export commodity price shock index captures the long-run exposure of a country to its commodity exports and the changes in international commodity prices. As most countries are price takers in any given commodity, the variation stemming from terms of trade is plausibly exogenous, and thus satisfies standard exclusion restrictions.

Columns (1) to (4) of Table 2 present the main results, using an ordinary least squares (OLS) specification. The coefficient on GDP growth is negative, indicating reform chatter tends to increase during downturns. Columns (5) to (8) present the two-stage least square (2SLS) regressions where GDP growth is instrumented by commodity terms of trade shocks. Column (5) shows that GDP growth does not systematically affect reform chatter. However, the results in columns (7) and (8) support the earlier findings. Economic downturns boost reform chatter significantly in more democratic countries, as well as in countries with strong executive constraints or strong political competition. The coefficient associated with the interaction between GDP growth and democracy implies that in response to a 1% decrease in GDP growth reform chatter in democracies goes up by 0.116 percentage points more than it does in autocracies. The coefficients associated with GDP growth are not significant for columns (5) to (8), implying that fluctuations in economic activity have no effect on reform chatter in autocracies.

The fact that reform chatter increases in democracies during economic downturns suggests that these countries have more public discussion about reforms when faced with a difficult situation. Political competition and other attributes of democracies provide the space for self-correction of government policy. Instead, in weaker democracies, the fact that reform chatter does not respond to economic activity suggests that there is little space to allow for corrections of policy.

The instruments used in the 2SLS are adequate: Appendix Table A2 presents the first stage regressions. Both lagged and contemporaneous commodity shocks are associated with higher GDP growth, with a stronger effect coming from the lagged commodity terms of trade shocks. Since the main regressions have two endogenous variables, the strength of the instruments is summarized by the multivariate F-statistic, as proposed by Cragg and Donald (1993). The statistics for each specification are reported in Table 2, in the row above Observations. The values exceed 10 in all specifications, implying that weak identification is not an issue in the IV framework. Appendix Table A3 shows the reduced-form regressions, where reform chatter is regressed against lagged and contemporaneous commodity terms of trade shocks and their interactions with democracy.

Table 2: Reform Chatter, Democracy and Economic Activity

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:				Reform Mentions - All Languages				
Estimation:	OLS (Full Sample)				2SLS			
GDP Growth	-0.015*** (0.005)	-0.002 (0.002)	-0.011* (0.006)	-0.016** (0.008)	0.063 (0.042)	0.037 (0.025)	0.037 (0.027)	0.040 (0.029)
GDP Growth X Democracy		-0.045*** (0.015)				-0.116*** (0.037)		
GDP Growth X Strong Executive Constraints			-0.064*** (0.017)				-0.124*** (0.043)	
GDP Growth X Strong Political Competition				-0.046*** (0.016)				-0.123*** (0.040)
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
ISO3	✓	✓	✓	✓	✓	✓	✓	✓
C-D F Statistic					19.056	11.462	13.293	13.018
Observations	5,603	4,822	4,694	4,694	5,603	4,822	4,694	4,694
Number of Clusters	182	160	160	160	182	160	160	160

Notes: This table presents the main results using OLS and the instrumental variable strategy. The dependent variable in all columns is the economic reforms article count in all languages normalized by the total number of articles. GDP growth is instrumented using contemporaneous and lagged changes in the gross export commodity price index, as described in the text. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We next present a battery of robustness checks, using the intensity of reform chatter measure as the dependent variable. First, we restrict news articles used to construct the reform chatter measure to English language only. Our main results appear stronger (Appendix Table A4). As Table 1 reminds us, more than half of the reform articles are in English, as are more than half of all the available articles.

The results are robust and quantitatively stronger than the baseline estimation when we next restrict news articles only to sources from the country under consideration, i.e. local sources only (Appendix Figure A5). While international perceptions and discussions about a country i's reforms are important, home-grown chatter are most meaningful for supporting domestic reforms.

Our results continue to be robust when we restrict the use of newspaper article to articles tagged by Factiva as "economic news" articles (Appendix Table A6). In the baseline regressions, we use all news articles regardless of the Dow Jones' classification. However, one could argue that without restricting to economic news articles, the reform article count could contain noise, e.g. articles not related to economic news yet mentioning economic reforms in the text.

Our results remain robust to using net export commodity price shocks as instruments instead of gross exports (Appendix Table A7). In this robustness check, we cover not only exports but also imports of commodities. Net exports commodity price shocks are more relevant to many commodity-import countries, though gross export commodity shocks are used in the previous literature (see for instance Bazzi and Blattman, 2014).

We show that our results are robust to different cutoffs of polity variables and different polity sources. Appendix Tables A8 to A10 present the results with three different cutoffs for polity measures. In Appendix Table A8, the cutoffs are defined as relative. Specifically, for each polity measure, we take the simple average of the entire sample. If a country's polity average is larger than the sample average, the country is considered to have stronger polity. In Appendix Table A9, instead of using a country average of polity measures as in the baseline regressions, we use the

country's initial polity measures. Specifically, we compare a country's Polity2 in 1990 with 0, executive constraints in 1990 with 5 and political competition in 1990 with 7. If the country's initial polity measures are larger than the above-mentioned cutoffs, the countries are considered to have better polity. In Appendix Table A10, we use 5-year rolling average Polity. At year *t*, a country is defined to have better polity if the country's backward 5-year window Polity average (i.e. from year *t-1* to *t-5*) is larger than the above-mentioned cutoffs. This is to address the potential evolution of countries' Polity, such as the democratization of many Eastern European and Latin American countries in the 1990s. Finally, we also use a Democracy measure from Freedom House. Our results show that the finding that economic downturns cause reform chatter to increase more in democracies holds.

Our results hold when we consider the higher income and lower income countries separately. Appendix Table A11 presents the results for high and upper-middle income countries, while Appendix Table A12 presents the results for low and lower-middle income countries. Within each income group, reform chatter responds more to downturns in countries with better polity. The results are stronger and more statistically significant for the low and lower-middle income countries, suggesting the overall results are driven primarily by poorer countries.

The results remain robust when crisis years are removed (Appendix Table A13). This robustness check confirms that our results are not driven by crisis years or extreme growth shocks. We also show that the results are not driven by the degree of press freedom. Appendix Table A14 shows that when Press Freedom is included, the interactions of executive constraints and political competition with GDP growth remain highly significant. However, the interaction of the aggregate index Polity2 (Democracy) becomes insignificant. We can conclude that our main results are not affected solely by press freedom but rather by some elements of democracy.

Our main results are not driven by human capital either. Appendix Table A15 shows that while high human capital does make reform chatter increase more in bad times, human capital does not crowd out the effects stemming from a higher level of democracy.

An important caveat is that negative economic shocks are likely to affect media coverage of all economic topics, not specifically economic reforms. It may even be that, as a share of *economic news*, the number of articles discussing reform decreases in response to economic downturns. To address this concern, we focus on the corpus of articles in Factiva categorized as "Economic News". Table A16 presents the IV results using this alternative dependent variable. The coefficients on all the interactions are negative and highly significant, suggesting that reform chatter increases even within the sub-sample of economic news articles. In contrast, reform chatter decreases in less democratic countries in response to negative economic shocks.

4. Extensions

In this section we explore the nexus between reform chatter, reform attitudes and actual reforms. Economic crises present a window of opportunity to debate and potentially enact reforms. Indeed, downturns could shift the attitude of both politicians and the general public on reform.

The first step is to gauge the language in economic news: is it mostly positive or negative on the necessity for reforms. The semantic orientation of reform articles in this paper is calculated using the number of positive and negative words present, scaled by the word count. Formally, the average sentiment of article k can be expressed as:

$$sentiment_k = 100 \times \frac{\#PositiveWords_k - \#NegativeWords_k}{WordCount_k}$$

A sentiment index is constructed by calculating the average sentiment of articles in every country-year, $sentiment_{i,t}$. A positive value expresses that the tone of the media was, on average, positive regarding economic reforms. Importantly, this refers to published articles in all languages for a given country. The semantic orientation of economic reform articles is calculated using the polyglot package in Python, which builds on the work of Chen and Skiena (2014). The authors create a knowledge graph connecting dictionaries of high-frequency words across 136 languages. The sentiment coding of words is then performed using a graph propagation algorithm starting from a well-known English sentiment lexicon (Liu 2010).

Figure 4 presents the density plot of the main attitudes-towards-reform index. Articles tend to be marginally positive in the global sample, but the distribution is slightly skewed toward the negative.
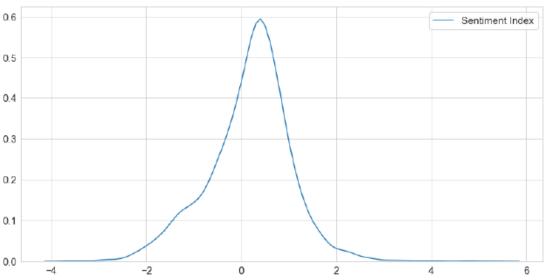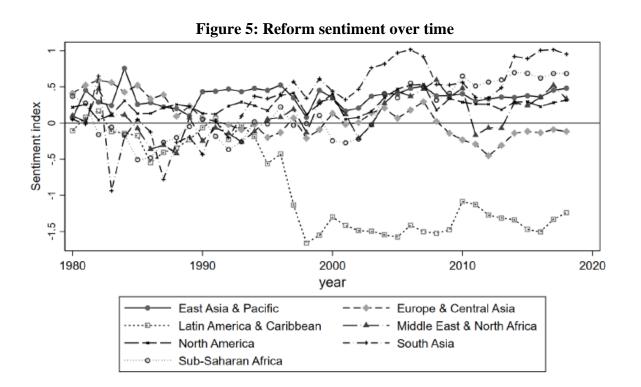
Figure 4: Distribution of Sentiment Index- All sources and all languages

Notes: This figure present the distribution of the main sentiment index measure. This measure captures the average sentiment in every country-year across all sources and languages. It is constructed using the *polyglot* project lexicons of positive and negative words.

Figure 5 presents the evolution of these attitudes across all languages, divided across seven world regions. One interesting pattern is the collapse in reform attitudes in Latin America in the 1990s. This pattern coincides with a period of upheavals with crisis followed by reforms aimed at liberalizing the region according to the so-called "Washington Consensus" (Williamson 1990). The policy prescriptions of the Consensus have been controversial and have not gained the wider support amongst the population. A further observation is that the decline in positive attitudes is absent when considering English only articles. This highlights the importance of using multiple languages to understand the evolution of sentiment across countries, a key contribution this paper makes.

All in all, a preliminary look at sentiment data suggests that attitudes toward economic reforms may be shaped by fluctuations in economic activity. We explore these dynamics, as well as the heterogeneity across different polity, more systematically.

Figure 5: Reform sentiment over time

The empirical strategy used for analyzing the relationship between attitudes towards reform and fluctuations in economic activity mirrors that of section 3, where the second-stage is as follows:

$$Sentiment_{i,t} = \alpha_i + \beta_t + \lambda GDPGrowth_{i,t} + \gamma GDPGrowth_{i,t} \times Democracy_i + \varepsilon_{i,t}$$

GDP growth and its interaction with the democracy indicator are instrumented with both lagged and contemporaneous changes in commodity terms of trade indices. The main coefficient of interest is λ, which captures the relationship between growth and attitudes in weaker democracies. The parameter γ reflects the heterogeneity in this result for stronger democracies. Country and

Table 3: Sentiment and GDP Growth- All sources and all languages

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent variable:				Sentiment Index				
Estimation:		OLS				2SLS		
GDP Growth	0.013*** (0.004)	0.007** (0.003)	0.013** (0.006)	0.012** (0.005)	0.025 (0.018)	0.023 (0.015)	0.028 (0.018)	0.030 (0.019)
GDP Growth X Democracy		0.018*** (0.005)				-0.040** (0.019)		
GDP Growth X Strong Executive Constraints			0.010 (0.007)				-0.066*** (0.021)	
GDP Growth X Strong Political Competition				0.014** (0.007)				-0.055*** (0.020)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓
C-D F Statistic					19.067	11.462	13.293	13.018
Observations	5,602	4,822	4,694	4,694	5,602	4,822	4,694	4,694
Number of Clusters	182	160	160	160	182	160	160	160

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 3 reports the results using the sentiment data using OLS and 2SLS estimators. Columns (1) to (4) show a positive association between GDP growth and attitudes around reform chatter. Overall, GDP growth and reform attitudes are significantly and positively correlated (Column 1), which could mean growth generates positive reform sentiment, or the reverse, that positive reform sentiment boosts growth. The OLS results also suggest that the positive relationship is stronger in stronger democracies. To ascertain a causal relationship, Columns (5) to (8) present results using 2SLS estimator. Column 5 suggests that sentiment is weakly pro-cyclical in response to exogenous growth shocks. This relationship is not statistically significant, and it belies an important heterogeneity across countries. Columns (6)-(8) explore heterogeneity across polity. Across the three indicators, sentiment around reform chatter remains pro-cyclical for countries with lower institutional quality. However, in stronger institutions, the relationship is negative. In other words, attitudes towards reform increase in stronger democracies during economic downturns.

The results presented in Table 3 support the presence of a "self-correcting mechanism" in democracies: attitudes toward reform improve in bad times, paving the way for actual reform. While results from the main section provide evidence at the "extensive margin," that is the intensity of reform chatter increases significantly during downturns in democracies, the results in this section provide evidence at "the intensive margin," that there is more support for reform on top of the increase in intensity.

While column 1 shows a positive association between reform attitudes and GDP growth, column 5 shows no such effect. Results in column 1 are consistent with the literature on sentiment predicting economic activity. Yet, the flipping of signs on the interaction terms between GDP growth and activity when comparing OLS and the 2SLS estimators is noteworthy. The interaction terms in the OLS regressions (columns 2 to 4) have positive coefficients, implying a more positive correlation between GDP growth and reform sentiment in stronger democracies. However, the interaction terms in 2SLS estimators are associated with negative coefficients implying economic slowdown causes improvements in reform attitudes in stronger democracies.

So far, we use data on all articles and use searches of keywords for 'economy' and 'reforms' in multiple languages. As a robustness check we select only articles that are classified as "Economic News" by Dow Jones to limit the potential noise stemming from the large pool of articles used initially (Appendix Table A17). The results remain robust and highly significant in this sub-sample, further supporting the results on the dynamics of reform attitudes presented in this section.

Next, we explore whether reform chatter is associated with reforms. Actual reforms are difficult to measure. Data on structural reforms for a large sample of countries are drawn from Ostry et al. (2009) and the World Bank's Doing Business project. The results presented in this subsection are mere associations. However, the strong relationship between reform chatter and actual reform suggests that reform chatter is not "cheap talk".

The main specification for testing the relationship between reform chatter and actual reforms is:

$$StructuralReforms_{i,t} = \alpha_i + \beta_t + \lambda ReformChatter_{i,t} + \gamma ReformChatter_{i,t} \times Democracy_i + \varepsilon_{i,t}$$

$StructuralReforms_{i,t}$ captures the changes in the principal component of domestic, international and aggregate indices. α_i and β_t are country and time fixed effects. The main coefficients of interest are λ and γ, which highlight the potential heterogeneity in the impact of reform chatter on actual reforms in the data.

Using data on structural reform (Ostry et al. 2009), Appendix Table A20 Panel A shows that reform chatter at time *t* is associated significantly with more domestic reforms (Column 2) but neither international reforms (Column 3) nor composite reforms (Column 1). However, Table A20 Panel B show that for more democratic countries, reform mentions are significantly associated with the composite index of actual reforms (see Columns 1-3). Columns 4-6 in Panel B show that the results are not significant for international reforms. Columns 8-9 in Panel show that domestic reforms are associated with reform chatter in democracies, though the result in Column 7 is not significant when using the democracy index.

The attitudes towards reform presented in Table A21 are associated with actual reform. In Panel B, columns 1-3 reveal that there is no heterogeneity alongside polity. These results suggest that reform attitudes are associated with actual reforms—when considering intensity of reform chatter the association with actual reform holds more in democracies.

Table 4: Attitude toward Reforms and Doing Business Reforms

Panel A: Contemporaneous Effect

Dependent variable: Reform Articles:	(1)	(2)	(3)	(4)
		=1 Any DB Reform		
		All Sources		
Reform Index$_t$	0.030* (0.016)	0.046** (0.021)	0.050** (0.021)	0.054** (0.022)
Reform Index$_t$ X Strong Democracy		-0.003 (0.034)		
Reform Index$_t$ X Strong Executive Constraints			-0.015 (0.036)	
Reform Index$_t$ X Strong Political Competition				-0.026 (0.036)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.267	0.249	0.240	0.240
Mean of Dependent Variable	0.579	0.623	0.632	0.632
Observations	2,807	2,221	2,167	2,167
Number of Countries	188	162	162	162

Panel B: Lagged Effect

Dependent variable: Reform Articles:	(1)	(2)	(3)	(4)
		=1 Any DB Reform		
		All Sources		
Reform Index$_{t-1}$	0.034** (0.017)	0.080** (0.036)	0.052 (0.035)	0.059* (0.032)
Reform Index$_{t-1}$ X Strong Democracy		-0.057 (0.044)		
Reform Index$_{t-1}$ X Strong Executive Constraints			-0.027 (0.047)	
Reform Index$_{t-1}$ X Strong Political Competition				-0.047 (0.046)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.268	0.250	0.240	0.240
Mean of Dependent Variable	0.579	0.623	0.632	0.632
Observations	2,807	2,221	2,167	2,167
Number of Countries	188	162	162	162

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

Using an alternative measure of actual reforms from World Bank (2020) provides stronger evidence that both the intensity and attitudes towards reform are associated with actual reforms irrespective of the polity. Indeed, in Table A22 both Panel A (all sources) and Panel B (local sources) show reform chatter is associated with an increase in actual reforms. All columns show no evidence of heterogeneity across polity both when using all media sources or only local ones. Table 4 explores different lag structures in the relation between reform chatter and actual reforms. The results point to both contemporaneous (Panel A) and lagged (Panel B) reform chatter having

statistically significant effect on actual reform—albeit the effect appear stronger when considering the contemporaneous effect of reform chatter. The attitudes towards reform presented in Table 5 are associated with actual reform drawn from Doing Business database. Columns 1-4 reveal that there is no heterogeneity alongside polity. These results suggest that reform attitudes are associated with actual reforms.

Table 5: Reform Sentiment and actual Doing Business Reforms

	(1)	(2)	(3)	(4)
Dependent variable:		=1 Any DB Reform		
Estimation:		OLS		
Sentiment Index$_t$	0.066***	0.129**	0.129***	0.126***
	(0.025)	(0.055)	(0.044)	(0.045)
Sentiment Index$_t$ X Democracy		-0.004		
		(0.066)		
Sentiment Index$_t$ X Strong Executive Constraints			-0.015	
			(0.065)	
Sentiment Index$_t$ X Strong Political Competition				-0.007
				(0.063)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.269	0.256	0.246	0.246
Mean of Dependent Variable	0.579	0.623	0.632	0.632
Observations	2,807	2,221	2,167	2,167
Number of Countries	188	162	162	162

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.10$.

In sum, whether using World Bank or IMF measures of reform we find evidence of a strong association between reform attitudes and actual reforms. Indeed, the fact that democracies experience higher intensity and sentiment of reform chatter following downturns suggests that they disproportionately benefit from the self-correcting channel that link reform chatter and actual reform.

5. Conclusion

This paper explored the dynamics of reform chatter using text analysis for about a billion newspaper articles in 28 languages. We document that the intensity of reform chatter increases (decreases) during economic downturns (upturns), and more so in stronger democracies. We showed that the relationship is *causal* using instrumental variable techniques exploiting commodity terms of trade variation. We then document that reform attitudes during economic downturns are more positive in stronger democracies. Our results are robust to an array of checks.

Amartya Sen famously posited that democracy and famines are negatively related. We also show that reform chatter is followed by actual reforms suggesting that democracies benefit from a "self-correcting" mechanism stemming from media chatter. This paper relates to what has become a heated debate on the relative benefits of democracy over autocracies.

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Appendix

Table A1: Languages in Dow Jones Database

Arabic	Hungarian
Malay	Italian
Indonesian	Japanese
Bulgarian	Korean
Catalan	Norwegian
Chinese (Simplified)	Polish
Chinese (Traditional)	Portuguese
Czech	Russian
Danish	Slovak
Dutch	Spanish
English	Swedish
Finnish	Thai
French	Turkish
German	Vietnamese

Figure A1: Economic Reform Articles by Language

Notes: This figure presents the distribution of economic reform articles in the full sample by language. Language codes are based on Dow Jones' coding algorithm.

Figure A2: Economic Reform Articles by Country
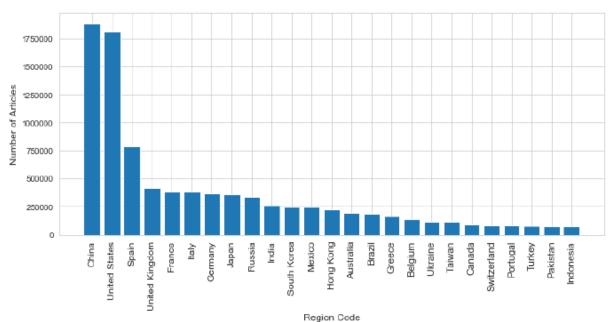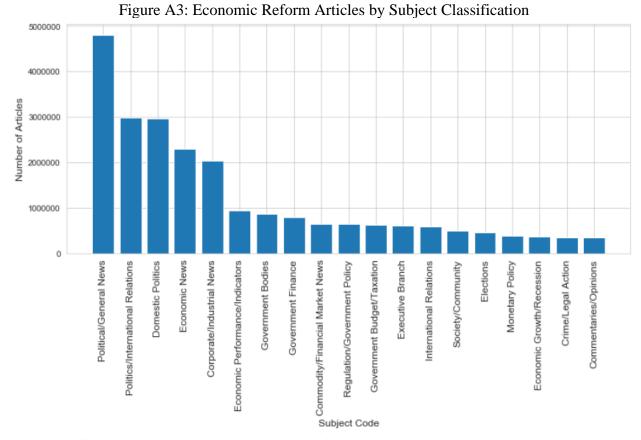
Figure A3: Economic Reform Articles by Subject Classification

Notes: This figure present the distribution of economic reform articles by subject category to which the articles are assigned. The 25 subjects with the highest number of articles are presented. Note that an article can be coded for multiple subjects. All subject codes are based on Dow Jones' coding algorithm.
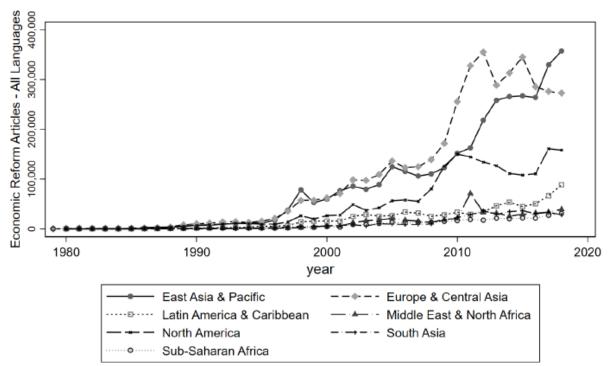
Figure A4: Evolution of reform articles across regions

Table A2: GDP growth and gross export commodity prices (First-stage regressions)

Dependent variable:	(1)	(2)	(3)	(4)	(5) ΔGDP X Democracy	(6) ΔGDP X Strong Ex. Const	(7) ΔGDP X Strong Pol Comp
		GDP Growth					
$\Delta \ln(Export\ ComPI)\ t$	9.740** (4.353)	11.301* (5.790)	9.140* (5.435)	8.711 (5.412)	-5.794*** (0.836)	-4.545*** (0.783)	-4.165*** (0.736)
$\Delta \ln(Export\ ComPI)\ t-1$	13.676** (6.258)	15.422** (7.506)	14.507** (7.164)	14.294** (7.172)	0.863 (0.673)	1.324** (0.565)	1.088* (0.577)
Democracy X ComPI t		2.656 (7.269)			21.649*** (5.297)		
Democracy X ComPI t-1		9.624 (9.361)			27.071*** (6.805)		
Strong Executive Constraints X ComPI t			6.515 (6.776)			28.800*** (5.317)	
Strong Executive Constraints X ComPI t-1			16.785 (10.822)			33.390*** (9.268)	
Strong Political Competition X ComPI t				12.615* (7.492)			34.393*** (6.651)
Strong Political Competition X ComPI t-1				19.242* (10.520)			35.314*** (8.926)
Country FE	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓
R²	0.153	0.162	0.203	0.204	0.288	0.402	0.419
F Statistic	3.098	4.211	4.603	6.383	20.190	16.507	19.326
Observations	5,603	4,822	4,694	4,694	4,822	4,694	4,694
Number of Clusters	182	160	160	160	160	160	160

Notes: This table presents the first stage for the instrumental variable specification. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A3: Reduced form regressions

Dependent variable: Estimation:	(1) Reform Mentions - All Languages 2SLS	(2)	(3)	(4)
$\Delta \ln(Export\ ComPI)\ t$	0.852** (0.395)	0.925*** (0.274)	0.846*** (0.295)	0.872*** (0.296)
$\Delta \ln(Export\ ComPI)\ t-1$	0.602 (0.402)	0.608* (0.352)	0.434 (0.349)	0.437 (0.355)
Democracy X ComPI t		-2.157 (1.399)		
Democracy X ComPI t-1		-2.943*** (0.972)		
Strong Executive Constraints X ComPI t			-3.558* (2.087)	
Strong Executive Constraints X ComPI t-1			-3.725*** (1.213)	
Strong Political Competition X ComPI t				-3.866* (2.067)
Strong Political Competition X ComPI t-1				-3.702*** (1.190)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.345	0.362	0.367	0.368
F Statistic	2.322	5.361	4.707	4.946
Observations	5,738	4,923	4,784	4,784
Number of Clusters	182	160	160	160

Notes: This table presents the reduced form of the main IV specification using reform mentions. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A4: Reform Chatter and GDP Growth- All sources - English only

Dependent variable: Estimation:	(1) Reform Mentions - English Only 2SLS	(2)	(3)	(4))
GDP Growth	0.074 (0.047)	0.036 (0.025)	0.040 (0.028)	0.043 (0.030)
GDP Growth X Democracy		-0.126*** (0.034)		
GDP Growth X Strong Executive Constraints			-0.140*** (0.037)	
GDP Growth X Strong Political Competition				-0.136*** (0.036)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	18.991	11.165	13.264	12.987
Observations	5,504	4,734	4,606	4,606
Number of Clusters	182	160	160	160

Notes: This table presents the results using the instrumental variable strategy for the period 1980-2005. The dependent variable in all columns is the economic reforms article count in all languages normalized by the total number of articles. GDP growth is instrumented using contemporaneous and lagged changes in the gross export commodity price index, as described in the text. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A5: Reform Chatter and GDP growth- All languages -Local sources only

Dependent variable:	(1)	(2)	(3)	(4))
	Reform Mentions - Local Sources			
Estimation:	2SLS			
GDP Growth	-0.092*	-0.004	-0.070	-0.064
	(0.055)	(0.038)	(0.055)	(0.052)
GDP Growth X Democracy		-0.146**		
		(0.061)		
GDP Growth X Strong Executive Constraints			-0.200***	
			(0.069)	
GDP Growth X Strong Political Competition				-0.131*
				(0.073)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	14.059	8.767	6.229	12.599
Observations	2,550	2,285	2,253	2,253
Number of Clusters	159	144	144	144

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate ***
$p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A6: Reform Chatter and Economic News

Dependent variable:	(1)	(2)	(3)	(4))
	Reform Mentions - Economic News			
Estimation:	2SLS			
GDP Growth	0.012	0.007	0.007	0.008
	(0.011)	(0.008)	(0.010)	(0.010)
GDP Growth X Democracy		-0.037***		
		(0.013)		
GDP Growth X Strong Executive Constraints			-0.029*	
			(0.016)	
GDP Growth X Strong Political Competition				-0.030**
				(0.015)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	18.968	11.749	14.055	13.717
Observations	5,207	4,522	4,397	4,397
Number of Clusters	182	160	160	160

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A7: Reform Chatter and Net Export Commodity Price Shocks

Dependent variable:	(1)	(2)	(3)	(4))
	Reform Mentions - All Languages			
Estimation:	2SLS			
GDP Growth	0.074	0.034	0.038	0.038
	(0.048)	(0.025)	(0.030)	(0.030)
GDP Growth X Democracy		-0.101**		
		(0.041)		
GDP Growth X Strong Executive Constraints			-0.106**	
			(0.042)	
GDP Growth X Strong Political Competition				-0.093**
				(0.044)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	15.112	7.513	10.974	10.581
Observations	5,603	4,822	4,694	4,694
Number of Clusters	182	160	160	160

Notes: This table presents the results using the instrumental variable strategy for the period 2006-2019. The dependent variable in all columns is the economic reforms article count in all languages normalized by the total number of articles. GDP growth is instrumented using contemporaneous and lagged changes in the gross export commodity price index, as described in the text. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Alternative Polity
Table A8: Reform Chatter and GDP Growth - Relative Polity

Dependent variable:	(1)	(2)	(3)	(4)
	Reform Mentions - All Languages			
Estimation:	2SLS			
GDP Growth	0.063	0.039	0.035	0.037
	(0.042)	(0.026)	(0.027)	(0.028)
GDP Growth X Democracy		-0.131***		
		(0.039)		
GDP Growth X Strong Executive Constraints			-0.124***	
			(0.042)	
GDP Growth X Strong Political Competition				-0.134***
				(0.039)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	19.056	12.163	13.644	14.033
Observations	5,603	4,822	4,694	4,694
Number of Clusters	182	160	160	160

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A9: Reform Chatter and GDP Growth – Polity in 1990

Dependent variable:	(1)	(2)	(3)	(4)
	Reform Mentions - All Languages			
Estimation:	2SLS			
GDP Growth	0.063	0.059**	0.054**	0.041
	(0.042)	(0.027)	(0.025)	(0.027)
GDP Growth X Democracy		-0.145***		
		(0.049)		
GDP Growth X Strong Executive Constraints			-0.146***	
			(0.052)	
GDP Growth X Strong Political Competition				-0.066
				(0.043)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	19.056	11.990	12.411	12.396
Observations	5,603	4,439	4,301	4,301
Number of Clusters	182	135	130	130

Notes: This table presents results using Polity IV coding based on 1990 only. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A10: Reform Chatter and GDP Growth – Rolling Average Polity

Dependent variable:	(1)	(2)	(3)
	Reform Mentions - All Languages		
Estimation:	2SLS		
GDP Growth	0.026	0.028	0.039
	(0.021)	(0.026)	(0.033)
Democracy 5yr MA	-0.194		
	(0.240)		
Strong Executive Constraints 5yr MA		-0.003	
		(0.206)	
Strong Political Competition 5yr MA			-0.139
			(0.202)
GDP Growth X Democracy 5yr MA	-0.068*		
	(0.040)		
GDP Growth X Strong Executive Constraints 5yr MA		-0.085**	
		(0.037)	
GDP Growth X Strong Political Competition 5yr MA			-0.097***
			(0.032)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
C-D F Statistic	12.837	12.945	12.000
Observations	4,734	4,417	4,417
Number of Clusters	158	158	158

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A11: Reform Chatter and GDP Growth
High and upper-middle income countries

Dependent variable: Estimation:	(1)	(2)	(3)	(4)
	Reform Mentions - All Languages			
	2SLS			
GDP Growth	0.082 (0.054)	0.044 (0.029)	0.039 (0.029)	0.042 (0.030)
GDP Growth X Democracy		-0.095** (0.036)		
GDP Growth X Strong Executive Constraints			-0.071* (0.038)	
GDP Growth X Strong Political Competition				-0.079** (0.036)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	13.613	8.535	11.082	11.087
Observations	3,313	2,716	2,691	2,691
Number of Clusters	107	88	88	88

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A12: Reform Chatter and GDP Growth
Low and lower-middle income countries

Dependent variable: Estimation:	(1)	(2)	(3)	(4)
	Reform Mentions - All Languages			
	2SLS			
GDP Growth	-0.026 (0.067)	-0.010 (0.054)	-0.010 (0.048)	-0.001 (0.051)
GDP Growth X Democracy		-0.154** (0.076)		
GDP Growth X Strong Executive Constraints			-0.335*** (0.109)	
GDP Growth X Strong Political Competition				-0.335*** (0.099)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	4.802	2.758	3.045	3.044
Observations	2,290	2,106	2,003	2,003
Number of Clusters	75	72	72	72

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A13: Reform Chatter and GDP Growth- Excluding Crisis Years

	(1)	(2)	(3)	(4)
Dependent variable:	Reform Mentions - All Languages			
Estimation:	2SLS			
GDP Growth	0.059	0.021	0.029	0.030
	(0.046)	(0.025)	(0.030)	(0.030)
GDP Growth X Democracy		-0.144***		
		(0.048)		
GDP Growth X Strong Executive Constraints			-0.149***	
			(0.051)	
GDP Growth X Strong Political Competition				-0.148***
				(0.046)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	13.679	6.988	9.160	9.162
Observations	4,554	3,784	3,679	3,679
Number of Clusters	182	160	160	160

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A14: Reform Chatter, Press Freedom and GDP Growth

	(1)	(2)	(3)
Dependent variable:	Reform Mentions - All Languages		
Estimation:	2SLS		
GDP Growth	0.017	0.026	0.030
	(0.015)	(0.020)	(0.020)
GDP Growth X Press Freedom	-0.160**	0.097	-0.049
	(0.069)	(0.060)	(0.068)
GDP Growth X Democracy	-0.030		
	(0.031)		
Growth X Democracy X Press Freedom	0.107		
	(0.090)		
GDP Growth X Strong Executive Constraints		-0.079***	
		(0.022)	
Growth X Strong Exec. Const. X Press Freedom		-0.091	
		(0.077)	
GDP Growth X Strong Political Competition			-0.082***
			(0.022)
Growth X Strong Pol. Comp. X Press Freedom			0.064
			(0.083)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
C-D F Statistic	6.580	7.612	7.565
Observations	3,627	3,543	3,543
Number of Clusters	159	159	159

Notes: Press freedom is an indicator equal to 1 when the average rating of the country over the sample is greater than the average f the entire sample. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A15: Reform Chatter, Human Capital and GDP Growth

Dependent variable: Estimation:	(1)	(2)	(3)
	Reform Mentions - All Languages		
	2SLS		
GDP Growth	0.095 (0.063)	0.128 (0.089)	0.136 (0.093)
GDP Growth X High Human Capital	-0.103* (0.056)	-0.147** (0.074)	-0.148* (0.075)
GDP Growth X Democracy	-0.118** (0.059)		
GDP Growth X Democracy X High Human Capital	0.003 (0.090)		
GDP Growth X Strong Executive Constraints		-0.151* (0.089)	
GDP Growth X Strong Executive Constr X High Human Capital		0.051 (0.126)	
GDP Growth X Strong Political Competition			-0.154* (0.093)
GDP Growth X Strong Political Competition X High Human Capital			0.063 (0.119)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
C-D F Statistic	2.128	1.433	1.458
Observations	4,153	4,053	4,053
Number of Clusters	134	134	134

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A16: Reform and GDP Growth: Reform Articles *within* Economic News Category

Dependent variable:	(1)	(2)	(3)	(4)
	ECAT Reform / Total ECAT Coverage			
GDP Growth	0.405* (0.213)	0.335** (0.168)	0.381* (0.198)	0.404* (0.212)
GDP Growth X Democracy		-0.523*** (0.194)		
GDP Growth X Strong Executive Constraints			-0.684*** (0.204)	
GDP Growth X Strong Political Competition				-0.722*** (0.205)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	19.389	11.867	14.890	14.592
Observations	5,021	4,490	4,369	4,369
Number of Clusters	170	156	156	156

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

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Table A17: Sentiment and GDP Growth- Economics News Category

Dependent variable:	(1)	(2)	(3)	(4)
		Sentiment Index		
Estimation:		2SLS		
GDP Growth	0.016	0.019	0.023	0.026
	(0.016)	(0.013)	(0.016)	(0.016)
GDP Growth X Democracy		-0.042*		
		(0.022)		
GDP Growth X Strong Executive Constraints			-0.045*	
			(0.023)	
GDP Growth X Strong Political Competition				-0.048**
				(0.022)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	18.892	11.749	14.055	13.717
Observations	5,206	4,522	4,397	4,397
Number of Clusters	182	160	160	160

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A18: Sentiment and GDP Growth- Local Sources

Dependent variable:	(1)	(2)	(3)	(4)
		Sentiment Index		
Estimation:		2SLS		
GDP Growth	0.010	-0.004	-0.003	-0.001
	(0.028)	(0.021)	(0.028)	(0.028)
GDP Growth X Democracy		-0.041		
		(0.030)		
GDP Growth X Strong Executive Constraints			-0.021	
			(0.033)	
GDP Growth X Strong Political Competition				-0.019
				(0.028)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	8.832	6.883	9.944	12.561
Observations	2,212	1,993	1,972	1,972
Number of Clusters	145	135	135	135

Notes: Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A19: Sentiment and GDP Growth—Excluding Extreme Sentiment

	(1)	(2)	(3)	(4)
Dependent variable:		Sentiment Index		
Estimation:		2SLS		
GDP Growth	0.020	0.016	0.020	0.021
	(0.014)	(0.012)	(0.014)	(0.014)
GDP Growth X Democracy		-0.046**		
		(0.022)		
GDP Growth X Strong Executive Constraints			-0.083***	
			(0.029)	
GDP Growth X Strong Political Competition				-0.061**
				(0.025)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
C-D F Statistic	18.290	9.559	11.971	12.066
Observations	5,073	4,409	4,287	4,287
Number of Clusters	182	160	160	160

Notes: This table presents results using the sentiment index based on economic reform articles in all languages. The sample is trimmed of the top 5% and bottom 5% of the sentiment index. Country codes are based on the country classification by Dow Jones. GDP growth in all specifications is instrumented by the contemporaneous and lagged change in the commodity price index of gross exports. Standard errors are clustered at the country level and reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A20: Reform Chatter and Actual IMF Reforms

Panel A. Different Reform Components

Dependent variable:	(1) Δ (IMF ALL Reforms)	(2) Δ (IMF Domestic Reforms)	(3) Δ (IMF Int'l Reforms)
Reform Mentions$_t$	0.013 (0.009)	0.013* (0.007)	0.002 (0.007)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
R^2	0.105	0.106	0.073
Observations	1,647	1,725	2,252
Number of Clusters	82	83	112

Notes: Standard errors are clustered at the country level and are reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel B. Heterogeneity along Polity

Dependent variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	Δ(IMF All Reforms)			Δ(IMF Int'l Reforms)			Δ(IMF Domestic Reforms)		
Reform Mentions t	-0.007 (0.011)	-0.002 (0.011)	-0.007 (0.010)	-0.009 (0.010)	-0.005 (0.009)	-0.004 (0.009)	0.002 (0.007)	0.002 (0.007)	-0.002 (0.007)
Reform Mentions t X Democracy	0.029* (0.017)			0.014 (0.013)			0.015 (0.012)		
Reform Mentions t X Exec. Constraint		0.036* (0.019)			0.016 (0.015)			0.026* (0.014)	
Reform Mentions t X Political Competition			0.052*** (0.019)			0.015 (0.015)			0.037** (0.014)
Country FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
Year FE	✓	✓	✓	✓	✓	✓	✓	✓	✓
R^2	0.107	0.112	0.116	0.073	0.075	0.075	0.107	0.111	0.115
Observations	1,647	1,629	1,629	2,168	2,135	2,135	1,725	1,704	1,704
Number of Clusters	82	82	82	108	108	108	83	83	83

Notes: This table presents the relationship between normalized reform counts and changes in the structural reform indices. The available indices from the IMF are: domestic finances; restrictions on capital account transactions; financial restriction on current account transactions; average tariff rates; index of agricultural regulation; network indicator. In Columns 1-3, the dependent variable is the first principal component of all the above measures. In Columns 4-6, the dependent variable is the first principal component of the capital account, current account, and average tariff measures. In Columns 7-9, the dependent variable is the first principal component of the domestic finance, agriculture, and networks measures. The reform mentions refers to the main measure of normalized reform counts in all languages. Standard errors are clustered at the country level and are reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A21: Sentiment and actual IMF Reforms

Panel A. Different Reform Components

Dependent variable:	(1) Δ (IMF ALL Reforms)	(2) Δ (IMF Domestic Reforms)	(3) Δ (IMF Int'l Reforms)
Sentiment Index$_t$	0.035** (0.014)	0.017* (0.009)	0.022* (0.013)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
R^2	0.108	0.105	0.075
Observations	1,647	1,725	2,252
Number of Countries	82	83	112

Notes: Standard errors are clustered at the country level and are reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Panel B. Heterogeneity across Polity

Dependent variable:	(1)	(2)	(3)	(4)
	Δ (IMF All Reforms)			
Sentiment Index$_t$	0.035** (0.014)	-0.000 (0.027)	0.021 (0.020)	0.022 (0.021)
Sentiment Index$_t$ X Democracy		0.044 (0.032)		
Sentiment Index$_t$ X Strong Executive Constraints			0.021 (0.028)	
Sentiment Index$_t$ X Strong Political Competition				0.020 (0.029)
Country FE	✓	✓	✓	✓
Year FE	✓	✓	✓	✓
R^2	0.108	0.109	0.110	0.110
Observations	1,647	1,647	1,629	1,629
Number of Countries	82	82	82	82

Notes: Standard errors are clustered at the country level and are reported in parentheses, stars indicate *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table A22: Reform chatter and actual Doing Business Reforms

Panel A: All media sources

	(1)	(2)	(3)
Dependent variable:	=1 Any DB Reform		
Reform Articles:	All Sources		
Reform Index$_t$	0.046**		
	(0.021)		
Reform Index$_t$ X Democracy	-0.003		
	(0.034)		
Reform Index$_{t-1}$		0.080**	
		(0.036)	
Reform Index$_{t-1}$ X Democracy		-0.057	
		(0.044)	
Reform Index$_{t-2}$			0.035
			(0.053)
Reform Index$_{t-2}$ X Democracy			0.005
			(0.055)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
R^2	0.249	0.250	0.249
Mean of Dependent Variable	0.623	0.623	0.623
Observations	2,221	2,221	2,221
Number of Countries	162	162	162

Panel B: Local media sources

	(1)	(2)	(3)
Dependent variable:	=1 Any DB Reform		
Reform Articles:	Local Sources		
Reform Index$_t$	0.026*		
	(0.015)		
Reform Index$_t$ X Democracy	-0.016		
	(0.020)		
Reform Index$_{t-1}$		0.043**	
		(0.020)	
Reform Index$_{t-1}$ X Democracy		-0.043*	
		(0.026)	
Reform Index$_{t-2}$			-0.019
			(0.029)
Reform Index$_{t-2}$ X Democracy			0.051
			(0.034)
Country FE	✓	✓	✓
Year FE	✓	✓	✓
R^2	0.256	0.257	0.262
Mean of Dependent Variable	0.668	0.670	0.669
Observations	1,513	1,459	1,409
Number of Countries	144	138	132

Note: The Reform Index variable captures media chatter about reforms.