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The effect of public opinion on policy outcomes: A case study on WLTP

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Abstract

While scientific literature seems to agree that public opinion influences public policy choices, the degree to which it influences the effectiveness of a policy remains unexplored. This early-stage study presents a novel methodology to measure the later by combining web-scrapping techniques, sentiment analysis and econometric techniques. Worldwide Harmonized Light-duty Test Procedure (WLTP) is chosen as the case study policy given its importance regarding Sustainable Development Goals (SDG's) as well as the potential sample of countries which apply it. As the WLTP revealed higher measures of nitrogen oxides (NOx) in Diesel cars, it is expected that Diesel car registrations is impacted. News data are then retrieved from media outlets from these countries through web scrapping and prepared for sentiment analysis. Finally, econometric techniques will be applied to test the significancy of the relationship between public opinion and the degree to which a policy accomplishes its goal.

Keywords: *WLTP; public opinion; web scrapping; news data.*

1. Introduction

Over the years, literature has extensively shown the importance of public opinion in the political process, given its influence on which policies are chosen (Burstein, 2003; Wei et al., 2021; Wlezien et al., 2016) or the participation in social movements (David, 2022). Moreover, literature has also explored the differences of determinants on public opinion such as income inequality (Newman et al., 2015) or pre-existing beliefs (Bergquist et al., 2022; Thomas et al., 2022).

Yet, these studies seldom show whether public opinion influences policy effectiveness, that is, if a favorable public opinion is related to a higher achievement of policy targets and vice versa, partly because of the difficulty in measuring public opinion at a large scale. Yet, the advances in the last years regarding web scrapping techniques as well as the birth of new open-source

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news platforms generate a considerable amount of potential data about the public opinion regarding a policy.

In this study, Media Cloud (Roberts et al., 2021) is employed to generate a sample of over 70,000 potential news regarding the implementation of the Worldwide Harmonized Light-duty Test Procedure (WLTP), a laboratory test which was implemented back in 2017 in over 30 countries. WLTP threatened to endanger the sales of diesel cars given that levels of emissions reported by this test would be significantly higher and therefore not comply with new established limits with other policies such as the new Real Driving Emissions (RDE).

These news are then retrieved using web scrapping techniques and filtered to provide a sample of news ready for analysis. The next steps of this work will include a sentiment analysis of the content of the news as well as the employment of econometric techniques to prove the relationship between public opinion and policy effectiveness.

2. WLTP & the European political context

The Worldwide Harmonized Light-duty Vehicle Test Procedure (WLTP) is a test procedure used to determine pollutant emission and fuel consumption in light-duty vehicles which was first introduced in September of 2017 (ACEA, 2018; DiPierro et al., 2019). WLTP is employed as the main procedure for measuring emissions in all EU-27 countries as well as Iceland, Israel, Liechtenstein, Norway, Switzerland, Turkey and the United Kingdom.

WLTP was conceived from the necessity to better reflect levels of emissions in light-duty vehicles given that the old test, the New European Driving Cycle (NEDC), was no longer able to provide realistic measurements in light of new technologies, especially with regards to the emissions of Nitrogen Oxides (NOx) in diesel cars (Mock et al., 2014; Weiss et al., 2011; Weiss et al., 2012), a necessity which would be further accentuated by international scandals such as the 'Dieselgate'. (Brand, 2016). Moreover, under WLTP, pollution measurements were expected to be higher across the board, but with a more pronounced effect on diesel cars than in gasoline cars (Pavlovic, 2016).

At the same time, the Real Driving Emission (RDE) test was also introduced as compliment to WLTP to improve the measurements of certain pollutants such as NOx under real-life driving conditions, since NOx levels tend to be significantly higher under these conditions than under a laboratory test such as WLTP (ECG, 2019). Additionally, RDE also provided new NOx emission limits derived from the Euro 6 legislation, which already reduced the permitted NOx levels by 56% from its predecessors (ICCT, 2016).

Finally, both the RDE as well as the WLTP tests were introduced at the EU level according to a timeline divided in three phases (ECG, 2019):

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- September of 2017: New passenger car models would be required to comply with WLTP and RDE standards.
- September of 2018: All new passenger car registrations and all new models of light commercial vehicles models would need to follow WLTP standards, except for end of series models.
- September of 2019: WLTP would be mandatory for light commercial vehicles as well and RDE would be mandatory for all passenger cars registrations. Moreover, last NEDC-approved cars would be sold.

Therefore, the expected effect of introducing these policies would be clear: the share of diesel cars registered in the market as well as its total numbers would be reduced.

3. Diesel cars registrations

The dependent variable of this study is the registration of diesel cars from 2013 to 2024 provided by Eurostat. From the initial list of countries, Israel is excluded because data is not available. As explained in Section 2, the expected outcome of the introduction of both the WLTP as well as the RDE test procedures is a reduction in both the total amount and the share of diesel cars registered yearly in the countries where WLTP is applied. Figures 1 and 2 show follow precisely this pattern. In both figures, the black dotted lines represent the years where a phase of WLTP and/or RDE is implemented. Both graphs show a declining trend prior to the implementation of the policy, which is attributed to the political background explained in Section 2. Yet, the introduction of WLTP and RDE seems to further accentuate these trends in both cases, providing evidence towards the importance of the economic shock generated by these policies.

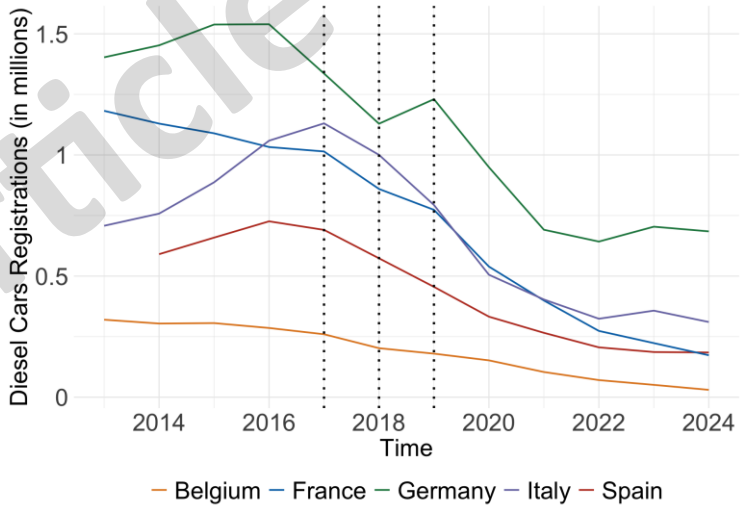


Figure 1. Yearly diesel car registrations by country (2013-2024). Source: Own elaboration.

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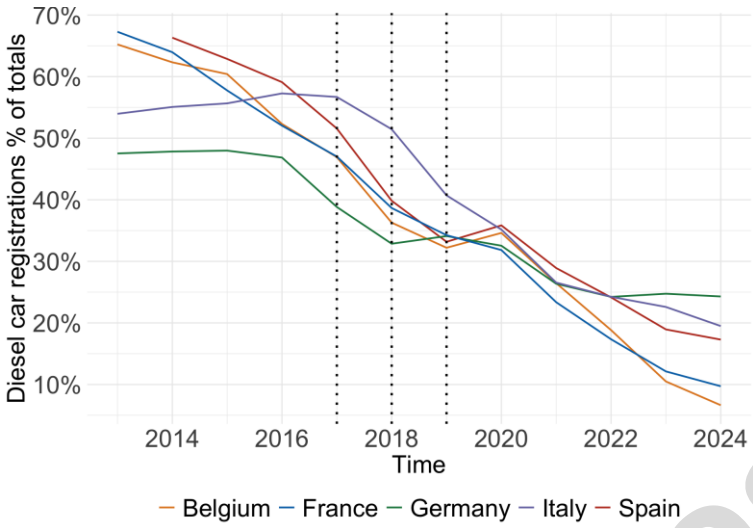


Figure 2. Yearly share of diesel car registrations by country (2013-2024). Source: Own elaboration.

4. Measuring public opinion

4.1. News data from Media Cloud

Media Cloud is an open-source platform which collects data from media outlets all around the world (Roberts et al., 2021). For this study, the data collected are all the news which contain the keyword 'WLTP' in the period from 01-01-2013 to 31-12-2024 in the countries where WLTP is implemented as the main standard. This query results in an initial sample of n=70,452 news, in 43 different languages, where each record contains: An ID given by Media Cloud; the data in which is indexed in Media Cloud; the code of the language in which is written, in ISO-369 format with 2 letters; the name of the media platform which published the news; the URL for the media platform; the date of publication; its title; the URL for the news and the domain of the webpage for the media platform.

The monthly frequency of these news is shown in Figure 3. Once again, the black dotted lines represent the phases of implementation of the policy, in this case at the monthly level, and it can be observed how the spikes in the amount of news precisely coincide with the phases of the implementation of the policy, thus giving further evidence to the importance of these policies.

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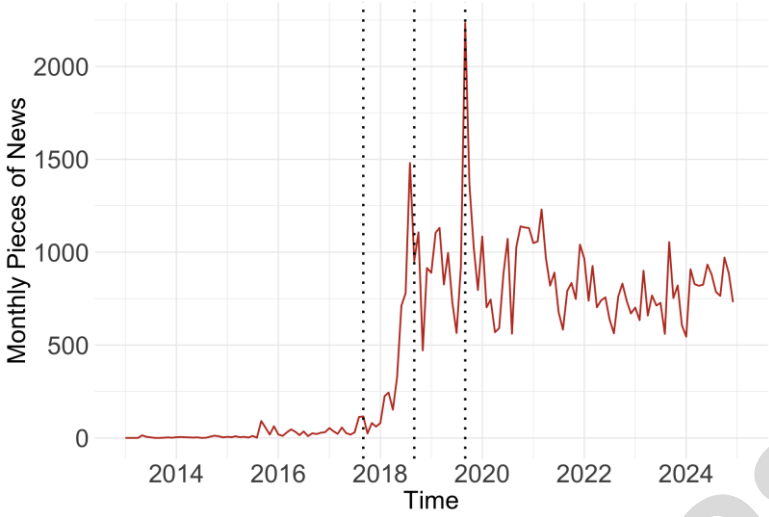


Figure 3. Monthly amount of WLTP-related news (2013-2024). Source: Own elaboration.

Moreover, the collection of media platforms for each country is also downloaded to match the news to the country where they are published. This process of matching adds some duplicates, as some news are published by media platforms which are present in more than one national collection, thus bringing the final sample to n=70,460.

4.2. Webscrapping & Data Handling

Next, the URL's in the sample are scrapped through Python, using packages like Trafilatura and Beatifulsoup. This process adds 4 more variables to the news: the scrapped title, subtitle and body, as well as a variable which concatenates all the scrapping contents named 'full_text'. In this initial stage, a retrieval is deemed successful if any text is retrieved at all. Under this definition, the web scrapping process provides a 91.03% success rate in its initial stage.

Next, to clean the data, certain measures are taken: First, all news for which the total text retrieved has less than 500 characters are removed and considered noise. Second, if none of the four variables generated from web scrapping contained the keyword 'WLTP', these are also removed, as they reflect either an incomplete scrapping, or noise. Lastly, an AI agent is tasked to generate a list of common expressions regarding lack of access or error in the retrieval such as '404' or 'login'. This list of expressions is then manually checked and corrected to provide a higher reliability, before being used as a filter.

After the data cleaning process, the sample is reduced to n=37,215 news with reliable web-scrapping content. Within the sample, some articles are found to be duplicates of others by content and title, but not by media platform. That is, different media platforms publish the same news as others, normally because the writer is the same for both. In these cases, the argument

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could be made both ways: on the one hand, that keeping them in the sample could generate a bias in the rest of analysis. On the other hand, removing them could potentially reduce the coverage of the sample, as consumers of one media platform do not necessarily need to consumer the other.

The decision is made to generate a sample without the duplicates and run all the analysis on both to provide a robustness check for results. The sample without duplicates is created according to the following criteria: If a title is repeated in the same collection (country), the one with higher character count is kept. In the content is the same, the one which was published first is kept.

5. Next steps & Conclusions

While this work is still in its early stages, both final steps are pre-planned: first, a sentiment analysis will be performed to show the differences in the sentiment transmitted by news in each country, as well as a yearly evolution of said variable. Secondly, the measurements obtained through sentiment analysis will be used as the main independent variable to explain the differences in trends in car diesel registrations at the country level using panel data techniques. As explained in Section 4, these results will be calculated for both sample with and without duplicates to enhance the robustness of results.

The expected contribution from this study is twofold: first, providing evidence for the relationship between public opinion and policy effectiveness, that is, showing that favorable public opinion towards a policy increases its effectiveness, and vice versa. Secondly, to provide a robust methodology which allows to reliably work with news data obtained from Media Cloud.

Finally, we expect these contributions to be of relevancy to policy makers, scholars and media outlets alike given the potential implications on communication strategies of showing the effect of public opinion on policy outcomes as well the potential benefits of being able to reliably handle news data.

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References

ACEA (2018). “WLTP FACTS”. https://www.wltpfacts.eu/ [Online; accessed: 21-10-2025]

Bergquist, M., Nilsson, A., Harring, N., & Jagers, S.C. (2022). Meta-analyses of fifteen determinants of public opinion about climate change taxes and laws. *Nature Climate Change*, 12(3), 235-240. https://doi.org/10.1038/s41558-022-01297-6

Brand, C. (2016). Beyond ‘Dieselgate’: Implications of unaccounted and future air pollutant emissions and energy use for cars in the United Kingdom. *Energy Policy*, 97, 1-12. https://doi.org/10.1016/j.enpol.2016.06.036

Burstein, P. (2003). The impact of Public Opinon on Public Policy: A Review and an Agenda. *Political Research Quarterly*, 56(1), 29-40. https://doi.org/10.1177/106591290305600103

David, Y. (2022). Public opinion, media and activism: the differentiating role of media use and perceptions of public opinion on political behaviour. *Social movement studies*, 21(3), 334-354. https://doi.org/10.1080/14742837.2021.1875321

DiPierro, G., Millo, F., Cubito, C., Ciuffo, B., & Fontaras, G. (2019). Analysis of the Impact of the WLTP Procedure on CO_2 Emissions of Passenger Cars. *Conference on Sustainable Mobility*. https://doi.org/10.4271/2019-24-0240

ECG (2019). WLTP, RDE and automotive emissions targets. https://www.ecgassociation.eu/wp-content/uploads/2019/10/19.10-WLTP-briefing-paper-v3-Draft-v1-Web.pdf [Online; accessed: 11-03-2026]

ICCT (2016). A technical summary of Euro 6/VI vehicle emission standards. https://theicct.org/sites/default/files/publications/ICCT_Euro6-VI_briefing_jun2016.pdf [Online; accessed: 11-03-2026]

Mock, P., Kühlwein, J., Tietge, U., Franco, V., Bandivadekar, A., & German J. (2014). The WLTP: How a new test procedure for cars will affect fuel consumption values in the EU (Working Paper 2014-09). International Council on Clean Transportation (ICCT). https://theicct.org/sites/default/files/publications/ICCT_WLTP_EffectEU_20141029_0.pdf [Online; accessed: 11-03-2026]

Newman, B.J., Johnston, C.D., & Lown, P.L. (2015). False Consciousness or Class Awareness? Local Income Inequality, personal Economic Position and Belief in American Meritocracy. *American Journal of Political Science*, 59(2), 326-340. https://doi.org/10.1111/ajps.12153

Pavlovic, J., Marotta, A., & Ciuffo, B. (2016). CO_2 emissions and energy demands of vehicles tested under the NEDC and the new WLTP type approval test procedures. *Applied Energy*, 177, 661-670. https://doi.org/10.1016/j.apenergy.2016.05.110

Roberts, H., Bhargava, R., Valiukas, L., Jen, D., Malik, M. M., Bishop, C. S., Ndulue, E. B., Dave, A., Clark, J., Etling, B., Faris, R., Shah, A., Rubinovitz, J., Hope, A., D'Ignazio, C., Bermejo, F., Benkler, Y., & Zuckerman, E. (2021). Media Cloud: Massive Open Source Collection of Global News on the Open Web. *Proceedings of the International AAAI Conference on Web and Social Media*, 15(1), 1034-1045. https://doi.org/10.1609/icwsm.v15i1.18127

Thomas, M., DeCillia, B., Santos, J.B., & Thorlakson, L. (2022). Great expectations: Public opinion about energy transition. *Energy Policy*, 162, 112777. https://doi.org/10.1016/j.enpol.2022.112777

Wei, Y., Gong, P., Zhang, J., & Wang, L. (2021). Exploring public opinions on climate change policy in "Big Data Era" —A case study of the European Union Emission Trading System (EU-ETS) based on Twitter. *Energy Policy*, 158, 112559. https://doi.org/10.1016/j.enpol.2021.112559

Weiss, M., Bonnel, P., Hummel, R., Manfredi, U., Colombo, R., Lanappe, G., Le Lijour, P., and Sculati, M. (2011). Analyzing on-road emissions of light-duty vehicles with Portable Emission Measurement Systems (PEMS). Technical Report, Joint Research Centre (JRC).

Weiss, M., Bonnel, P., K¨uhlwein, J., Provenza, A., Lambrecht, U., Alessandrini, S., Carriero, M., Colombo, R., Forni, F., Lanappe, G., Le Lijour, P., Manfredi, U., Montigny, F., and

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Sculati, M. (2012). Will Euro 6 reduce the NOx emissions of new diesel cars? – Insights from on-road tests with Portable Emissions Measurement Systems (PEMS). *Atmospheric Environment,* 62, 657665. https://doi.org/10.1016/j.atmosenv.2012.08.056.

Wlezien, C. and Soroka, S. N. (2021). Public Opinion and Public Policy. Oxford *University Press.* https://doi.org/10.1093/acrefore/9780190228637.013.74.

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