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Letter from the Editor

The Ashoka University Economic Review (AUER) is a testament to our commitment to fostering undergraduate research in the diverse realms of economics. We are delighted to unveil the third volume of the AUER, a compilation of high-calibre manuscripts that traverse various economic fields and uphold the rigorous standards of economic research.

Our gratitude extends to the Department of Economics for their unwavering support in the realization of the AUER. The vision set forth by our previous Editor-in-Chief was brought to life through the concerted efforts of our dedicated team. I extend my heartfelt thanks to my Managing Editor, Fiona Arora, and our diligent editors - Aanya Mehra, Sidharth Wagle, Siya Arora, and Suhani Mittal. Their tireless work in reviewing and refining the submissions has ensured that only the most fitting manuscripts grace the pages of the AUER.

This year's journal showcases a rich array of research papers that delve into pressing economic issues. The inaugural paper sheds light on the factors that influence sustainable plastic waste management, unravelling the intriguing relationship between GDP per capita and plastic waste exports. The subsequent paper probes the interplay between institutional frameworks and development outcomes, utilizing data from 2018 to discern trends unaffected by the COVID-19 pandemic. The third paper scrutinizes the influence of corporate lobbying on firm profitability, providing nuanced insights into the confluence of politics and business. The final paper investigates the correlation between Corporate Social Responsibility (CSR) and firm performance in India's manufacturing sector. Collectively, these papers deepen our understanding of current economic challenges and offer invaluable insights for both policymakers and practitioners.

We hope this issue not only provides a thought-provoking read but also inspires more undergraduates to engage in economic research. By welcoming research from a plethora of perspectives, we aim to make a meaningful contribution, however small, to the expansive body of economic literature.

This edition embodies the spirit of rigorous research and critical thinking, the cornerstone principles of Ashoka University. I am confident that future editions will continue to reflect the vibrant research culture nurtured at Ashoka, as we continue to expand our research and academic horizons with the inauguration of more Centres.

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What it takes to clean the Commons: Factors Affecting Global Plastic Waste Pollution

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Abstract

One of the most pressing environmental issues of the twenty-first century is the growing plastic pollution disaster. The recognition of factors related to plastic pollution that will further allow policies to be translated into practice must take priority, with 2021 marking the start of the UN's 'Decade of Ocean Science.' This paper aims to identify factors that are fostering sustainable plastic waste management in the international context. The paper uses OLS regression in a cross-section to study the typical variables of significance in determining the level of mismanaged plastic waste exported by a country. The analysis finds that higher GDP per capita is associated with greater plastic waste exports per capita although this may not be correlated with higher investment in research and development for environmentally friendly solutions. It is posited that visible reminders of environmental damage may promote more sustainable behaviours in mitigating plastic pollution.

JEL Classifications: Q53, Q56, O13, O44, Q01

Keywords: Plastic pollution, Plastic waste management, Development, Environment, Environmental threats

1. Introduction

One of the most pressing environmental issues of the twenty-first century is the growing plastic pollution disaster. The annual entry of millions of tonnes of plastic garbage into the oceans has far-reaching and significant effects on human health, ecosystems, and marine life. This study aims to decipher the complex network of variables that allow nations to successfully reduce and hopefully, mitigate plastic pollution. It does so by accounting for multiple parameters including governance, economic expansion, technological innovation, international cooperation, and other stakeholders' involvement.

The growing stock of mismanaged and untreated plastic waste is an internationally recognized problem today. By 2050, 12,000 metric tonnes (mt) of plastic garbage will be in landfills or the environment, if current manufacturing and waste management patterns continue. (Geyer et al) The impact of plastic pollution on both living and non-living elements of the ecosystem has been documented for over 50 years, making it a chronic global concern. Given our shared quest for sustainability, the growing worries about the short and long-term effects of plastic matter entrainment into food and water cannot be overstated. To lessen the

negative effects of the disposal of plastics in landfills, a range of legislative tools have been created to regulate, control, and manage the usage of plastics in daily life. Current laws strongly support taxes, prohibitions, and community-based initiatives known as "reduce and reuse campaigns."[1]

To prevent islands of toxic microplastics from being formed in landfills and the ocean, effective legislation is required that engages all stakeholders towards the common goal of plastic waste mitigation globally. While diplomatic discourse on the topic is ongoing and there exist numerous pledges as well, we hardly find these being put into practice in the real world- the pollution and its effects are only getting worse with time. The recognition of factors related to plastic pollution that will further allow policies to be translated into practice must take priority, with 2021 marking the start of the UN's 'Decade of Ocean Science.'

Our research aims to identify factors that are affecting the fostering of sustainable plastic waste management in the international context. Economic growth measured through GDP per capita plays a central role in our paper. It is postulated that higher economic status may provide countries with the resources necessary to invest in more sophisticated waste management infrastructure and green technology. However, the relationship between economic growth and environmental sustainability is complex and requires careful examination to understand its nuances.

Technological development and diffusion of green technologies are part of our analysis as well. Advances in technology can offer impactful solutions to the global plastic pollution crisis, such as enhancing recycling processes through research and development and pioneering methods to manufacture biodegradable alternatives instead of polluting plastics. Also, considering the impact of overall green growth indicators and the amount of plastic waste generated per country provides a better context for examining a country's environmental performance and its capacity to effectively manage plastic waste. By incorporating these variables into our research, we hope to provide a thorough picture of the opportunities and

[1] Lam, Chung-Sum, et al. "A Comprehensive Analysis of Plastics and Microplastic Legislation Worldwide - Water, Air, & Soil Pollution." SpringerLink, Springer International Publishing, 25 Oct. 2018, link.springer.com/article/10.1007/s11270-018-4002-z.

difficulties that nations encounter when attempting to fight plastic pollution. We have primarily sourced plastic waste data from OECD datasets.

Our methodology uses an Ordinary Least Squares (OLS) regression model to analyze the effect of the selected variables on plastic pollution management results. This quantitative approach allows us to understand the extent to which legislation, economic indicators, technological progress, and international cooperation correlate with effective plastic waste management. Other factors responsible for sustainable plastic waste management practices are identified, based on existing literature, to be: economic growth (GDP per capita) and level of technological development, green technology diffusion, international collaboration in technology development rates, overall green growth indicators, and amount of plastic waste generated per country sourced from OECD datasets.[2] The relevant dependent variables are the amount of mismanaged plastic waste, plastic emitted to the ocean per capita and plastic waste exports per capita. We also aim to understand the mechanisms by which legislation may translate into implementation: whether this occurs through the intervention by certain stakeholders or the demographic/ economic characteristics of an economy. This particular feature of our research holds significant value as it illuminates the diverse roles played by governments, industries, communities, and distinct demographic and economic aspects of economies.

The hypothesis is that countries with higher GDP levels, a larger concern for the environment, and technological development would have lower amounts of mismanaged plastic and plastic emitted to the ocean, per capita. We shall discuss policy recommendations that address the issues identified in our analysis. This paper seeks to contribute to the growing body of literature on plastic pollution mitigation by offering a holistic analysis of the factors that enable effective management of this global environmental issue. The goal is to foster a more sustainable and resilient global ecosystem, one in which the tides of plastic pollution stem through concerted, collaborative efforts across all sectors of society.

[2] Cordier, Mateo, et al. "Plastic pollution and economic growth: The influence of corruption and lack of education," Ecological Economics,Volume 182, 2021, 106930, ISSN 0921-8009, https://doi.org/10.1016/j.ecolecon.2020.106930.

2. Literature Review

The increasing shares of manufacturing and disposal of plastics have resulted in plastic waste and pollution becoming major global environmental issues.[3] The plastics sector has grown exponentially fast over the past few decades, leading to a significant increase in plastic usage, all over the world. There is a shocking amount of plastic waste in terrestrial and marine environments due to the growth of plastic consumption. In 2016, more than 150 million tonnes of plastic debris were thought to be in marine waterways. A significant concern is the presence of microplastics (plastic particles with a diameter of less than 5 mm) in the water.[4] It is anticipated that the amount of plastic in the environment will more than double by 2050, further aggravating the crisis.[5]

The increase in plastic waste and pollution can be ascribed to many important variables. One factor contributing to the surge in plastic waste is the affordability and versatility of plastics. Plastics have become a preferred material, both by producers and end-consumers, due to their low cost of production and wide range of applications, leading to an increase in the production and consumption of plastics, which results in higher plastic waste generation.[6] Furthermore, a lack of effective waste management systems globally is another factor that influences plastic waste pollution. Many countries do not have proper recycling systems to be able to handle the growing burden of plastic waste. As a result, a large portion of plastic waste ends up in landfills or is improperly disposed of, making its way into waterways and oceans.

The prevailing perception has depicted major nations as the predominant contributors to marine plastic pollution worldwide. Yet, this does not account for the notable increase in plastic waste exports from minority to majority nations post 1993, despite limited recycling infrastructure in developing countries. This trend has resulted in a global crisis concerning the environment, especially disproportionate levels of plastic pollution in certain countries.[7] This

[3] Thushari, G. G. N., and J. D. M. Senevirathna. “Plastic Pollution in the Marine Environment.” Heliyon, vol. e04709, no. 8, 1 Aug. 2020, https://doi.org/10.1016/j.heliyon.2020.e04709.
[4] Lincoln, Susana, et al. "Marine litter and climate change: inextricably connected threats to the world's oceans." *Science of The Total Environment* 837 (2022): 155709
[5] Issifu, Ibrahim, et al. “How COVID-19 Could Change the Economics of the Plastic Recycling Sector.” Recycling, vol. 6, no. 4, 26 Sept. 2021, p. 64, https://doi.org/10.3390/recycling6040064.
[6] Gallo et al. Chapter 10; Analysis of Nanoplastics and Microplastics in Food. CRC Press, 2020, books.google.ie/books?id=g8EIEAAAQBAJ&printsec=frontcover&dq=Analysis+of+Nanoplasti cs+and+Microplastics+in+Food+edited+by+Leo+M.L.+Nollet,+Khwaja+Salahuddin+Siddiqi&h l=&cd=1&source=gbs_api.
[7] Cowan, Emily, et al. “Single-Use Plastic Bans: Exploring Stakeholder Perspectives on Best Practices for Reducing Plastic Pollution.” Environments, vol. 81, no. 8, 16 Aug. 2021, https://doi.org/10.3390/environments8080081.

brings to light the immediate requirement for improved waste disposal infrastructure in plastic-waste-importing countries. To address the issue of plastic waste and pollution, global plastic agreements must ensure funding availability and establish efficient waste disposal systems in countries unfairly facing the major impact of plastic waste imports. Identifying and tracing the sources of microplastic pollution is also important for reducing plastic waste pollution. Stakeholders need to focus on the pathways and destinations of plastic pollution to prevent its dispersion. The inclusion of plastic materials into the circular economy is a possible solution to reduce plastic waste. Overall, the literature on this subject highlights several key factors influencing the rapid increase in plastic waste pollution. These factors include the affordability and versatility of plastics, inadequate waste management systems and infrastructure, and the global shipment of plastic waste. Furthermore, when it comes to viable solutions, the importance of addressing plastic waste and pollution through improved waste disposal systems and providing funds for R&D could also be solutions. Ertz et al.[8] conducted an empirical study ("To waste or not to waste?") examining the factors that influence consumers' waste minimisation behaviour, zero-waste behaviour in particular. The study utilizes the Theory of Planned Behavior and finds that behavioural intentions are major predictors of waste minimization efforts. The research identifies perceived consumer effectiveness as the most influential factor affecting waste reduction actions. Thus, the authors suggest that policies and programs should focus on enhancing consumers' perceived capacity to minimize waste.

Although immediate action has been taken, 710 million metric tons of plastic waste cumulatively still entered aquatic and terrestrial ecosystems as of 2020.[9] Some of the strategies implemented by governments to combat the pollution caused by plastic waste are: i) Single-use plastic item bans: Several nations and areas have outright banned certain single-use plastics such as straws and plastic bags. ii) Extended Producer Responsibility Programmes: These mandate that plastic manufacturers take responsibility for the full lifecycle of their goods from production to collection, recycling, and safe disposal. iii) Plastic trash Reduction Targets: To reduce their negative effects on the environment and advance a circular economy, governments are setting and regularly updating targets to reduce the production and consumption of plastic trash. iv) Recycling and Waste Management Systems: Recycling of plastic waste is

[8] Ertz, Myriam, et al. "To Waste or Not to Waste? Empirical Study of Waste Minimization Behavior." *Waste Management*, vol. 443–452, 1 July 2021, https://doi.org/10.1016/j.wasman.2021.06.032.
[9] Lau, Winnie W. Y., et al. "Evaluating Scenarios toward Zero Plastic Pollution." Science, vol. 369, no. 6510, 23 July 2020, pp. 1455–1461, science.sciencemag.org/content/early/2020/07/22/science.aba9475, https://doi.org/10.1126/science.aba9475.

incentivised by making investments in the infrastructure related to recycling and trash management, increasing the efficiency of these processes and adding value to recycled by-products. v) Plastic Waste Trade Regulations: Rules are put in place to monitor and regulate the worldwide trade in plastic waste, preventing imports of plastic waste from overloading nations with limited resources. vi) Research and Innovation Promotion: To create technologies like biodegradable plastics and substitute materials for efficient plastic waste management, governments actively fund research and innovation.[10]

In addition to such legislative measures, cooperation between multiple stakeholders including the governments, enterprises, and residents of all countries, is essential in addressing the issue of plastic waste management. This collaboration could include awareness campaigns, educational initiatives, and public-private sector partnerships. Governments have implemented multiple policies such as banning single-use plastics, introducing plastic waste reduction targets, recycling and waste management systems, plastic waste trade regulations, and promoting research and development, to reduce pollution.[11]

Heidbreder et al. examined social-scientific literature to understand the multifaceted issue of plastic pollution and identified factors for reducing plastic consumption. Despite a pronounced awareness of the environmental and health ramifications of plastic usage, habitual use, social norms, and situational factors continue to drive consumption. The review calls for enhanced global, integrated solutions and encourages a range of stakeholders, from educators to politicians, to address the issue collaboratively. A study conducted by Vegter et al. in 2014[12] is also significant as it is the first to assemble international marine pollution and marine wildlife specialists to discuss prevalent information gaps on the issue, aimed at informing strategies to control and mitigate the effects of plastic pollution on marine life. This indicates that despite increased awareness, there is still a dearth of comprehensive understanding of the impact of plastic waste pollution, which our research concludes ten years later, in 2024 as well, making it an extremely relevant subject for further research and policy action.

[10] Shershneva, E. G. "Plastic waste: global impact and ways to reduce environmental harm." IOP conference series: Materials science and engineering. Vol. 1079. No. 6. IOP Publishing, 2021.
[11] Lau, Winnie W. Y., et al. “Evaluating Scenarios toward Zero Plastic Pollution.” *Science*, vol. 369, no. 6510, 23 July 2020, pp. 1455–1461, science.sciencemag.org/content/early/2020/07/22/science.aba9475, https://doi.org/10.1126/science.aba9475.
[12] Vegter, Amanda C., et al. “Global Research Priorities to Mitigate Plastic Pollution Impacts on Marine Wildlife.” *Endangered Species Research*, vol. 225–247, no. 3, 17 Oct. 2014, https://doi.org/10.3354/esr00623.

3. Data and Methodology

The factors driving plastic waste exports can be thought of as a chain: whether citizens of a country are aware of the hazards of plastic pollution and willing to mitigate it, whether this, in turn, impacts policymaking, and whether infrastructure is available to translate policy into action. A study of the factors driving plastic waste exports must therefore systematically examine the data at each step of this relation. This is an empirically challenging task as these factors interact in a multi-directional manner and cannot be measured in isolation. The availability of data is low, particularly to construct panel data. However, this paper attempts to make the best out of scarce options by using the ordinary least squares method in a cross-section of country-wise data for important factors in the year 2019. The results drawn from the correlations yield important insights for the policy-making domain.

The year 2019 is selected as the latest year for which data is available, in the pre-pandemic era, and is relatively free from bias. The dependent variables are (i) mismanaged plastic waste to ocean per capita (kg per year) and (ii) per capita exports of plastic waste via all modes of transport. The log transformation of these variables is taken to improve the fit of the regressions and manage outliers. The variables serve to capture the amount of plastic pollution emitted by a country over a given year. In regressing the mismanaged plastic waste to the ocean per capita, we control the shoreline of the country.

The independent variables chosen for the analysis can broadly be classified under the following categories (a complete list is in the appendix):

- Demographic variables
- GDP (decomposition) variables
- Green indicators
- Environmental threats

The motivation of the analysis is to identify the typical characteristics of nations that have a low or high plastic waste export and attempt to back out the possible reasons driving these trends. Among the GDP decomposition variables, we test the correlation between per capita GDP and plastic waste exports. Countries with higher per capita GDP can afford to use more plastic products and have a higher probability of pollution in this regard, however, these countries also can develop technologies to mitigate and manage the waste if they choose.

Variables such as the share of the budget spent on research and development of green technologies, the percentage of total revenue contributed by green taxes, etc, are indicative of the willingness of political institutions to improve the environment. It is interesting to note the correlation of this effort with realized plastic pollution mitigation. In such regressions, it is also useful to control for the sectoral decomposition of GDP in the economy, i.e. the shares of GDP attributable to agriculture, industry, and the service sectors as these are reflective of the technological capability of the economy. Taking these factors constant, we can calculate the willingness of the country to mitigate plastic pollution despite its technological limitations. We also regress the variables without the controls to check for robustness. The sectoral share of GDP by tourism is an important factor in this context: countries with a higher GDP contributed by the tourism industry are more likely to have plastic pollution contributed by the hospitality industry but may also have more incentive to deal with the problem to invite more tourism.

Environment-related indicators are taken as controls to check whether other environmental factors such as the percentage of renewable energy supply, the percentage of marine protected area of the total exclusive economic zone, and the percentage of total municipal waste disposed to landfills are correlated with the plastic pollution. Taken together, these would reflect social and institutional concern for the environment. Social awareness regarding environmental issues caused by plastic, such as climate change would be reflected in the country's willingness to deal with these issues, by treating the consequences of plastic pollution as well. In addition to these variables, we measure the correlation with exposure to environmental threats. The motivation behind using these variables is to check whether societies exposed to the consequences of environmental adversities are more highly correlated with being plastic polluters or not. While this is not a causal inference, it is important to test whether the countries which are responsible for plastic pollution are facing environmental threats as these can motivate societies to become more responsible about their environmental footprints. The variables have been gathered primarily from OECD datasets. GDP data has been collected from the World Bank and Education rates from UNICEF.

4. Results

The most significant variables correlated with the per capita exports of plastic waste via all modes of transport are GDP per capita, fertility rates, mean population exposure to PM2.5, population exposure to icing days, population connected to public sewerage, (significant at
0.001) and slightly correlated with mortality from exposure to ambient ozone (significant at 0.05) (Table 1). Concerning mismanaged plastic waste in the ocean per capita, all variables are insignificant. (Table 2)

A per cent change in GDP per capita is approximately correlated with a percentage change in per capita exports of plastic waste, ceteris paribus. When omitted, the fertility rates become highly significant, i.e., countries with higher fertility rates show lower plastic waste exported per capita. Further, higher fertility rates are highly statistically correlated with low GDP per capita (Table 3). Thus, countries with lower GDP per capita are correlated with lower plastic waste exported per capita. The high significance of fertility in this relationship is due to omitted variable bias. We interpret this to indicate that countries with higher GDP per capita levels have higher usage of plastics and thus export more waste. However, there is no statistically significant relation between GDP per capita and the percentage share of Research and Development in the government budget. (Table 3) Thus, we highlight those countries with higher GDP per capita do not spend higher amounts on environment-related issues. This is true with or without controls for the sectoral share of industry in the GDP. Similarly, the highly significant coefficient on the percentage of the population connected to public sewage becomes negligible when controlling for various other environment-related variables and is best explained by a high correlation with per capita GDP.

There is no significant relationship between mortality from exposure to ambient ozone, exposure to PM 2.5, and GDP per capita (Table 3). However, there is a negative relationship between mortality from exposure to ambient ozone (slightly significant (0.05 level)) and exposure to PM 2.5, (highly significant (0.001)) and plastic exports per capita (Table 1). We posit a negative correlation between significant climate threats to lives at a mass scale and plastic exports since day-to-day reminders of the importance of climate change mitigation might have a pro-environmental impact on behaviour. This relation must be tested out in further empirical analysis. Exposure to icing days is positively associated with plastic waste exports

but the significance goes away with the introduction of more meaningful controls and is best explained by omitted variable bias.

The amount of mismanaged plastic waste in the ocean per capita is hardly explained by any explanatory variables. This is a surprising result considering the relevance of these variables suggested by the literature. In these regressions, the log of GDP per capita, fertility, and even climate crises such as exposure to PM 2.5, icing days, and hot days, have no significant impact on the amount of mismanaged plastic waste exported to the ocean per capita. The share of tourism as a percentage of GDP (with or without controlling for coastline) is similarly insignificant. We cannot definitively conclude the reason behind these results.

Table 1. Dependent Variable: Log of per capita exports of plastic waste via all modes of transport

	(1) Log	(2)Log	(3)Log	(4)Log	(5)Log	(6)Log	(7)Log
Log of GDP per capita (current US$)	0.929**	0.831**	0.915*	1.053***			0.975*
	(2.79)	(2.81)	(2.21)	(3.74)			(2.41)
Conversion from natural and semi-natural	0.0428	0.0878	0.0489				
land to artificial surfaces (%) since '92	(0.74)	(0.82)	(0.81)				
Fertility rate	0.227	0.343	0.217	-0.563*	-1.455***	-0.799**	-0.458
	(0.69)	(0.75)	(0.65)	(-1.99)	(-4.19)	(-3.37)	(-1.58)
Municipal waste disposed to landfills, %	0.00727	0.000966	0.00808	0.0204*		0.00856	
treated waste	(1.19)	(0.12)	(1.23)	(2.53)		(1.08)	
Mean population exposure to PM2.5	-0.0400**	-0.0516***	-0.0407**				
	(-3.10)	(-3.97)	(-3.00)				
Life expectancy at birth	0.114*	0.0527	0.115*				
	(2.13)	(0.64)	(2.07)				
Environmentally related taxes (%)	0.0588	0.101	0.0640				
	(1.44)	(1.65)	(1.40)				
Area of Cropland (%)		-0.00309					
		(-0.32)					
Population exposure to hot days (%)		-0.0116			0.00345		0.00492
		(-1.47)			(0.53)		(1.05)
Population exposure to icing days (%)		0.0145			0.0317***		0.0224***
		(1.46)			(5.87)		(4.71)
Population exposure to wildfires (%)		0.0145			-0.0192		0.0329
		(0.27)			(-0.37)		(0.61)
Tourism_GDP		0.133*				0.142	
		(2.12)				(1.96)	
Export Product Share (%)		-0.182					
		(-0.69)					
Import Product Share (%)		0.176*					
		(2.54)					
Population connected to public sewerage (%)		0.00644		0.0171***		0.0158***	
		(1.66)		(3.98)		(3.92)	
Value added in agriculture (%)			-0.00574		-0.0639		-0.0149
			(-0.14)		(-1.94)		(-0.32)
Value added in industry (%)			-0.00460			-0.0430*	
			(-0.28)			(-2.57)	
Value added in services (%)			-0.00893			0.0108	
			(-0.77)			(0.84)	
Net migration				0.000370		0.00103	
				(0.47)		(0.55)	
Mortality from exposure to ambient ozone				-0.0208	-0.0285*	-0.0247*	
				(-1.71)	(-2.58)	(-2.12)	
Sales of pesticides per unit of agricultural land				-0.0393	0.116**	-0.0125	
				(-0.58)	(3.26)	(-0.27)	
Environmentally related government R&D budget (%)				-0.0230	0.00519	-0.102	-0.0165
				(-0.29)	(0.05)	(-1.47)	(-0.18)
Population Density (per sq. km)				0.000288		-0.000574	
				(0.42)		(-1.72)	
Population aged 15-64 (%)					-0.0949		
					(-1.68)		
GDP per capita (current US$)						0.0000431**	
						(3.29)	
Constant	-17.94***	-12.61	-17.14***	-9.481**	9.730*	0.706	-9.133*
	(-4.41)	(-1.63)	(-3.62)	(-2.88)	(2.13)	(0.61)	(-2.03)
Observations	99	49	99	99	99	50	99
R-squared	0.620	0.819	0.621	0.574	0.564	0.756	0.548
F-statistic	34.39	56.02	23.50	20.66	33.81	19.03	40.05

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 2. Dependent Variable: Mismanaged plastic waste to ocean per capita (kg per year)

	(1)	(2)	(3)	(4)Log	(5)Log	(6)Log
Shoreline(kms)	-8.74e-08	-9.22e-08	-7.16e-08			
	(-0.62)	(-0.64)	(-0.91)			
Population aged 15-64 (%)	-0.0593	-0.0581	0.00236	-0.143	0.197	-0.223
	(-0.64)	(-0.64)	(0.05)	(-0.24)	(1.02)	(-1.92)
Population aged 65+ (%)	-0.0660	-0.0664		-0.173		
	(-1.71)	(-1.63)		(-1.28)		
Population Density (per sq. km)	0.000184	0.000175		0.00145		0.000345
	(0.56)	(0.52)		(0.56)		(1.20)
Fertilty rate	-0.346	-0.338	-0.224	-0.265	0.513	-1.587*
	(-0.94)	(-0.94)	(-0.94)	(-0.14)	(0.52)	(-2.34)
Women, % total population	0.0146	0.0165	0.0113	-0.0638	0.203	
	(0.29)	(0.32)	(0.29)	(-0.16)	(1.49)	
GDP per capita (current US$)	0.00000211	0.00000230				
	(0.30)	(0.32)				
Tourism_GDP	0.0790	0.0801		0.122		
	(1.23)	(1.17)		(2.23)		
Value added in agriculture (%)	-0.00142	-0.00275	0.0129	86.11	0.0288	0.115**
	(-0.04)	(-0.07)	(0.87)	(0.62)	(0.66)	(2.90)
Value added in industry (%)	0.00712	0.00711		85.59		
	(0.75)	(0.74)		(0.62)		
Value added in services (%)	-0.0102	-0.0106		85.57		
	(-1.56)	(-1.29)		(0.62)		
Environmentally related taxes (%)	0.0545*	0.0543*	-0.00761	0.184		
	(2.08)	(2.05)	(-0.42)	(1.43)		
Environmentally related government R&D budget (%)	-0.00707	-0.00491	-0.0285*			-0.148
	(-0.44)	(-0.21)	(-2.00)			(-1.69)
Net migration		-0.0000922	0.000165	-0.00233	-0.000780	
		(-0.16)	(0.55)	(-1.25)	(-0.80)	
Log of GDP per capita (current US$)			0.0805	2.053	-0.920*	
			(0.60)	(0.93)	(-2.38)	
Renewable energy share (%)			-0.00569			
			(-1.97)			
Population exposure to wildfires (%)			-0.0116			-0.0431
			(-1.59)			(-1.65)
Population exposure to hot days (%)			0.00236			-0.00552
			(0.80)			(-0.36)
Population exposure to icing days (%)			-0.00310			-0.0181
			(-1.05)			(-1.35)
Mortality from exposure to ambient ozone			-0.0113			-0.0223
			(-1.75)			(-1.63)
Municipal waste disposed to landfills, % treated waste			0.000205			
			(0.08)			
Area of Cropland (%)			0.00462			
			(0.55)			
Life expectancy at birth			-0.0349			
			(-1.72)			
Export Product Share (%)			0.00232			
			(0.04)			
Import Product Share (%)			-0.0479			
			(-1.09)			
Log of shoreline(kms)				-0.165		0.00705
				(-1.57)		(0.07)
Log of % budget on R&D				0.0752		
				(0.41)		
Sales of pesticides per unit of agricultural land						-0.0273
						(-0.47)
Constant	4.759	4.594	2.166	-8569.3	-19.70	14.88
	(0.50)	(0.50)	(0.41)	(-0.62)	(-0.92)	(1.59)
Observations	48	48	90	18	96	85
R-squared	0.391	0.391	0.182	0.933	0.174	0.257
F-statistic	1.284	1.157	0.980	.	5.595	5.994

t statistics in parentheses
$p < 0.05$, * $p < 0.01$, ** $p < 0.001$

Table 3: Miscellaneous Regressions within controls

	(1) Log GDP per capita (current US$)	(2) Mortality from exposure to ambient ozone	(3) Population aged 15-64 (%)	(4) Environmentally related government R&D budget (%)	(5) Log GDP per capita (current US$)	(6) Log per capita exports of plastic waste via all modes of transport
Mortality from exposure to ambient ozone	0.00652*		0.0155	0.00592	-0.00189	
	(2.23)		(0.57)	(0.75)	(-0.92)	
Mean population exposure to PM2.5	-0.0112*	0.332	0.0120	-0.0130		
	(-2.46)	(1.02)	(0.32)	(-1.44)		
Value added in agriculture (%)	-0.0717***	-0.192	-0.0249	-0.00113	-0.0539***	
	(-5.40)	(-0.22)	(-0.41)	(-0.05)	(-5.29)	
Population aged 15-64 (%)	0.0351	-0.614		0.0135		
	(1.49)	(-0.82)		(0.72)		
Log of GDP per capita (current US$)		4.317	4.093***	0.112		
		(0.76)	(6.34)	(0.54)		
Tourism/GDP		1.561				
		(1.56)				
Population Density (per sq. km)			0.00112	-0.000221		
			(1.60)	(-0.82)		
Population connected to public sewerage (%)			-0.0107	0.0117*		
			(-0.66)	(2.33)		
Fertility rate					-0.468***	
					(-6.03)	
Log of population density (per sq. km)						0.0694
						(0.26)
Export Product Share (%)						0.202
						(1.05)
Import Product Share (%)						0.205
						(1.38)
Marine protected area, % total EEZ						-0.0358
						(-0.82)
Net migration						0.00199
						(1.23)
Primary school education						0.0359
						(1.79)
Constant	8.034***	4.164	27.13***	-1.245	11.19***	-6.558**
	(4.76)	(0.06)	(4.29)	(-0.60)	(79.40)	(-2.77)
Observations	155	62	155	155	155	51
R-squared	0.660	0.104	0.312	0.116	0.708	0.285
F-statistic	71.33	1.271	24.41	2.759	88.59	2.966

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

5. Conclusion

This study examines the complex factors influencing plastic waste management and pollution across countries. The analysis finds that higher GDP per capita is associated with greater plastic waste exports per capita, likely due to higher plastic consumption and usage in wealthy nations. However, there is no evidence that these countries invest more in research and development for environmentally friendly solutions. Interestingly, exposure to major climate threats like high PM2.5 and ambient ozone is negatively correlated with plastic waste exports. This suggests that visible reminders of environmental damage may promote more sustainable behaviours in mitigating plastic pollution. Still, the drivers of mismanaged plastic waste in oceans remain unclear, as no factors significantly predicted this measure of plastic pollution.

Overall, the research highlights the nuances underlying plastic waste generation, management, and pollution globally. While wealthier countries produce more waste, they do not necessarily take proportionate action to implement environmentally sustainable systems and technologies. Greater cooperation, public education, and stakeholder involvement across

all income levels and exposure to climate impacts are likely needed to fundamentally address the plastic crisis. Concrete policy steps should incentivize reductions in plastic usage, particularly single-use items, while also building waste management infrastructure where it is lacking. With concerted efforts, the tide of plastic pollution may be stemmed through a combination of technological innovation, behavioural change, and strong institutions.

The current analysis has implications for the policy space: economically better economies should ethically bear more responsibility for mitigating plastic pollution since the consequences of their actions are felt by the entire planet. They must also step up their ante to further research and development efforts in this direction.

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Appendix

Categories of Controls:

Demographic / Population-specific:

1. Population, ages 15-64, % total
2. Population, ages 65 and above, % total
3. Women, % total population
4. Population density, inhabitants per km2
5. Life expectancy at birth
6. Total fertility rate, children per woman
7. Net migration

GDP (decomposition):

1. Log Real GDP per capita
2. Value added in agriculture, % of total value added
3. Value added in industry, % of total value added
4. Value added in services, % of total value added
5. Environmentally related taxes, % total tax revenue
6. Environmentally related government R&D budget, % total government R&D
7. Export Product Share (%)
8. Import Product Share (%)

Patents:

1. Patents on Reuse, recycling, or recovery technologies
2. Patents on mechanical processing of waste for the recovery of materials, e.g. crushing, shredding, separation, or disassembly
3. Patents on plastics and rubber recycling
4. Total number of green patents

Environment Related Indicators:

1. Renewable energy supply, % total energy supply

2. Marine protected area, % total exclusive economic zone
3. Conversion from natural and semi-natural land to artificial surfaces, % since 1992
4. Conversion from natural and semi-natural land to cropland, % since 1992
5. Municipal waste disposed to landfills, % treated waste

Other Miscellaneous indicators:

1. Cropland, % total
2. Population connected to public sewerage, % total population
3. Sales of pesticides per unit of agricultural land
4. Production-based CO2 intensity, energy-related CO2 per capita

Environment threats:

1. Mortality from exposure to ambient ozone
2. Percentage of population exposure to wildfires
3. Percentage of population exposure to hot days
4. Percentage of population exposure to icing days
5. Mean population exposure to PM2.5

Back to Blue Index:

1. Overall Score
2. Governance
3. Systemic Capacity
4. Stakeholder Engagement

Dependent Variables

1. Log of mismanaged plastic waste to ocean per capita (kg per year)
2. Log of per capita exports of plastic waste via all modes of transport
3. Mismanaged plastic waste to ocean per capita (kg per year)
4. Per capita exports of plastic waste via all modes of transport

Control for waste to the ocean:

1. Shoreline (km)
2. Log of shoreline (km)

SUMMARY STATISTICS

	mean	sd	min	max	count
Population aged 15-64 (%)	66.87058	8.302877	0	84.42	155
Population aged 65+ (%)	8.848774	5.45691	0	20.9	155
Women, % total population	49.61052	5.227087	0	54.81	155
Population Density (per sq. km)	173.3348	493.867	2.07	5545.74	155
Life expectancy at birth	72.49077	12.28876	0	83.98	155
Fertilty rate	2.367032	1.198209	0	6.96	155
Net migration	100.9454	553.0758	-1177.22	4085.76	155
Log of net migration	3.748215	2.215544	-1.609438	8.315263	69
Log of population density (per sq. km)	4.203871	1.331755	.7275486	8.620786	155
Observations	155				

	mean	sd	min	max	count
Log of GDP per capita (current US$)	9.592811	1.087004	6.803394	11.81634	155
Value added in agriculture (%)	8.394903	8.357534	0	39.22	155
Value added in industry (%)	28.80406	11.41481	0	62.05	155
Value added in services (%)	58.28477	17.56617	0	86.88	155
Environmentally related taxes (%)	3.596194	4.062899	0	17.29	155
Environmentally related government R&D budget (%)	.5406452	1.657727	0	15.64	155
Observations	155				

	mean	sd	min	max	count
Patents on Reuse, recycling or recovery technologies	226.75	634.7304	2	3681	36
Patents on plastics and rubber recycling	69	207.9723	0	1219	36
Patents on mechanical processing of waste for the recovery of materials, e.g. cr	25.44444	87.19942	0	516	36
Total no. of green patents	136400.8	416095.1	780	2390741	36
Observations	36				

	mean	sd	min	max	count
Renewable energy share (%)	26.96923	26.73523	0	101.5	155
Marine protected area, % total exclusive economic zone	5.774065	10.82898	0	46.48	155
Conversion from natural and semi-natural land to artificial surfaces(%) since'92	.7912258	2.937763	0	30.03	155
Conversion from natural and semi-natural land to cropland (%) since'92	28.27619	20.17168	0	84.59	155
Municipal waste disposed to landfills, % treated waste	6.587742	17.94149	0	87.67	155
Observations	155				

	mean	sd	min	max	count
Area of Cropland (Population connected to public sewerage (%)	8.529161	27.25041	0	100	155
Sales of pesticides per unit of agricultural land	.7453548	2.436981	0	24.2	155
Production-based CO2 intensity, energy-related CO2 per capita (tonnes)	4.766581	4.837664	.02	30.33	155
Observations	155				

	mean	sd	min	max	count
Mortality from exposure to ambient ozone	17.11271	17.22518	0	122.98	155
Population exposure to wildfires (%)	1.018774	4.354085	0	46.16	155
Population exposure to hot days (%)	10.74839	22.98647	0	93.5	155
Population exposure to icing days (%)	8.268	20.39523	0	94.54	155
Mean population exposure to PM2.5	26.46381	17.05	0	83.3	155
Observations	155				

The Role of Institutions and Environment in Development

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Abstract

In recent times, there has been a shift in macroeconomic attitudes whereby countries are driving change to improve developmental indicators. The Human Development Index combines different indicators that can better capture the developmental story unique to each nation. This research aims to understand the multi-dimensional nature of development through its interactions with institutions. Institutions help structure social spheres of life and have positive implications on development by expanding capabilities. Using data from UNDP and The World Bank we narrow down our institutional indicators to the Democracy Index (DI), Government Effectiveness Index (GEI), Environmental Performance Index (EPI), and Corruption Perceptions Index (CPI) of 149 countries around the world for the year 2018 and aim to study their relationship with the Human Development Index. Using 2018 as the base year for analysis is due to a pre-COVID context. This is because it provides a stable reference point unaffected by the extraordinary events of the COVID-19 pandemic, which began in late 2019 and significantly disrupted global economies, societies, and behaviours. It also helps to better isolate and analyse trends, patterns, and relationships without the confounding effects of the pandemic. This allows for a clearer understanding of baseline conditions and facilitates more accurate comparisons. Additionally, we chose this year due to the availability of comprehensive data covering various aspects of social, economic, and environmental factors. We built different regression models, using the OLS technique, concluding that two indices, the Environmental Performance Index (EPI) and Government Effectiveness Index (GEI) have positive relations with the Human Development Index, following existing literature. Improving environmental pre-conditions and increased investment in institutional quality show positive empirical conversions into development. However, the Democracy Index (DI) and Corruption Perceptions Index (CPI) were found to play a rather insignificant role in development, thereby making us question how the political atmosphere across different countries can have varied implications for development.

JEL classification: O43, O15, Q56

Keywords: Human Development Index, Institutions, Government, Environment, Corruption

1. Introduction

The Human Development Index (HDI) is the current operational metric of human development that combines indicators of life expectancy, education, and income. Institutions play a critical role in the development of these dimensions, as they provide the necessary framework and resources to support human development. Institutions are defined as the formal and informal rules and norms that shape the behaviour of individuals and organisations in a society. They include government agencies, educational institutions, healthcare providers, legal systems, and other organisations that are responsible for providing essential services and promoting social and economic development.

The purpose of this paper is to help understand whether institutions influence human development after accounting for heterogeneous dynamics and dependencies.

2. Literature Review

The Human Development approach highlights the gap between what individuals are truly capable of achieving and their current state of existence. Initially, the many discussions on development were rather ambiguous, stemming from comparisons in economic growth or the measurement of utility. One can see why this can be misleading, as income alone is not a good enough evaluation of well-being.

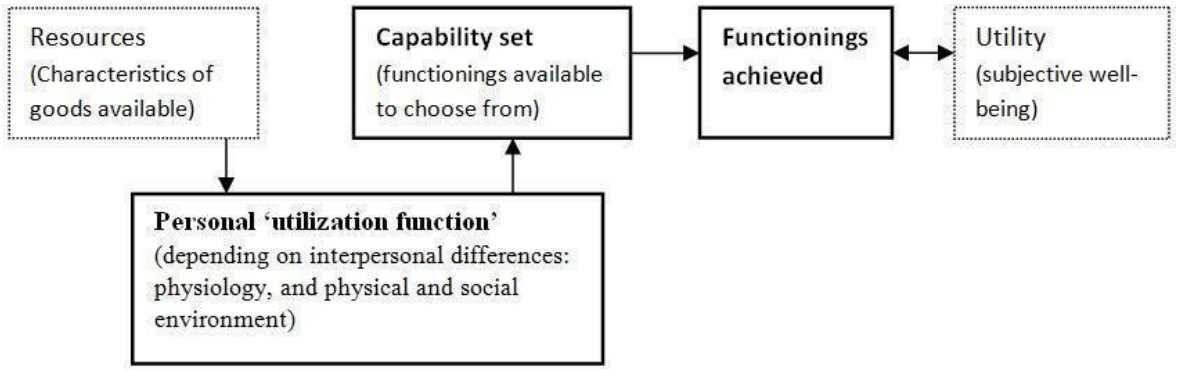
To understand development, one must define well-being. Amartya Sen viewed well-being as what people can 'be' and 'do.' In his work, Sen[1] (1989) argued that the basic difference between the traditional model of development and the capability approach to human development is the notion of human "capabilities and functionings", which relates to the activities that the individual can undertake (doings) and the kind of person the individual can become (beings) that promote his human development. Unlike the traditional development model, the capability approach to human development considers human beings as the means and ends of development according to Streeten[2] (1994).

Moreover, Sen has gone beyond recognition of the instrumental aspect of social arrangements[3] to hint at a more fundamental role that social spheres of life play in

[1] Sen, Amartya. *Development as Capability Expansion*. Journal of Development Planning, 1989.
[2] Streeten, Paul. "Human Development: Means and Ends." *The American Economic Review*, vol. 84, no. 2, 1994, pp. 232–237, www.jstor.org/stable/2117835. Accessed 30 Dec. 2021.
[3] Sen 1999, p. 116, refers to "the advantage of group activities in bringing about substantial social changes."

determining individual capabilities. Sen[4] (2009) also emphasises "valuing a person's ability to take part in the life of the society itself, there is an implicit valuation of the society itself, and that is an important aspect of the capability perspective."

Figure 1: Outline of the core relationships in the Capability Approach [5]



Institutions are "humanly devised constraints that shape human interactions" according to North[6] (1992). Rodrik[7] (2007) views high-quality institutions as those that induce socially desirable behaviour on the part of the economic agents. They help shape social spheres of life and equip individuals with social competencies that enhance capabilities. Social competencies can be defined as the capabilities of institutions and not those of groups. This, however, should not be mistaken for social capabilities, which Stewart[10] (2013) defines as "valuable things that individuals can be or do, and which they have reason to value."

Table 1: Roles of social institutions in affecting major capabilities[8]

Dimensions of Capabilities	**Social Organisations**	**Social Norms**
Bodily well-being	NGOs communities and families provide goods and services	Norms of health behaviour Attitudes to violence

[4]Amartya Sen. The Idea of Justice. London, Penguin Books, 2009.
[5]Wells, Thomas, *Outline of the core relationships in the Capability Approach*, n.d., "Sen's Capability Approach." Internet Encyclopaedia of Philosophy, https://iep.utm.edu/sen-cap/#H1
[6] North, Douglass C. *Institutions, Institutional Change and Economic Performance*. Cambridge, Cambridge University Press, 1990.
[7] Rodrik, Dani. *One Economics, Many Recipes: Globalisation, Institutions, and Economic Growth*. Princeton, N.J., Princeton University Press, 2007.
[8] Ibid.

Material well-being	Cooperatives NGOs Family (including remittances). Producer and workers organisations	Attitudes to employment Discrimination
Mental development/well-being	Family and community effect	Social norms (positive or negative)
Work	Workers' associations	Norms towards female and child work
Security	Warring groups and criminal gangs (negative) Community associations (positive)	Societal norms
Social relations	Family and community	Clubs and associations
Spiritual well-being	Religious organisations	Societal norms
Empowerment and political freedom	Political parties Social movements. Peoples' associations as basis of empowerment	Norms of hierarchy and discrimination
Respect for other species and for natural environment	Community action NGOs	Norms of behaviour

With the onset of the human development reports in 1990 published by the United Nations Development Programme (UNDP), there was a much more widespread use of its 'operational metric'- the Human Development Index (HDI)[9], which enabled a focused cross-country (and inter- temporal) analysis of development performance. In light of this, various research papers have attempted to analyse the impact of specific institutional indicators on development. For instance, Becherair and Tahtane[10] (2017) explore the causal relationship between corruption and human development, through a panel data analysis of Middle East and North African (MENA) countries, to investigate whether corruption has a causal effect on human development outcomes, such as education, health, and income. The paper finds evidence of a negative relationship between corruption and human

[9]Stewart, Frances. *Capabilities and Human Development: Beyond the Individual - the Critical Role of Social Institutions and Social Competencies*. UNDP, Human Development Report Office, 2013.

[10] Becherair, Amrane, and Mourad Tahtane. "The Causality between Corruption and Human Development in MENA Countries: A Panel Data Analysis." *East-West Journal of Economics and Business*, no. 2, 2017, www.u-picardie.fr/eastwest/fichiers/art218.pdf.

development, suggesting that corruption undermines the ability of governments to provide basic services and improve the well-being of their citizens. It highlights the need for anti-corruption measures and institutional reforms that can promote transparency, accountability, and good governance in MENA countries to counter corruption as reducing corruption can help to promote human development and improve the well- being of citizens, ultimately contributing to more stable and prosperous societies in the region.

Lai and Chen[11] (2020) investigate the relationship between environmental performance and human development by comparing between environmental performance index (EPI) and Human Development Index (HDI). It discusses the limitations of past methodologies for measuring these indices and the controversy surrounding their relevance. The authors discuss the limitations of past methodologies for measuring these indices and use a more comprehensive approach of an index aggregation methodology to combine their variables into two composite indices, one for human development and one for environmental performance, to address this. A canonical correlation approach to empirically assess the relationship between these two indices suggested that countries with higher levels of environmental performance tend to have higher levels of human development. However, this relationship is complex and multifaceted, and further research is needed to fully understand the mechanisms underlying this relationship. The degree of importance for indicators in representing the aggregated index such as GDP per capita, life expectancy, and CO2 emissions per capita is taken into consideration.[12]

Liotti, Musella, and D'Isanto[13] (2018) suggest that the construction of an effective institutional system consisting of formal and informal institutions that complement each other is of great importance for the implementation of the basic principles and ideas of human development as a component of the concept of sustainable development. Several indicators in the paper, including political stability and absence of violence/terrorism, government effectiveness as well as rule of law, take values in the range from -2.5 to 2.5, which reflect the effectiveness of government management. They can be used to determine the percentage value among all countries, ranging from the lowest (0) to the highest (100)

[11] Lai, Sue Ling, and Du-Nin Chen. "A Research on the Relationship between Environmental Sustainability Management and Human Development." *Sustainability*, vol. 12, no. 21, 29 Oct. 2020, p. 9001, https://doi.org/10.3390/su12219001.

[12] Please note that some indicators may be more important than others depending on the specific context.

[13] Liotti, Giorgio, et al. "Does Democracy Improve Human Development? Evidence from Former Socialist Countries." *Eastern Journal of European Studies*, vol. 9, no. 2, 2018, ejes.uaic.ro/articles/EJES2018_0902_LIO.pdf.

rank. The indicators are based on several hundred individual variables of the perception of management, received from 35 separate data sources from 33 different organisations from around the world. The paper also discusses the problems that arise in the national economy due to an increase in tax pressure and a lack of effective control and sanctions on the part of the state in relation to economic entities. These include shadow employment, hiding of income, the transfer of economic activity to the shadow and financial resources to other countries or offshore zones, and the growth of criminal activity.

The effects of political institutions on human development outcomes are time-dependent and the histories of these institutions are critical to understanding present outcomes, according to Gerring, Thacker, and Alfaro[14] (2007). They suggest that long-term democracies benefit from increased political competition resulting in greater accountability, stronger civil societies promoting human development, development of norms supporting greater demands for equality, and higher levels of institutionalisation relative to authoritarian regimes or new democracies. However, they caution that countries should not expect large immediate dividends in human development to result from democratic transitions. The dichotomous coding of cases into two piles is inconsistent with theoretical arguments about democracy and outcomes like infant mortality. A more differentiated measure of regime type is necessary to test more precisely a causal argument about human development outcomes in what is, after all, a relatively small- sample analysis. In conclusion, figuring out the ways in which present outcomes depend upon past choices is a critical task for every empirical analysis, not simply a matter to be reserved for case- studies or historical-institutionalist researchers. The authors argue that the practical implications of their argument introduce grounds for both optimism and caution with respect to the ability of developing countries to improve their levels of human development.

Ulman and Bujancă[15] (2014) analyse if the macro-economic environment and corruption share a circular relation and influence each other, looking at countries in different stages of development in their paper. Two indices, namely, the Macroeconomic Environment (ME) and the Corruption Perceptions Index (CPI) were analysed for this

[14]Gerring, John, et al. *Democracy and Human Development*. 2007.

[15]Ulman, Simona-Roxana, and Gimia-Virginia Bujancă. "The Corruption Influence on the Macroeconomic Environment. Empirical Analysis on Countries' Development Stages." *Procedia Economics and Finance*, vol. 16, 2014, pp. 427–437, core.ac.uk/download/pdf/82783724.pdf, https://doi.org/10.1016/s2212-5671(14)00822-3. Accessed 1 May 2020.

purpose using two Spearman Rank Correlation tests[16] and two regressions. A positive correlation was confirmed between the two variables suggesting that corruption, on average, is related to the level of development of the macroeconomic environment. The findings of the evaluation summarise that "corruption is a global problem that exists in all countries to varying degrees, and sustainable development requires the control of corruption because of its high and disproportionately social and economic costs."

1. Methodology

1.1 Dependent Variable

In our model the dependent variable is the Human Development Index (HDI), sourced from the Human Development Reports of UNDP. It is a summary measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable, and having a decent standard of living. The general formula used to calculate the HDI is:

$$\sqrt[3]{I_{life}. I_{education}. I_{income}}$$

where:

I_{life}= Life Expectancy Index

$I_{education}$= Education Index

I_{income} = Income Index

1.1 Independent Variables

The dependent variable is regressed on four factors:

(i) Corruption Perceptions Index (CPI): It gives the "combined impact of different manifestations of corruption into one globally comparable indicator." Sourced from data that is published by Transparency International, each country's score is a combination of at least three data sources drawn from 13 different corruption surveys

[16] It assesses how well the relationship between two variables can be described using a monotonic relationship.

and assessments. The data sources are in turn sourced from the World Bank, World Economic Forum, etc. The different manifestations of corruption included bribery, diversion of public funds, nepotistic appointments, and diversion of public funds to name a few. A country's scores are reported on a scale of 0 -100 (0 means highly corrupt, 100 means clean), whereas the rank is the position relative to other countries. For our study, we look at the CPI scores.

(ii) Democracy Index (DI): The Democracy Index is based on five categories: electoral process and pluralism; civil liberties; the functioning of government; political participation; and political culture. Each category has a rating on a 0 to ten scale, and the overall index is the simple average of the five category indexes. The five categories are interrelated and form a coherent conceptual whole. Based on its scores on a range of indicators within these categories, each country is then classified as one of four types of regimes: "full democracy," "flawed democracy," "hybrid regime" and "authoritarian regime."

(iii) Environmental Performance Index (EPI): It "ranks countries on climate change performance, environmental health, and ecosystem vitality" and "provides a gauge at a national scale of how close countries are to established environmental policy targets," was sourced and taken from the Database by the Socioeconomic Data and Applications Center (NASA). EPI is calculated based on 24 performance indicators across ten issue categories covering environmental health and ecosystem vitality. These metrics provide a gauge at a national scale of how close countries are to established environmental policy goals. The EPI thus offers a scorecard that highlights leaders and laggards in environmental performance, gives insight into best practices, and provides guidance for countries that aspire to be leaders in sustainability.

(iv) Government Effectiveness Index: It is one of the five main pillars of the Institutional Quality Index (IQI), the Government Effectiveness Index (GEI) published by the World Bank, can be used to look at the endowment of social and economic systems as well as the administrative capacity of governments regarding environmental regulations, waste management, and health policies. Government Effectiveness

captures perceptions of the quality of public services, the quality of the civil service and the degree of its independence from political pressures, the quality of policy formulation and implementation, and the credibility of the government's commitment to such policies. Estimate gives the country's score on the aggregate indicator, in units of a standard normal distribution, i.e., ranging from approximately -2.5 to 2.5.

1.2 Control variables

We have used government expenditure on health and education as control variables in our study to enhance the accuracy of the estimated relationships between the independent variable (CPI, DI, EPI, GEI) and the dependent variable (HDI). They are to control the impacts of health and education expenditure on human development. According to Banik et al.[17] (2022), "health expenditure can improve human development through several channels such as economic growth, improved labour productivity, reduced mortality and encouraging people to engage more in the learning and education process." A good healthcare system and better awareness among people contribute to an increase in the quality of human capital churned in a country. Similarly, investment in job training and organised education at the elementary, secondary, and higher levels improve human capabilities. Additionally, population, inflation rate, and Gini coefficient have been used to control for country size, accounting for differences in the purchasing power of currencies across countries, and income inequality in our research. Larger populations might face challenges in providing adequate resources and services to their citizens, potentially lowering the HDI. By including population as a control variable, we can isolate the effects of other variables on HDI without the confounding influence of population size. High inflation rates can erode the value of income and savings, impacting people's ability to afford education, healthcare, and other essential services. By controlling for inflation, we can better understand the relationship between other factors and HDI without the interference of inflationary effects. Similarly, higher levels of income inequality may indicate disparities in access to education, healthcare, and economic opportunities, which can hinder overall human development within a country.

[17] Banik, Banna, et al. "Healthcare Expenditure, Good Governance and Human Development." *EconomiA*, vol. 24, no. 1, 16 Dec. 2022, https://doi.org/10.1108/econ-06-2022-0072.

After sourcing the data for various indices, we arrived at a list of 149 countries that were common for all the variables and dropped countries for whom data points were not available.

2. Descriptive Statistics and Visual Representation

Summary statistics of the variables are included in Table 2.

Table 2: Summary Statistics

Variable	Mean	Median	Standard Deviation	Range
Dependent Variable				
HDI	0.733	0.762	0.151	0.563
Independent Variables				
Democracy Index	5.766	5.870	2.014	7.720
EPI	56.931	57.420	13.322	59.990
CPI	44.033	38.000	18.767	72.000
Government Effectiveness	49.761	48.558	28.251	98.558
Control Variables				
Government Expenditure on Health	6.420	6.308	2.676	14.739
Government Expenditure on Education	4.348	4.255	1.514	7.985
Population	50513128.2	11170335	168097174.8	1416716449
Inflation Rate	461.820	2.6	5466.469	65376.9
Gini Coefficient	0.358	0.353	0.067	0.289

Figure 2: Scatter plot depicting a strong positive correlation between Environmental Performance Index and HDI

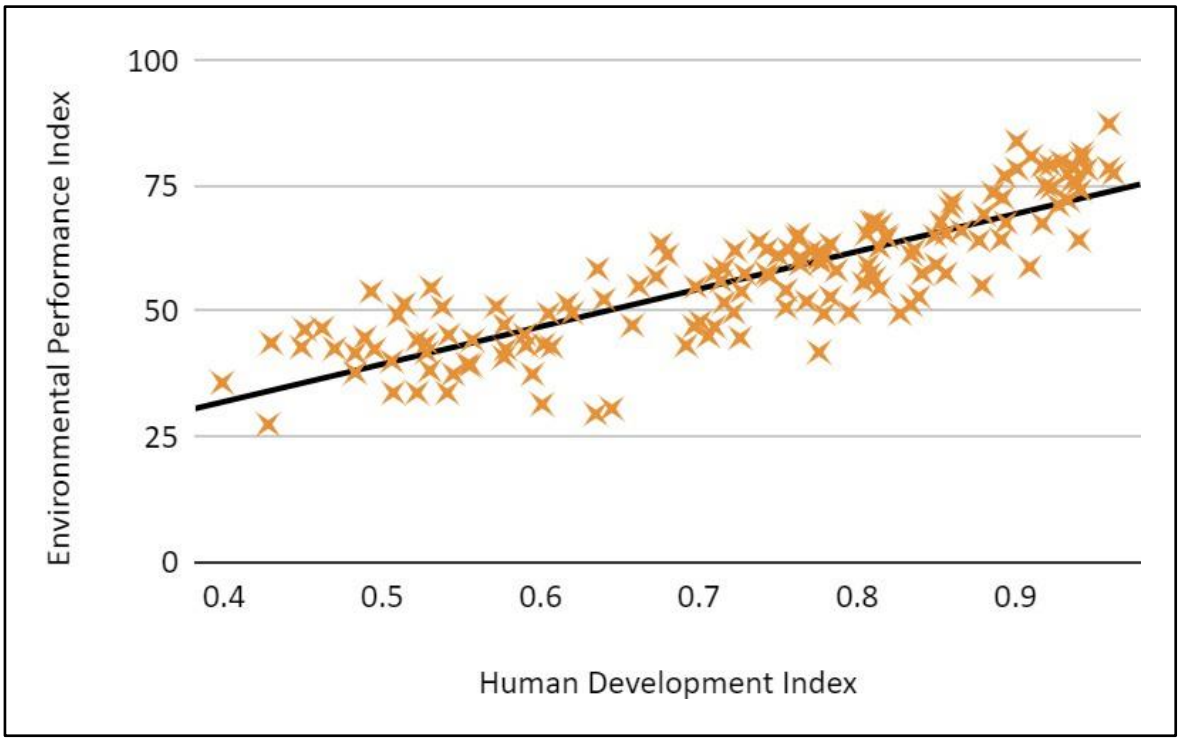


Figure 3: Scatter plot depicting a weak positive correlation between Government Effectiveness Index and HDI

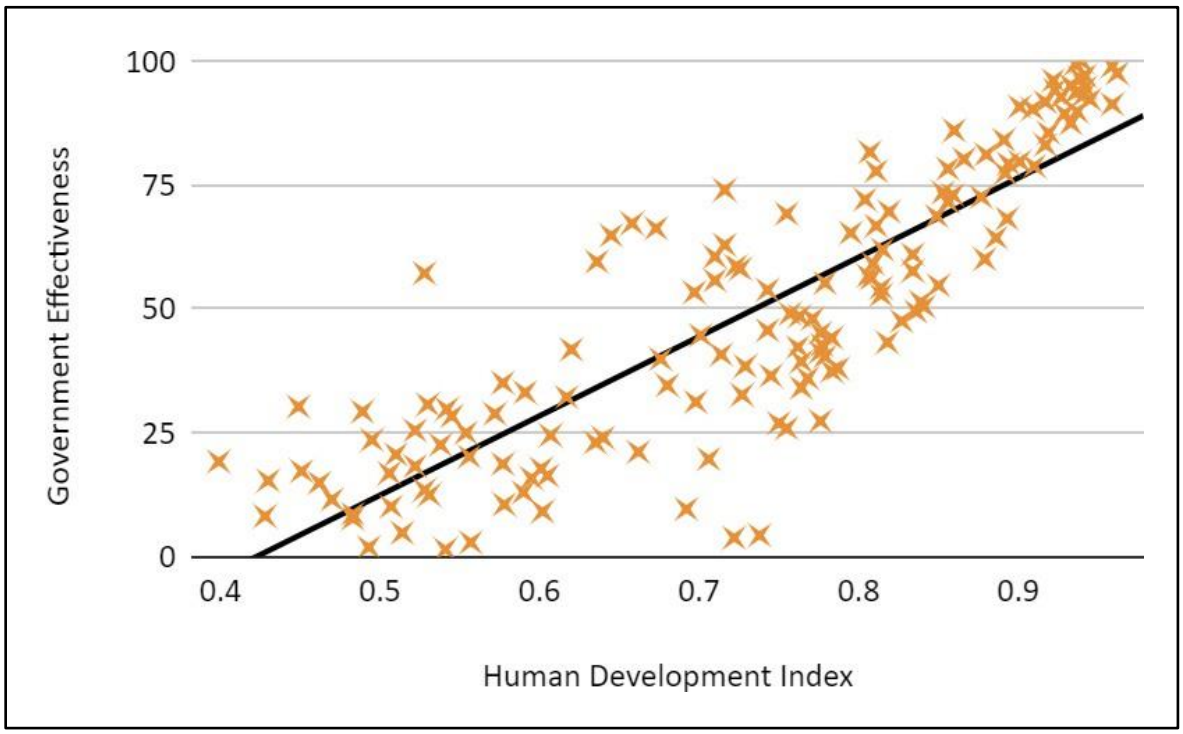


Figure 4: Scatter plot depicting a weak positive correlation between Corruption Perception Index and HDI

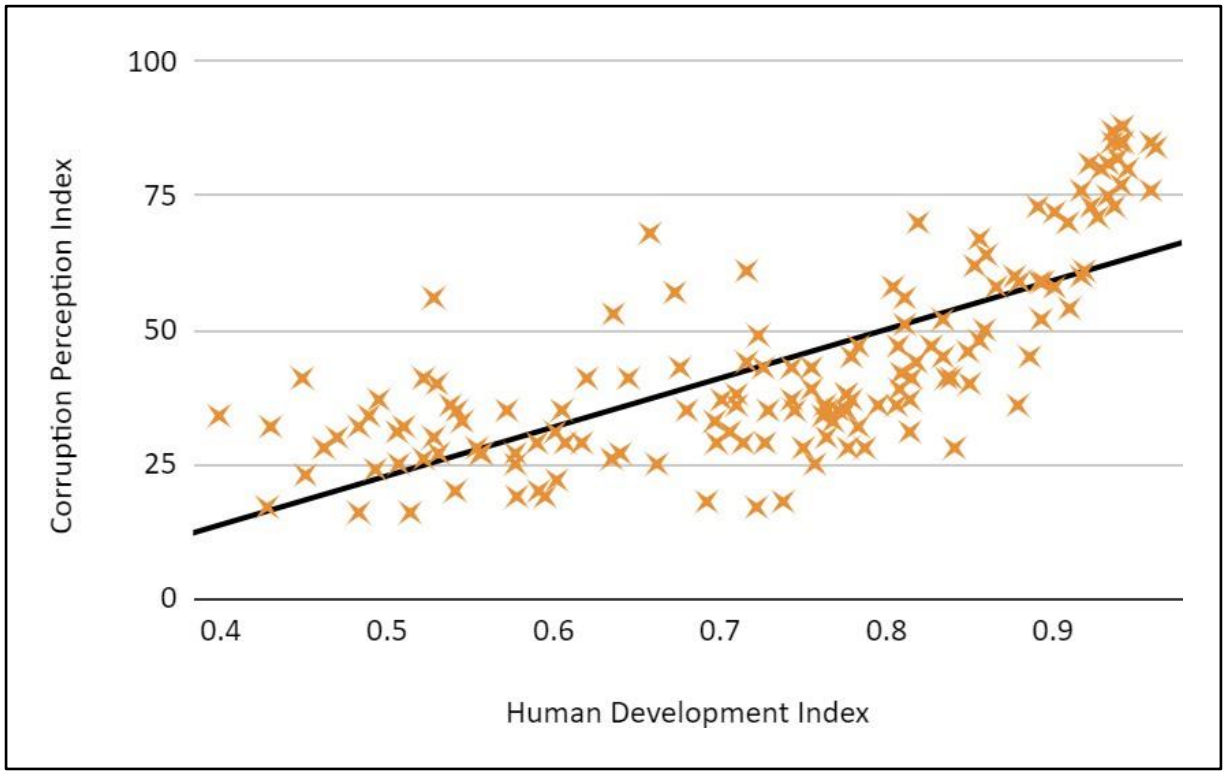
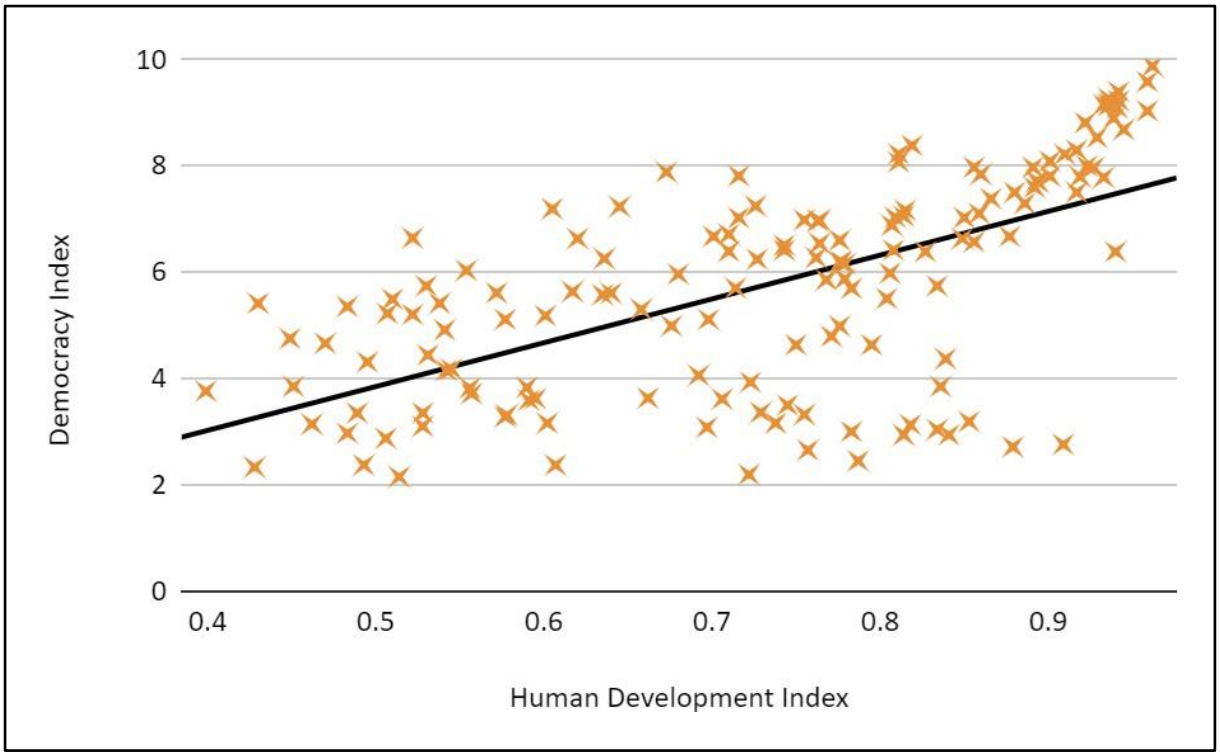


Figure 5: Scatter plot depicting no correlation between Democracy Index and H



3. Multiple Regression Model

We used Gretl for the multiple regression[30] analysis, to develop the relationship between the dependent variable, HDI, the four independent variables described namely CPI, DI, EPI, GEI, and the control variables Government expenditure on Health and Government expenditure on Education. We experimented with multiple functional forms to understand the varied impact of the independent variables on the dependent variable in our study. To test our objective, we implemented the following model after assessing the R-squared values of the experimental models and choosing the best one:

$$Y = \beta + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 X_7 + \beta_8 X_8 + \beta_9 X_9$$

(1) The model has been corrected for multicollinearity.

[30] Multiple regression is a statistical technique that can be used to analyse the relationship between a single dependent variable and multiple independent variables.

Table 3: Model: OLS, using observations 1-149. Dependent variable: HDI

Explanatory Variables				
	Coefficient	**Std. Error**	**t-ratio**	**p-value**
Constant	0.356	0.06	5.913	<0.0001
Democracy Index (X_2)	0.001	0.007	0.211	0.833
Environmental Perception Index (X_3)	0.005	0.001	4.187	<0.0001
Government Effectiveness Index (X_4)	0.005	0.0007	6.983	<0.0001
Corruption Perception Index (X_1)	−0.0035	0.0008	−4.043	0.0001
Control Variables				
Population (X_5)	−2.70E-11	4.18E-11	-0.6487	0.5187
Inflation rate (X_6)	0.003	0.0011	2.624	0.0107
Gini coefficient (X_7)	-0.09	0.105	-0.858	0.3937
Government Expenditure on Health (X_8)	0.0005	0.0036	0.159	0.874
Government Expenditure on Education (X_9)	0.0015	0.0055	0.272	0.786
R- square	0.879			

4. Results

With a highly significant p-value, the EPI was found to have a coefficient of about 0.005. This indicates a positive relation with HDI. This seems to be consistent with the existing literature review from which we had found the a priori sign to be non-negative. Empirical evidence has also shown that countries with properly implemented environmental policies have higher HDI values.

GEI showed a p-value below 0.001, with a coefficient of about 0.005. This again indicates a positive relation with HDI. This also keeps in line with the existing literature review from which we had found the a priori sign to be non-negative. Better institutional quality leads to an increase in human development, arguing that improving the quality of governance prevents the waste of resources and directs revenues from natural resources to more education, health, and productive economic activities.

DI showed a very high p-value in the model. Thus, through our regression, we found this variable to be statistically insignificant in terms of its impact on the HDI. Realistically, countries should not expect large immediate dividends in human development to result from democratic transitions. On the other hand, given sufficient time, democracy should begin to yield important, tangible benefits to the underprivileged in society. There is no demonstrable causal relationship between the two factors, that are, human development and democratic stock.

CPI showed a p-value of 0.0001, with a negative coefficient of about 0.0035. Thus, our regression states that corruption has negative but statistically significant effects on human development.

5. Limitations

Human development inevitably depends on various other factors that this paper has not taken into consideration. The control variables account for only certain factors like the impact of education, health, and income inequality on HDI. There are other heterogeneous social factors like family influence, cultural factors, and normative influences to name a few that affect development in various contexts across countries, which are unaccounted for in our study. While our econometric analysis provides valuable insights into the relationships between variables, it is crucial to acknowledge several limitations and statistical pitfalls inherent in our approach.

1. **Lack of Causal Inference Techniques:** Our analysis does not employ advanced causal inference techniques. As a result, we cannot establish causal relationships between variables but rather identify correlations and associations.
2. **Data Limitations:** Our analysis relies on available data for the chosen time period (2018), which may be subject to measurement errors, reporting biases, and missing

variables. Furthermore, the pre-COVID-19 nature of our dataset may not fully capture the potential impacts of the pandemic on the relationships under investigation.

3. **Model Specification:** The specification of econometric models involves various assumptions and choices, including functional forms, variable selection, and inclusion of control variables. Alternative model specifications could yield different results, and our findings should be interpreted in light of these choices.
4. **Extrapolation and Generalization**: Our analysis focuses on a specific context and may not be directly applicable to other settings or time periods. Extrapolating our results beyond the scope of our study should be done cautiously, considering potential differences in data, institutional settings, and underlying dynamics.

Despite these limitations, our analysis serves as a valuable starting point for understanding the relationships between variables. Future research could build upon our work by employing more sophisticated causal inference techniques, addressing endogeneity more comprehensively, incorporating additional data sources, and exploring alternative model specifications. Therefore, it is essential to interpret our findings with caution due to the aforementioned limitations and statistical pitfalls.

6. Conclusion

Institutions are indeed important. However, the existing literature is limited in the sense of what constitutes these institutions. There is also no existing holistic single operational metric that captures the range of institutions. The aim of this paper was to study the effect of institutional indices on human development. Overall, the OLS estimation technique suggests that institutions play an important role in explaining development.

Through our analysis of the four indices that we opted for as independent variables in this research, we found that the Environmental Performance Index and Government Effectiveness Index proved to be most significant in affecting the HDI. Both indices were positively related to HDI, showing that an increase in these indices increases the measure of human development. As seen in existing literature reviews, the Corruption Perception Index turned out to have a negative relation with HDI. Democracy Index was found to be inconclusive in its impact on the human development index in our literature review, and in keeping with that, the Democracy Index showed insignificance to our research in the

regression model we analysed. Thus, the focus on the institutions affecting the environment and the governmental activities in a country can help better the human development in that country

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Crony Capitalism: Studying the Impact of Lobbying Expenditure on Firm Financial Performance

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Abstract

Corporate political activity has surged in the United States, with lobbying expenditure surpassing $2.6 billion [1]across all corporations in 2023. This paper examines the impact of lobbying on financial performance from 2018 to 2022, particularly during the COVID-19 pandemic. Adopting a two-stage least square regression methodology and instrumenting for potential endogeneity concerns, our analysis reveals a positive and significant effect of lobbying expenditure on firm profitability, even after controlling for various factors. The sector-specific analysis highlights divergent impacts, with lobbying positively influencing net income in the technology sector but showing a negative association in healthcare. These findings underscore industry-specific nuances in the relationship between lobbying and firm profitability. This study contributes to the literature by offering causal insights into the relationship between lobbying expenditure and financial performance and by investigating the dynamics of lobbying investments during times of heightened uncertainty. The paper concludes with a discussion of policy implications and avenues for future research.

JEL Classification: D72, G38, M48, L21, K22

Keywords: Lobbying, Capitalism, Firm Performance, Government

I. Introduction

Over the past few years, corporate political activity or 'The Business of Influence' has accelerated in the United States, with lobbying expenditure exceeding $2.6 billion across all US corporations in 2023. With firms seeing a surge in profits over the past few years while steadily increasing their lobbying expenditure during the same period, it raises questions of whether the relationship between the two is, in fact, causal. This potential interplay between

[1] *OpenSecrets*, www.opensecrets.org/. Accessed 4 Dec. 2023.

corporate involvement in politics and financial success raises concerns about a political system that rewards companies prioritising political investments over internal investments to improve business operations, potentially favouring corporate interests at the expense of broader societal welfare.

In light of these concerns, this paper examines the impact of lobbying on financial performance in the United States from 2018 to 2022. While previous literature has examined the relationship between lobbying and financial performance, given the impact of COVID-19 on business and our study's timeframe, we seek to ascertain whether this relationship persists during the pandemic and, if so, its nature. Our analysis sheds light on the impact of lobbying activities within two pivotal sectors—healthcare and technology—both of which played active roles in lobbying efforts during the pandemic. By exploring these different dimensions, this paper offers nuanced insights into the impact of lobbying expenditure during periods of crises and across industries.

Our empirical analysis adopts a two-stage least square regression methodology to examine the association between lobbying expenditure and firm profitability. To address potential endogeneity concerns, we instrument firm-level lobbying expenditure (relative to total assets) with the industry's total lobbying expenditures (relative to the industry's total assets) for the current and previous years. To investigate potential non-linear returns associated with increasing lobbying expenditure on net income, we conduct a heterogeneity analysis, splitting the sample into quartiles based on lobbying expenditure relative to total assets.

Our OLS estimates consistently demonstrate a positive and significant effect of lobbying expenditure on firm profits, even after controlling for production capital, labour, and firm age. Instrumenting for industry-average lobbying strengthens our results, finding a

significant positive association between lobbying expenditure and profitability measures, relative to total assets. The quartile breakdown of lobbying expenditure indicates increasing returns as the scale of lobbying rises.

Our sector-specific analysis focusing on the technology and healthcare sectors uncovers divergent impacts. While lobbying expenditure positively influences net income in the technology sector, it exhibits a negative association within the healthcare sector. These findings suggest industry-specific nuances in the relationship between lobbying and firm profitability, offering insights into the differential impact of political engagement across sectors.

This paper contributes to existing literature in two critical dimensions. Firstly, our paper is amongst a few that delve into a causal analysis of the relationship between lobbying expenditure and firm financial performance. Secondly, our paper investigates the dynamics of lobbying investments during a period of heightened uncertainty– the COVID-19 pandemic. By assessing the applicability of established theories and channels of corporate political engagement amidst this tumultuous environment, our study fills a critical gap in the literature, shedding light on how firms navigate political landscapes during times of unprecedented global upheaval.

The rest of this paper is organised as follows. Section 2 briefly covers background information and existing literature that contribute to understanding the relationship between lobbying and firm performance. The data sources, key variables, and descriptive statistics of the study are presented in Section 3. Section 4 proceeds to illustrate our empirical strategy. Our results are detailed in Section 5**,** followed by a discussion, and outlining of policy implications in Section 6.

2. Background and Context

Lobbying can be broadly defined as the organised activities carried out by individuals, organisations, or interest groups with the objective of influencing the policy formulation and implementation processes of government legislation and regulatory activities. In the United States, lobbying can occur as direct activities, such as direct interactions with lawmakers and Congressional testimonies, or indirect activities, such as grassroots campaigns. Although lobbying is often misconstrued as a corrupt practice that enables lobbyists and their clients to get preferential treatment, it is legally protected by the "right to petition" under the First Amendment of the U.S. Constitution and was initially included to ensure that citizens had adequate opportunity of having their grievances addressed by the government. However, total lobbying expenditures by labour unions and ideological groups has been minuscule compared to large corporations, with the latter contributing 86.4% of the share of total lobbying expenditures incurred in 2023, making it increasingly difficult to believe that the public has an equal footing with corporate interest groups[2].

The necessity for corporate lobbying can be better understood by examining it through the lens of both governmental and corporate interests. From the government's point of view, the increasing involvement of corporations in lobbying the government can be largely attributed to the complexities inherent in drafting legislation. The lack of subject expertise among Congresspeople, paired with the fact that major governmental administrative and regulatory agencies are increasingly becoming understaffed, provides corporate lobbyists the opportunity to address the information asymmetry by providing them with relevant and crucial

[2] "Business, Labor & Ideological Split in Lobbying Data." *OpenSecrets*, https://www.opensecrets.org/federal-lobbying/business-labor-ideological. Accessed 19 Dec. 2023.

data, information, and projected outcomes for upcoming regulations and legislation bills. From the corporations' point of view, the overarching objective of lobbying efforts is to wield influence over public policy at the industry level, intending to strengthen and consolidate their economic position within their respective industries. With maximising shareholders' value being the top priority for firms, lobbying activities are given similar, if not equal, importance as other operating activities like research and development and advertising. Lobbying then increasingly becomes a strategic political investment aimed at safeguarding and increasing current and future earnings of a firm. Therefore, while lobbying might improve the law-making processes for the government and the general public, it doesn't necessarily prevent firms from pursuing rent-seeking behaviour to influence legislation in a manner that provides them disproportionate benefits.

Existing literature shows that this rent-seeking behaviour of firms repeatedly arises in multiple ways. For example, Ivan, Mishra, and Tressel (2009) show that private banks that lobbied aggressively during the 2008 financial crisis to prevent tighter regulation in lending standards were the ones that engaged in riskier lending practices and increased securitization of originated loans. Additionally, it was found that these banks had a higher probability of receiving bailout funds compared to non-lobbying financial institutions. Using a portfolio approach, Chen, Parsley, and Yang (2010), find that "portfolios of firms with the highest lobbying intensities significantly outperform their benchmarks in the three years following portfolio formation."[3] Similarly, Richter, Samphantharak and Timmons (2009) find that firms that spend more on lobbying in a given year pay lower effective taxes in the following year.[4] Interestingly, Yu and Yu (2008) find that "compared to non-lobbying firms, firms that lobby

[3] Chen, Hui, David C. Parsley, and Ya-wen Yang. "Corporate Lobbying and Financial Performance." *SSRN Electronic Journal*, 2010. https://doi.org/10.2139/ssrn.1014264.
[4] Richter, Brian Kelleher, Krislert Samphantharak, and Jeffrey F. Timmons. "Lobbying and Taxes." *American Journal of Political Science* 53, no. 4 (2009): 893–909. https://doi.org/10.1111/j.1540-5907.2009.00407.x.

on average have a significantly lower hazard rate of being detected for fraud, evade fraud detection 117 days longer, and are 38% less likely to be detected by regulators."[5] More recently, Tanglis and Lincoln (2021) show that companies that lobbied the federal government in 2020 were considerably more likely to secure contracts aimed at combatting the pandemic.[6] Specifically, while only six percent of the contracting companies lobbied the government, they received over half ($19.4 billion) of the total COVID-related government contracts.

The COVID-19 pandemic was accompanied by a notable escalation in lobbying expenditures across the United States. This escalation primarily found its roots in the corporate support for the largest aid package in US history—the Coronavirus Aid, Relief, and Economic Security (CARES) Act (Schwartz 2020), which aimed to provide direct economic assistance to corporations and individuals affected by the pandemic.

Two sectors that were particularly under the limelight during the pandemic were the healthcare and technology sectors. Within the healthcare sector, the pharmaceutical industry engaged in substantial lobbying, particularly concerning intellectual property for generic vaccines. The World Trade Organization had proposed a temporary waiver on intellectual property rights to enable the global production of generic coronavirus vaccines.[7] This waiver sought suspension of IP enforcement, allowing local pharmaceutical facilities to obtain compulsory licences for coronavirus vaccine production without facing legal action from licence holders. However, over 100 drug lobbyists opposed the bill, citing potential threats to their profits if the waiver was granted.[8]

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[5] Yu, Frank, and Xiaoyun Yu. "Corporate Lobbying and Fraud Detection." Journal of Financial and Quantitative Analysis 46, no. 6 (2011): 1865–91.
[6] Tanglis, Mike, and Taylor Lincoln. "The Covid Lobbyists." *The Center for Responsive Politics* , 2021.
[7] Foss-Solbrekk, Katarina. "The IP Waiver and Covid-19: Reasons for Unwavering Support." *Journal of Intellectual Property Law & Practice* 16, no. 12 (2021): 1347–59. https://doi.org/10.1093/jiplp/jpab150.
[8] Fang, Lee. "Pharmaceutical Industry Dispatches Army of Lobbyists to Block Generic COVID-19 Vaccines." The Intercept, 2021. https://theintercept.com/2021/04/23/covid-vaccine-ip-waiver-lobbying/.

Shifting focus to the technology sector, apart from the incremental profits enjoyed from worldwide digitisation during the pandemic, the industry also witnessed financial gains from having the opportunity to quietly pursue longstanding objectives amidst the volatile political and economic landscape. For example, Google and Facebook lobbied to delay the implementation of California's new online privacy regulations and Amazon advocated for increased funding to facilitate federal employees' remote work.[9] During the pandemic, 'Big Tech' also spent substantial sums on lobbying to face investigations from the government on grounds of antitrust practices. For instance, Google encountered accusations of abusing its search engine dominance by securing agreements with smartphone manufacturers to set itself as the default search engine,[10] while Apple faced scrutiny over its mobile operating system favouring its own products and potentially hindering competition among third-party developers.[11]

Based on anecdotal evidence and a theoretical understanding of the intention and motivation driving corporate political investment, we hypothesise that lobbying expenditure yields a positive impact on firm financial performance.

[9] Mccabe, David. "How Tech's Lobbyists Are Using The Pandemic to Make Gains." The New York Times, April 3, 2020. https://www.nytimes.com/2020/04/03/technology/virus-tech-lobbyists-gains.html.
[10] Mccabe, David, and Cecilia Kang. "In Its First Monopoly Trial of the Modern Internet Era, U.S. Sets Sights on Google." *The New York Times*, 6 Sep. 2023, https://www.nytimes.com/2023/09/06/technology/modern-internet-first-monopoly-trial-us-google-dominance.html.
[11] Tilley, Aaron, et al. "WSJ News Exclusive | U.S. Escalates Apple Probe, Looks to Involve Antitrust Chief." *The Wall Street Journal*, Dow Jones & Company, 16 Feb. 2023, www.wsj.com/articles/u-s-escalates-apple-probe-looks-to-involve-antitrust-chief-2fa86ddf#.

3. Data

3.1 Data Sources

The panel dataset utilised in this study contains comprehensive data on financial metrics and lobbying expenditure for firms listed in the S&P 500 index spanning the period 2018 to 2022. The main financial variables included in the dataset, such as total assets, operating profit and cash flows, and capital structure (debt and equity) have been obtained from Yahoo Finance. Other firm-related variables, such as number of employees and establishment date, have been sourced from Macro Trends and Crunchbase respectively. The methodology utilised for industry classification adheres to the Global Industry Classification Standard (GICS) published by MSCI, ensuring consistency in categorising firms across industries.

The main independent variable of interest, firm-level lobbying expenditures, has been obtained from OpenSecrets, which is administered by the Centre for Responsive Politics (CRP). [12]CRP compiles lobbying data using quarterly records of lobbying disclosures reported in the Senate Office of Public Records (SOPR), available on OpenSecrets by calendar year. Organisations can engage in in-house lobbying and/or hire external lobbyists, with both expenditures filed with the SOPR. In cases where an organisation conducts in-house lobbying, it files the expenditure. Otherwise, CRP aggregates the reported expenditure filed by external lobbying firms for a specific firm.

[12] The Center for Responsive Politics is a non-profit organisation that provides detailed financial records on campaign contributions and lobbying expenditures carried out by major industries, corporations, individual donors, and advocacy organisations.

3.2 Descriptive Statistics

Examining the latest year in our dataset, 2022, we observe that an average S&P 500 firm in our sample is 75 years old and has approximately 60,000 employees (refer to Appendix table [1]). In 2022, an average firm reported a net income of $3 billion and total assets valued at $85 billion, resulting in an average Return on Assets [13]of 3.5%.

Looking at Graph 1 (Appendix), we observe a notable rise in the proportion of firms engaged in lobbying activities, increasing from 73% in 2018 to 81% in 2022. This pattern aligns with the overarching narrative indicating a growing emphasis among US firms to increase their influence on regulatory capture. Average lobbying expenditure portrays a consistent year-on-year increase, barring a sudden dip in 2020. This anomaly could be attributed to the initial disruptive effects of the pandemic on lobbying efforts. Observing each industry's share in the total lobbying expenditure per year (Graph [2] Appendix), it is evident that Capital Goods, Health Care Equipment and Services, and Pharmaceuticals consistently stand out as the top contributors to the overall lobbying expenditure across all years.

4. Empirical Strategy

We study three standard profitability measures as our dependent variable–Profit after Taxes, Earnings before Interest and Taxes, and Operating Cash Flow. With Profit after Taxes indicating the bottom line and being the most comprehensive measure of profitability, we focus on this measure across all our specifications. Our independent variable is a key measure of political capital– lobbying expenditure. Our main controls include measure of capital (debt and equity employed in the business), labour (number of employees), and length of the operating

[13] Return on Assets (ROA) = Net Income/Total Assets

period of the business (age). We believe incorporating firm age is a proxy for measuring multiple intangible yet important advantages established businesses enjoy. Examples of such advantages could be an established brand name or a better understanding of market dynamics and industry-specific regulations.

Recognising the impact of firm size on financial variables, we scale our financial metrics[14] by each firm's total assets. This normalisation process allows us to compare firms of varying sizes, ensuring a fair assessment of their capability to generate profits relative to their asset base. To address the skewed distribution observed in the employee count of firms, we opt to log-transform this variable.

To test our research hypothesis of whether lobbying expenditure has a significant effect on the profits of an enterprise, we estimate the following equation:

$$Profitability\ Measure_{it} = \beta_0 + \beta_1 Lobbying_{it} + \beta_2 TotalDebt_{it} + \beta_3 TotalEquity_{it}$$
$$+\beta_4 \log(EmployeeCount_{it}) + \beta_5 Age_{it} + \beta_6 Age_{it}^2 + \gamma + \epsilon_{it} \quad (1)$$

We regress our scaled dependent variable, net income, on our scaled independent variable of interest, lobbying expenditure, and other controls for firm *i* in year *t*. We include year-fixed effects (γ) to account for common but unobserved time-specific factors in a given year.

Recognizing that OLS might produce biased estimates due to concerns of omitted variable biases and reverse causality, we instrument for the lobbying expenditure of a firm using the industry-based calculation of lobbying expenditure-to-total assets ratio for the current and past year:

[14] These metrics include: Lobbying, PAC, Net Income, Earnings before Interest and Taxes, Operating Cash Flow, Total Debt and Total Equity

$$Lobbying_{it} = \beta_0 + \beta_1 IndustryAverage_{it} + \beta_2 TotalDebt_{it} + \beta_3 TotalEquity_{it} + \beta_4 \log(EmployeeCount_{it}) + \beta_5 (Age_{it}) + \beta_6 Age_{it}^2 + \gamma + \epsilon_{it} \quad (2)$$

$$ProfitabilityMeasure_{it} = \beta_0 + \beta_1 Lobbying_{it} + \beta_2 TotalDebt_{it} + \beta_3 TotalEquity_{it} + \beta_4 \log(EmployeeCount_{it}) + \beta_5 Age_{it} + \beta_6 Age_{it}^2 + \gamma + \epsilon_{it} \quad (3)$$

The instrumental variable, the industry lobbying expenditure-to-total assets ratio, is calculated by aggregating the lobbying expenses of all companies within the industry (excluding the specific firm under consideration) in the current and previous years, factoring in their respective total assets during the same period. This approach helps mitigate any fluctuations or irregularities in lobbying activities within a single year. Additionally, as evidenced by Drutman (2015), lagged lobbying is by far the best predictor of current-year lobbying.[15] How much other firms in the industry lobby in the current and past year should be directly correlated to a firm's lobbying expenditures. Moreover, the shared interests among firms in an industry often align with specific policy outcomes. The industry-level lobbying-to-assets ratio reflects these common interests, focusing on matters that are crucial for the industry as a whole. Consequently, any effect on individual firm profitability due to industry-level lobbying is likely channelled through the firms' own lobbying efforts rather than through a direct impact of the industry's lobbying efforts.[16]

[15] Drutman, Lee. *The Business of America is Lobbying*. Oxford University Press, 2015.

[16] Two common counterarguments to the validity of the exclusion restriction are the concepts of free-riding and a zero-sum game. Firstly, the issue of free riding within an industry suggests that even firms not directly engaging in lobbying activities may still benefit from positive spillover effects generated by other lobbying firms within the same industry. For instance, if one firm successfully lobbies for a tax benefit regime that benefits the entire industry, even non-lobbying firms may experience increased profits. Secondly, the concept of a zero-sum game posits that certain lobbying outcomes may result in losses for some firms within the industry while benefiting others. For example, if one firm successfully lobbies for a valuable import license, it may come at the expense of other firms who are denied access. The net impact of these opposing effects depends on various factors including the specific industries, the issues being lobbied for, and the success rates of the lobbying efforts. Given the lack of data on these factors, we assume a neutral effect, suggesting that industry-level lobbying would have no impact on firm profits, other than the channel of the firm's own lobbying.

A challenge in this specification is the lack of open-source financial data for firms in 2018. As we could not scale the instrumental variable based on total assets for the combined lobbying sum from 2018 and 2019, we ended up excluding one year's worth of data. Consequently, our model only incorporates observations from the years 2020 to 2022. We choose to go ahead with this because the IV generates plausibly causal estimates of the impact of lobbying on firm performance.

Though this study doesn't delve into the specific issues lobbied, we contemplate the potential presence of non-linear effects on profits as lobbying expenditure becomes larger. To explore such non-linearities we conduct a heterogeneity test for different quartiles of lobbying expenditure.

Due to the substantial influence wielded by lobbying efforts in shaping pivotal legislation during the pandemic, it is imperative to study the impact of lobbying for sectors that actively participated in these efforts. The pivotal role of 'Big Tech' and the pharmaceutical drug companies draws our attention to the technology and healthcare sector.[17] To study the impact of lobbying on profits in these particular sectors, we take a subsample of data for firms belonging to these particular industries and run a multivariate OLS regression for the same.

One source of concern in our study stems from the potential underreporting of lobbying expenditures by corporations in their disclosure filings. Draca, Fons-Rosen, and Rocco (2020) have highlighted limitations within the Lobbying Disclosure Act, contributing to the emergence of what they term 'shadow lobbyists.' These shadow lobbyists can potentially

[17] The technology sector includes the 'Technology Hardware & Equipment' and 'Software & Services' whereas the healthcare sector includes 'Health Care Equipment & Services' and 'Pharmaceuticals, Biotechnology & Life Sciences'

represent a substantial portion of 'regulatory capture' activities that remain unaccounted for in the reported figures, distorting the true extent of corporate lobbying efforts.

5. Results

Table 3: Impact of Lobbying Expenditure on Firm Profits - OLS

	(1) Net Income	(2) Net Income	(3) Net Income	(4) Net Income
Lobbying Expenditure	125.366***	138.092***	140.097***	108.792***
	(25.592)	(26.158)	(25.429)	(26.668)
Total Debt		0.044***	0.045***	0.025**
		(0.010)	(0.010)	(0.011)
Total Equity		0.043***	0.041***	0.022**
		(0.010)	(0.010)	(0.010)
Employee Count			-0.000	-0.001
			(0.001)	(0.001)
Age				0.000**
				(0.000)
Age^2				-0.000***
				(0.000)
_cons	0.061***	0.032***	0.033**	0.058***
	(0.002)	(0.006)	(0.016)	(0.017)
N	1840	1825	1805	1690

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Included: Year Fixed-effects
Lobbying, Net Income, Total Debt and Total Equity are scaled by Total Assets.
Employee Count is logged.

The results from the OLS estimate of equation (1) showing the impact of lobbying expenditure on firm profits (Column 1 Table [3]), indicate that lobbying per dollar total assets has a positive and significant impact on the return on assets. We add our controls sequentially to show how our estimates change (refer Columns 2-3, Table [3]). When controlling for measures of capital and labour, we see that our estimates remain statistically significant and increase in magnitude. When controlling for the age of the firm, we observe the magnitude of the coefficient of lobbying decrease but stay significant (refer to Column 4, Table [3]). A one percentage point

increase in lobbying expenditure per dollar total assets corresponds to a 1.08 percentage point increase in Return on Assets. We also note that the age of a firm has a non-linear relationship with its profits, consistent with economic theory that suggests that firms experience different stages of growth and efficiency, and after a certain point, the benefits of ageing or maturity taper off.

Table 4: Impact of Lobbying Expenditure on Firm Profits - 2SLS

	(1) Net Income	(2) EBIT	(3) OCF
$\widehat{Lobbying}$	789.985***	839.745***	737.204***
	(196.519)	(227.366)	(192.466)
Total Debt	-0.009	-0.001	0.035
	(0.025)	(0.032)	(0.024)
Total Equity	0.031	-0.005	0.041*
	(0.024)	(0.031)	(0.023)
Employee Count	-0.003	-0.004	-0.000
	(0.003)	(0.003)	(0.003)
Age	0.000*	0.000	0.000
	(0.000)	(0.000)	(0.000)
Age^2	-0.000**	-0.000*	-0.000
	(0.000)	(0.000)	(0.000)
_cons	0.044	0.083*	0.051
	(0.034)	(0.044)	(0.035)
N	1250	1170	1241

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Included: Year Fixed-effects, Clustering at the firm-level
Net Income, EBIT, OCF, Total Debt and Total Equity are scaled by Total Assets.
Employee Count is logged.

When instrumenting for the industry lobbying expenditure-to-total assets ratio[18], we find that lobbying expenditure per unit of assets is positive and statistically significant, consistent across all three profitability measures, relative to total assets (refer Table [4]).

[18] The first stage regression is presented in the appendix, titled Table [5]

Specifically, we see that for a one-percentage-point increase in lobbying per dollar of total assets, Return on Assets increases by approximately 7.90 percentage points, *ceteris paribus*.

One question that might arise concerning our results is the size of the coefficient. However, on closer examination, we find that our results are consistent with the existing literature, both in terms of size and direction. For example, Chen, Parsley, and Yang (2010) find that for a one-dollar increase in lobbying, net income increases by approximately 74 dollars. Similarly, in the European Union, Chalmers and Macedo (2020) find that "an increase in lobbying expenditure in proportion to a firm's total assets by one (either over time within a firm or across firms within the same period) increases their ROA by 0.052." Alternatively, a one-percentage-point increase in lobbying per dollar of total assets increases Return on Assets by 5.2 percentage points.

Table 7: Testing for a Non-Linear Relationship between Lobbying and Firm Profits

	(1) Net Income	(2) Net Income	(3) Net Income
	25-50th percentile	50-75th percentile	> 75th percentile
$\widehat{Lobbying}$	456.102	702.916*	1198.225*
	(1304.463)	(404.829)	(656.571)
Total Debt	-0.022	-0.068***	-0.051
	(0.036)	(0.026)	(0.050)
Total Equity	0.147***	0.102***	-0.057
	(0.031)	(0.022)	(0.048)
Employee Count	0.003	0.004*	-0.018**
	(0.003)	(0.002)	(0.007)
Age	0.000	0.000	0.001***
	(0.000)	(0.000)	(0.000)
Age^2	-0.000	-0.000	-0.000**
	(0.000)	(0.000)	(0.000)
_cons	-0.036	-0.026	0.160
	(0.056)	(0.031)	(0.097)
N	197	689	355

Standard errors in parentheses
* p < 0.10, ** p < 0.05, *** p < 0.010
Included: Year Fixed-effects, Clustering at the firm-level
Net Income, Total Debt and Total Equity are scaled by Total Assets. Employee Count is logged.

The heterogeneity analysis regression splits the lobbying expenditure into quartiles to test for non-linear impacts of lobbying on profit (refer Table [7]). We observe that the coefficient of lobbying per dollar total assets increases in magnitude as we move from the 25th-50th percentile to the 50th-75th percentile, and further to firms above the 75th percentile of the lobbying expenditure distribution. All coefficients are statistically significant at the ten percent significance level. This indicates a convex relationship between lobbying and profits, highlighting increasing returns to net income as lobbying expenditure increases.

Table 8: Healthcare

	(1) Net Income
Lobbying Expenditure	-277.117* (157.326)
Total Debt	-0.016 (0.088)
Total Equity	-0.021 (0.080)
Employee Count	-0.027*** (0.008)
Age	0.000 (0.001)
Age^2	-0.000 (0.000)
_cons	0.381*** (0.116)
N	214

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Included: Year Fixed-effects, Clustering at the firm-level
Lobbying, Net Income, Total Debt and Total Equity are scaled by Total Assets.
Employee Count is logged.

Table 9: Technology

	(1) Net Income
Lobbying Expenditure	306.032* (163.773)
Total Debt	-0.037 (0.064)
Total Equity	-0.082** (0.038)
Employee Count	-0.006 (0.007)
Age	0.000 (0.001)
Age^2	-0.000 (0.000)
_cons	0.194** (0.076)
N	148

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Included: Year Fixed-effects, Clustering at the firm-level
Lobbying, Net Income, Total Debt and Total Equity are scaled by Total Assets.
Employee Count is logged.

Narrowing our attention to the technology and healthcare sector, we find that the impact of lobbying expenditure, relative to total assets, is positive on Return on Assets for the Technology sector (refer Table [9]). This result suggests that the increased lobbying expenditure by the technology sector, consistent with anecdotal evidence, has indeed positively affected a firm's financial performance. In contrast, this relation is negative for the Healthcare

sector, indicating that a one-percentage-point increase in lobbying expenditure per dollar of total assets relates to a decrease in the Return on Assets (refer Table [8]). Although no previous studies analyse the relationship between lobbying and the financial performance of firms in the healthcare sector, our finding is consistent with Cojan (2015), who observes a negative correlation between corporate political activity and the financial performance of pharmaceutical companies. The different effects of lobbying on firm financial performance in the healthcare and technology sectors highlight industry-specific nuances in the effect of political investments during the pandemic years, which warrants further discussion in Section 6.

6. Discussion

Our findings suggest that investing resources in lobbying activities positively influences a firm's profitability. Additionally, firms enjoy increasing returns in financial performance from larger expenditures on lobbying. Given that our observations are rooted in a study of the pandemic years, we posit that the mechanisms through which lobbying affects firm financial performance remain consistent during a crisis and likely have similar effects. This aligns with anecdotal evidence such as the intent behind increased lobbying for the CARES Act, as outlined previously.

The observed positive relationship between lobbying and profits might predominantly stem from a strategic resource allocation decision. Firms weigh the potential bottom-line advantages derived from investing in lobbying, factoring in associated costs and risks. We hypothesise that this evaluation most likely positions lobbying as a superior investment when compared to alternatives like research and development or better employee compensation. Furthermore, firms operating within highly regulated industries, particularly those whose

revenues are reliant on government contracts, are more inclined to consistently allocate firm resources towards lobbying activities.

Three likely reasons could explain the increasing returns to lobbying in terms of net income as lobbying expenditure escalates. First, it could be the case that firms that spend more on lobbying also have increased access to political connections, information, and networks. Intense involvement in lobbying expenditure may grant firms access to insider information and influential networks, both of which reward the firm with an information advantage that could positively impact their financial performance. Second, it could be the case that firms that spend more on lobbying have more complex public policy needs. This would mean that they get involved in lobbying issues that have higher stakes in terms of returns, warranting the increased lobbying efforts. The success of these lobbying efforts would in turn have a higher positive influence on financial performance. Third, it could simply be that lobbying more is better than lobbying less. Perhaps engaging in the modern policy-making process requires consistent and sustained lobbying efforts as firms have to pay the increasingly high price of entry necessary for effective participation.[19]

In the technology sector, the observed positive relationship between lobbying expenditure and the Return on Assets aligns with the findings from the broader dataset. When considering the pandemic's impact, the turbulent political and economic landscape during the outbreak provided an opportunity for technology firms to pursue their longstanding objectives. Consequently, many strategic goals that had been pending or sought by these firms might have been attained during this period. Therefore, the positive returns on lobbying investments could

[19] Drutman, Lee. *The Business of America is Lobbying*. Oxford University Press, 2015.

be explained by firms capitalising on the pandemic-induced circumstances to advance their agendas successfully.

Understanding the observed negative relationship between lobbying expenditure and Return on Assets within the healthcare sector presents a challenge. We speculate that the lobbying efforts of these firms were primarily targeted at opposing policies that hinder their ability to profit from the R&D of novel vaccines, such as the proposed WTO waiver of intellectual property rights. However, during the pandemic, the regulatory landscape may have prioritised policies aimed at serving the public interest rather than solely benefiting healthcare firms. Therefore, despite their lobbying efforts, these firms might have been unsuccessful.

A crucial downside to the business of influence is not only hindering the passage of legislation but also complicating it with side deals favouring private interests. Consequently, there's an increased reliance on lobbyists who possess the expertise to comprehend and influence these intricate and often opaque policies. This reliance tends to favour larger corporations that have the financial means to hire corporate lobbyists, thereby placing them at the 'centre of the policymaking process'.[20] These firms often direct their lobbying efforts to rent-seeking outcomes, which may not align with the broader interests of society and the economy. Addressing this would require the creation of a political system where a wide range of societal interests are taken into account.

Given the financial power that these corporations hold, the government should provide public citizens with the necessary resources to have an equal footing with corporations if they wish to lobby against the latter's special interests. As suggested by Drutman (2015), the

[20] Drutman, Lee. *The Business of America is Lobbying*. Oxford University Press, 2015.

government can resolve this by establishing an Office of Public Lobbying, wherein involved public officials would guarantee adequate representation for citizen groups and labour unions, preventing their voices from being overshadowed by powerful corporate interests.[21] The viability of such a solution warrants the need for further research.

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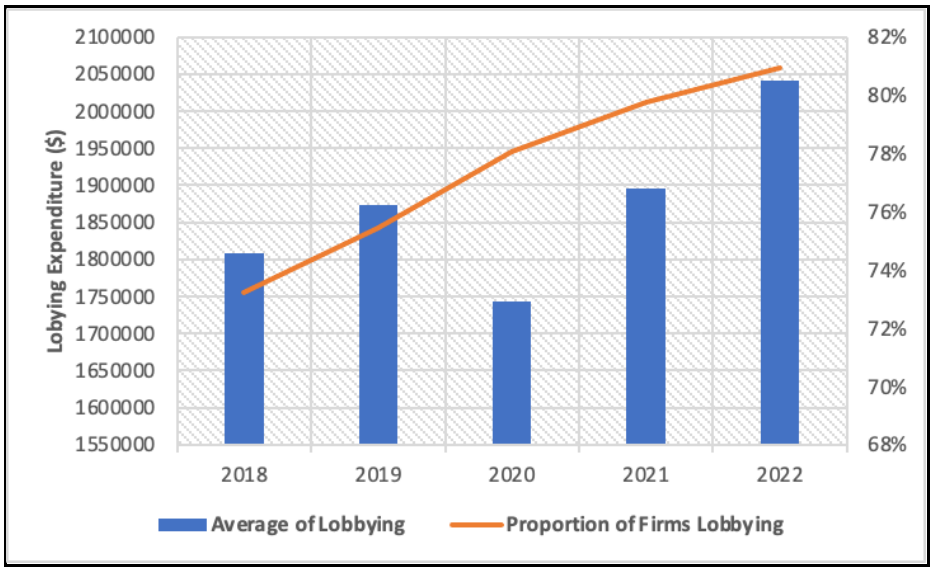
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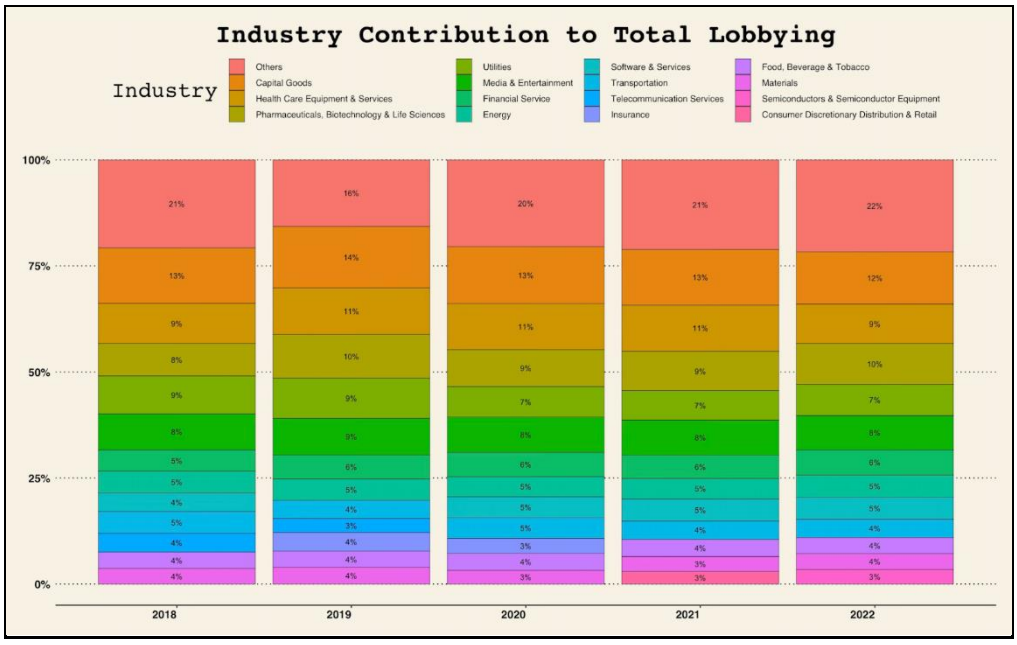
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Appendix



Graph 1: Average Lobbying Expenditures and Proportion of Firms Lobbying by Year



Graph 2: Industry Contribution to Total Lobbying

Table 1: Summary Statistics of Firm Characteristics, 2022

	Age	Total Assets	Net Income	Employee Count
Mean	75.3	8.52e+10	3.26e+09	58262
Min.	5	1.44e+09	-1.67e+10	23
Max.	238	3.67e+12	9.98e+10	2300000
Median	60	2.63e+10	1.32e+09	21000

Table 2: Lobbying Expenditure by Industry [Across Years]

	Mean	N	Min	Max	Median
Automobiles & Components	2449841	30	0	1.13e+07	455000
Banks	1563288	75	0	5290000	1070000
Capital Goods	2579905	223	0	1.54e+07	510000
Commercial & Professional Services	514467.2	60	0	2830000	310000
Consumer Discretionary Distribution & Retail	1813348	66	0	2.14e+07	170500
Consumer Durables & Apparel	579842.8	55	0	8370000	120000
Consumer Services	852980.9	88	0	2420000	790000
Consumer Staples Distribution & Retail	1557031	32	0	7000000	335000
Energy	2076061	105	0	1.12e+07	510000
REITs	321853.8	130	0	2890000	0
Financial Service	1474021	165	0	8370000	1250000
Food, Beverage & Tobacco	1721736	99	0	1.25e+07	640000
Health Care Equipment & Services	2446966	182	0	2.70e+07	1077500
Household & Personal Products	651992.2	27	0	3284028	190000
Insurance	1338663	110	0	6790000	850000
Materials	1139403	138	0	1.16e+07	735000
Media & Entertainment	4532023	80	0	2.19e+07	1071500
Pharmaceuticals, Biotechnology & Life Sciences	3276987	121	0	1.27e+07	1470000
Real Estate Management & Development	0	10	0	0	0
Semiconductors & Semiconductor Equipment	1273451	91	0	9300000	290000
Software & Services	1792191	105	0	1.21e+07	640000
Technology Hardware & Equipment	981200.2	98	0	9360000	260000
Telecommunication Services	8938883	15	0	1.85e+07	1.15e+07
Transportation	2878781	69	0	1.02e+07	1880000
Utilities	2304309	149	0	1.23e+07	1630000

Table 5: First Stage Regression - 2SLS

	(1) Lobbying Expenditure
Industry Average Lobbying	0.864*** (0.196)
Total Debt	0.000 (0.000)
Total Equity	-0.000** (0.000)
Employee Count	-0.000 (0.000)
Age	-0.000 (0.000)
Age^2	0.000 (0.000)
_cons	0.000* (0.000)
N	1250

Standard errors in parentheses
* p<0.10, ** p<0.05, *** p<0.010
Included: Year Fixed-effects, Clustering at the firm-level
Lobbying, Industry Averages, Total Debt and Total Equity are scaled by Total Assets.
Employee Count is logged.

Corporate Social Responsibility and Performance of a Firm: Evidence from the Manufacturing Sector of India

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Abstract

There has been an increase in awareness about Corporate Social Responsibility (CSR) and Sustainable Development around the globe. CSR refers to a company's commitment to operate ethically and responsibly, considering its social, economic, and environmental impacts. CSR has gained considerable importance for key business stakeholders, and this has led to a remarkable shift in how businesses are run. From the sole perspective of financial growth, firms must now consider their impact on and contribution to society, including sustainable practices and giving back to communities. Therefore, understanding the relationship between CSR and the performance of the firm is becoming more and more important. With a sample of 6047 firms, both public and private, we would see the impact of CSR on the financial performance of firms belonging to the manufacturing sector of India. The lagged regression analysis reveals a significant negative relationship between the given year's CSR expenditure and the financial performance of a firm.

JEL Classifications: M14, L25, Q56, G30

Keywords: Corporate Social Responsibility, Manufacturing, Financial Economics, Sustainability, Development

1. Introduction

1.1 Corporate Social Responsibility (CSR): An Overview

Corporate Social Responsibility (CSR) is now being seen as an integral part of corporate strategy. Every company is striving to ensure that they portray themselves as socially responsible while being economically profitable. CSR entails the integration of social concerns within a company's business operations thereby ensuring that their responsibility to society is not lost in their pursuit of profitability. However, does it make

any difference whether the firm is engaging in CSR activities or not? Existing literature has attempted to explore the influence of CSR on various variables, including firm-specific variables like firm reputation, financial performance, stock market performance, etc. While this paper will mainly focus on CSR's effect on the financial performance of the company, understanding its effect on overall welfare is also crucial.

Over the last several decades, social investments have become a mainstream activity with firms investing ever more resources in public good provision, and many companies even reducing their negative externality below levels required by the law.[22] Why are firms diverting resources to something that is not economically beneficial to them? On a superficial level, it does not benefit them at all. CSR seems like an additional cost that translates to a competitive disadvantage[23] and lower profitability. But when you consider the new expectations of how firms should contribute more to social goals beyond shareholder wealth, it starts to make sense. CSR is seen as a symbol of trust, social capital, and responsibility which is crucial to firm managers.

According to the 2019 Aflac Survey on Corporate Social Responsibility,[24] 77% of consumers say they would be motivated to purchase a product if the company behind the product shows they are committed to making the world a better place. 41% of the younger generations of investors are putting in more effort into researching a company's role in improving society and the environment before deciding to invest as compared to GenX (27%) or boomers (16%).[25] Similar results are being shown by other surveys conducted by Markstein[26] and Futerra.[27] This suggests that firm managers must take note of a multitude

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[26] "CSR Survey Deck for Website." Markstein, 2019.
[27] Townsend, Solitaire. "Consumers Want You To Help Them Make a Difference." Forbes, 21 Nov. 2018.

of social affairs in order to maximize long-term financial results. These developments have pressured firms to put in serious efforts into a wide range of CSR activities. With almost 90% of the top 250 companies regularly investing and engaging in discussions on sustainability[28] and approximately 10% of S&P companies reporting in detail on their CSR activities,[29] it is being taken seriously. Even if consumer preference for socially responsible companies leads to increased sales, this does not guarantee improved overall financial performance for the firm.

It isn't only consumers, but investors, too who are expecting firms to be more socially responsible. The changing view can be confirmed by the fact that there are over 3,300 ESG (Environmental, Social, and Corporate Governance) funds globally and the number has tripled over the last decade. The value of these assets is over $40.5 trillion.[30] Simply put, modern investors are re-evaluating traditional approaches, and beginning to consider the impact their investment has on the planet. People expect the firms to include a broader set of responsibilities besides their main goal of profit maximization.

In essence, multiple stakeholders want firms to transition from a mindset of harm minimization to value creation.[31] This is because of the way companies are now integrated with our lives and our environment. Firms hold a much higher position of power and wealth which gives them certain control over us which could lead to disasters if they are not held accountable. Firms ought to consider the implication of their actions on all stakeholders - consumers, businesses, communities, government, etc while making

[28] "KPMG International Survey of Corporate Responsibility Reporting 2015." KPMG, 2015.
[29] Kotler, Philip, and Nancy R. Lee. "Corporate Social Responsibility: Doing the Most Good for Your Company and Your Cause." Wiley.com, 18 Jan. 2005, www.wiley.com/en-ie/Corporate+Social+Responsibility:+Doing+the+Most+Good+for+Your+Company+an d+Your+Cause-p-9780471476115.
[30] "Explained: What are ESG funds, and why are they becoming popular?" Indian Express, 2024.
[31] Luetkenhorst, Wilfried. (2004). Corporate Social Responsibility and the Development Agenda. Inter Economics, 39(3), 157-168. Intereconomics. 39. 157-166. 10.1007/BF02933583.

decisions even if it leads to a reduction in shareholders' wealth. In describing the evolving public view, Scherer and Palazzo (2008) note that Business firms are not just considered the solely self-interested entities responsible for financial scandals, environmental disasters, and social ills but also the solution to global regulation and public good problems.[32] A survey conducted by PwC indicates that CEOs plan to increase their engagement in CSR activities to restore stakeholder trust. This supplements the paper's view.

1.2 Impact of CSR

Having now established why and whether CSR should exist, it is important to understand how it influences the existing dynamics of businesses and their goal of profit maximization. While at first glance, it may seem that CSR is an additional cost that poses an additional burden on profits. However, we need to consider the beneficial impact of having a high CSR on a firm's social capital and its ability to influence outcomes.[33] While engaging in CSR is mandated by the Indian government at 2% of profit after tax, many companies go above and beyond that limit. In the USA, there is no hard law regarding CSR either, yet firms still invest in it since it is more of an unwritten rule resulting from consumer and investor expectations, along with internal norms. Innes and Sam (2008) also note that the main reason for investing in CSR is to foster better relationships with regulators. Secondly, as firms are now recognized as integral components of society, there

[32] Scherer, Andreas Georg, and Guido Palazzo. "Globalization and Corporate Social Responsibility." SSRN, 30 May 2007, papers.ssrn.com/sol3/papers.cfm?abstract_id=989565.
[33] Kitzmueller, Markus, and Jay Shimshack. 2012. "Economic Perspectives on Corporate Social Responsibility." Journal of Economic Literature, 50 (1): 51-84

is an expectation for them to contribute accordingly.[34] This puts additional pressure on the company.

In India, things are a bit more complicated. India is the first country to mandate CSR expenditure which takes away the free will of the firms and therefore, on some level, makes the results incoherent from the results obtained in the rest of the world. Section 135 of The Companies Act (2013) specified that companies having a net worth of rupees five hundred crores or more, or turnover of rupees one thousand crores or more or a net profit of rupees five crores or more during the immediately preceding financial year shall constitute a Corporate Social Responsibility Committee of the Board consisting of three or more directors, out of which at least one director shall be independent. This board shall indicate the amount of expenditure to be incurred, which is stipulated to be at least 2% of the average net profits before tax of the company made during the three immediately preceding financial years. The board would also be responsible for creating a CSR policy for the company and monitoring its activities.[35]

2. Literature Review

2.1 Lack of Consensus in CSR's Effect on Firm Performance

Even after extensive research showing that consumers and investors prefer a firm that engages in CSR and makes social investments, there is a lack of consensus regarding the relationship between a firm's initiatives and its financial performance. Some

[34] Innes, Robert, and Abdoul G. Sam. 2008. "Voluntary Pollution Reductions and the Enforcement of Environmental Law: An Empirical Study of the 33/50 Program." Journal of Law and Economics 51 (2): 271–96
[35] "Corporate Social Responsibility Under Section 135 of Companies Act 2013." ClearTax, 2023.

researchers report a positive relationship[36,37], while others report a negative linkage between performance and CSR activities.[38,39,40] Some even argue that there is no relationship whatsoever between the two.[41, 42] While it is undeniable that some firms have generated a positive market return and a huge boost in brand equity due to their investments in CSR and other social investment initiatives, there is always the issue of negative financial returns resulting largely from the added cost of making and continuing CSR investments. The lack of consensus can be due to varied CSR policies across countries; e.g. in the US, it is up to the firms whereas, in India, it is mandatory. Secondly, there is a lack of systematic measurement of CSR across the globe.

2.2 Negative Association

Pan et. al (2014) and Garg and Gupta (2020) found a negative association between CSR and financial performance. Pan did a pooled least square regression analysis using 228 Chinese mineral-listed firms from 2010 to 2013. The company took data starting in 2010 because that's when CSR reports were made mandatory by the Chinese administration. The

[36]Choi, Jong-Seo & Kwak, Young-Min & Choe, Chongwoo. (2010). Corporate Social Responsibility and Corporate Financial Performance: Evidence from Korea. Australian Journal of Management. 35. 10.1177/0312896210384681.

[37] Heinz, D.C. "Financial Correlates of a Social Measure." Akron Business and Economic Review, 7.1 (1976): 48-51.

[38] Pan, Xiping & Sha, Jinghua & Zhang, Hongliang & Ke, Wenlan. (2014). Relationship between Corporate Social Responsibility and Financial Performance in the Mineral Industry: Evidence from Chinese Mineral Firms. Sustainability. 6. 4077-4101. 10.3390/su6074077.

[39] Garg, A. and Gupta, P.K. (2020), "Mandatory CSR expenditure and firm performance: Evidence from India", South Asian Journal of Business Studies, Vol. 9 No. 2, pp. 235-249. https://doi.org/10.1108/SAJBS-06-2019-0114

[40] Lopez, M., Garcia, A., & Rodriguez, L. Sustainable development and corporate performance: A study based on the Dow Jones Sustainability Index. Journal of Business Ethics, 75 (2007), 285-300.

[41] Nigro, Claudio & Iannuzzi, Enrica & Cortese, Flora & Petracca, Miriam. (2015). The relationship between corporate social responsibility and financial performance. An empirical analysis on a sample of Italian listed firms. 10.13140/RG.2.1.2085.9364.

[42] Aupperle,, K.E., Carroll, A.B., and Hatfield, J.D. "An empirical examination of the relationship between corporate social responsibility and profitability." Academy of Management Journal 28 (1985): 458.

authors used the dataset that divided CSR into five sub-levels: shareholders' responsibility, employee responsibility, supplier, customer and consumer rights responsibility, environmental responsibility, and social responsibility. Each of the sub-categories has multiple measurements. For financial performance, the paper used multiple metrics like earnings per share, Return on Assets, Return on Equity, the main operation's growth rate, and net assets' expansion rate. CSR shows an insignificant positive impact on all performance metrics. As for the CSR elements, the results found significant positive effects of shareholder responsibility (profits, debt, credit, and innovation) on most financial performance indicators. Such results are not surprising since they are the same thing. Interestingly, other CSR sub-categories do not have a significant positive effect. Betterment of community, employees, environment, and public would not lead to better performance. A possible reason for this could be that the betterment of the community and the environment requires a lot of money which would decrease their net profits.

Garg and Gupta (2020) investigated the CSR-CFP relationship using a one-way ANOVA regression of 388 firms. It uses the same dataset as we are using. Therefore, the metric for quantifying CSR is the same. For financial performance, the paper chooses to use enterprise value and stock returns. The authors never described the dataset and the kind of firms the data has except for them being privately held or public which serves as a limitation. The paper found a negative relationship between both market performance (stock returns) and financial performance (Enterprise Value). A limitation of this paper is the lack of a larger dataset. The authors averaged the CSR expenditure of companies from FY16 to FY18 and did a one-way analysis. It might have shown more accurate results if the authors did a panel or linear regression using a bigger dataset. Secondly, I am assuming that the authors have used all the companies in the dataset which does not show any industry-specific results which can help bring a change.

2.3 Positive Association

Researchers have found a positive correlation in Korea (Choi et. al, 2010). The authors here used an index to measure CSR which gives scores to companies based on soundness, fairness, contribution to society, consumer protection, environmental protection, employee satisfaction, and contribution to the economy. And for financial performance, the authors used ratios like RoA, RoE, etc. The authors employed Carhardt's four-factor model[43] to control for other variables that are known to be important determinants of financial performance. They found a positive and significant association here. While looking at the dataset they used, It was observed that the dataset consists of only large firms which have a superior position in terms of performance and CSR but the authors can't be faulted here since it is the only CSR measure available in Korea. In this paper, firms of varying sizes are considered, and we will make comparisons between firms with respect to size to find any possible difference in results.

Why would a firm with higher CSR generate excess returns? The literature has verified that firms with higher CSR spending have higher social capital. Therefore, it may be inferred that consumers are more likely to buy their products and the firm is more likely to treat their employees better which could increase their productivity. This discussion is of importance to us when we try to understand the relationship between financial performance and the firms' CSR spending.

2. 4 Null Association

Finally, Claudio et. al (2015) and Aupperle et. al (1985) found the relationship between CSR and financial performance to be insignificant, i.e., change in CSR does not

[43] "Carhart 4 Factor Model." Breaking Down Finance, 2024.

substantially affect the financial performance of a firm. With a small sample of 84 firms, Claudio and his colleagues measured CSR using self-assigned scores based on the disclosure of CSR activities mentioned in the company's annual and other official reports. For the Company's Financial Performance (CFP), the authors use Return on Assets (RoA), Return on Sales (RoS), and Return on Equity (RoE). The insignificant association between the authors' original measurement of CSR which involved disclosure of CSR activities and the firm's performance makes us wonder if CSR is just for show and whether it holds any strategic value.

Aupperle et. al (1985) also had an original measure of CSR. They sent out a survey to 818 CEOs which contained questions about different ways to measure CSR. The four sets analysed a distinct area of CSR—economic, legal, ethical, and philanthropic—and their content validity and reliability were confirmed via empirical tests. The 241 CEOs that responded to this survey assigned up to 10 points to each item, with a 10 indicating that the item appropriately measured CSR. Here, the authors did not find a statistically significant relationship measured using short-term (one-year) and long-term (five-year) RoA.

Since CSR does not have a clear standard of measurement yet, my goal in the literature review was to show different techniques applied in a variety of countries. This would give varying results but would help us have a better understanding of the relationship between CSR and CFP.

Most of the studies that found a positive relationship between CSR and firm performance in India were conducted when CSR was not mandatory in India. The ones that did post the law found that smaller firms decreased their spending on CSR activities and the larger firms increased their spending (Mukherjee and Bird, 2016). Nair and Bhattacharyya (2019) found an insignificant relationship after the implementation of

mandatory CSR law. The present study aims to delve deeper on the sector-wise relationship between CSR expenditure and firm performance.

3. Data

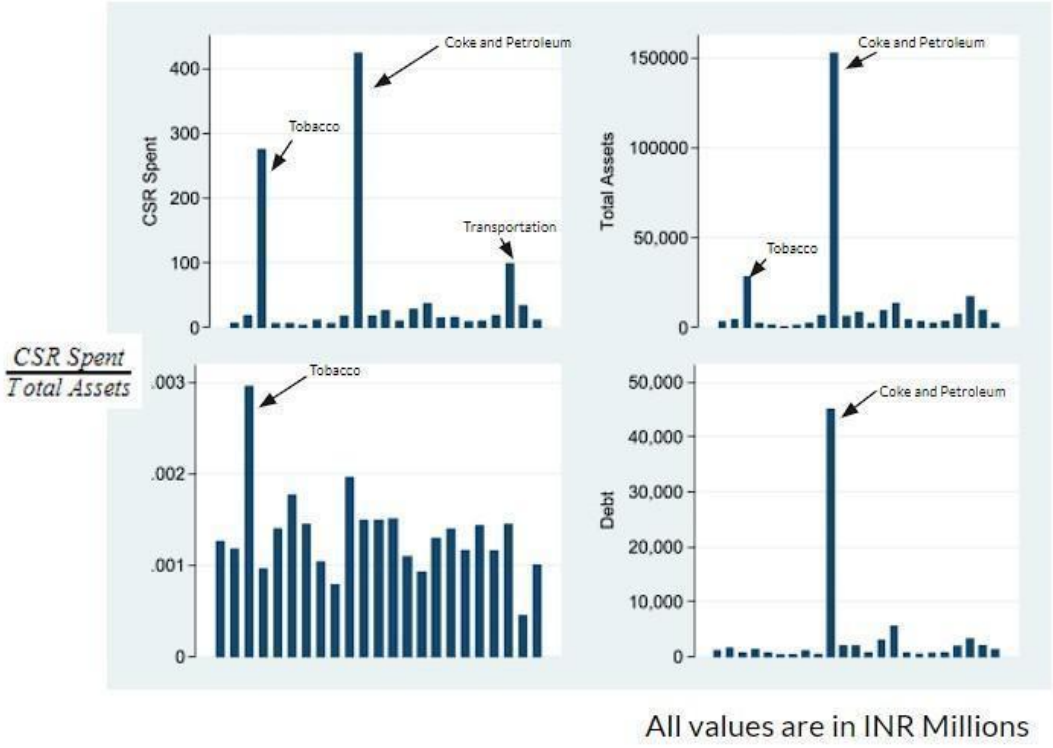
The data has been collected from the Centre for Monitoring Indian Economy (CMIE) ProwessIQ database. The database is a highly comprehensive database containing the financial data of companies in India. The database is built from the audited Annual Reports of companies and information submitted to the Ministry of Company Affairs; and in the case of listed companies, the database also includes company filings with stock exchanges and prices of securities listed on the major stock exchanges. The financial years chosen for analysis in this paper are 2024-19 since the law (Section 135 of The Companies Act (2013)) was introduced in October 2013. The FY2020 had the effect of COVID-19 in its last quarter plus FY20 data wasn't available for more than 50% of the firms in our dataset, hence the year was not included in our analysis.

The total sample is composed of 6047 firms**.** We have 3700 public and 2342 private firms and some foreign entities, partnerships, and associations. The firms here are from the manufacturing sector. The firms are further subcategorized into 23 different kinds of manufacturing subsectors including but not limited to footwear, metals, furniture, food, etc. Our data includes all kinds of companies manufacturing tangible goods.

The manufacturing industry was chosen because it is the easiest to comprehend from a financial and operating point of view. A firm in this sector utilizes whatever machinery is needed to create a product that is sold to other businesses or directly to consumers.

Wherever necessary, the data is winsorized and adjusted for inflation. With these groups, the impact of CSR on the firm's financial performance is investigated.

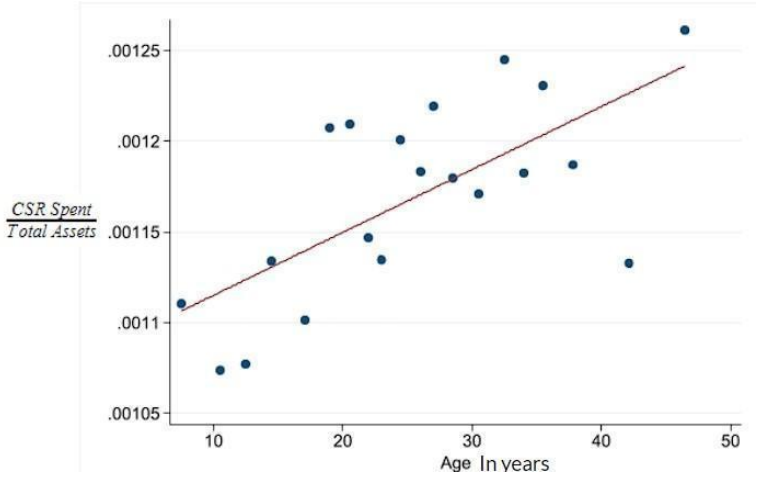
Figure 1: Descriptive Statistics by Sub-Industries



The top left graph displays CSR expenditure per sub-industry. Statistical analysis suggests that firms, on average, allocated between 50-60 million INR for Corporate Social Responsibility (CSR) initiatives. We see the abnormalities in the tobacco, coke, and petroleum products and manufacturers of transportation like two and four-wheelers, ships, railways, etc. Now, it is true that a much larger firm would spend much more on CSR than other firms and some industries are much bigger in terms of sales, assets, and therefore in terms of CSR spent than others. To control for that, look at the bottom left graph. Here, we have divided the CSR spent by total assets and compared by sub-industries. Here too we are getting a much higher expenditure in tobacco at least and almost average one in the coke and petroleum industry and transportation manufacturing industry. To have another look at the size of the firm, we have graphs showing total assets above and debt below on the right side of the slide. Here the overshoot is in the coke and petroleum industry only.

Now, an important thing to consider is why these industries are spending so much on CSR - namely, the tobacco, coke, and petroleum industries and transport manufacturing industries. Tobacco has a significant impact on the health of the people and the coke and petroleum industry, and transport industry have a huge impact on the environment. Looking at the annual reports of the companies in these industries, there is no clear-cut indication that these companies are using their CSR expenditure specifically in areas counteracting their negative impact on society. However, Coke and petroleum-producing firms do spend heavily on the environment and health since these industries are often heavily scrutinized due to their impact on the environment.[44]

Table 1: Controlled CSR expenditure by the firm Vs. Age of the Firm



The graph indicates a generally positive correlation between firm age and CSR spending, as older firms tend to allocate more resources to CSR initiatives. However, significant outliers are observed, particularly among firms aged 20 to 40. This variability suggests that both newer and older firms invest in CSR, but factors such as industry-specific variables, differing firm priorities, and other considerations contribute to the

[44] Spence, David B. "Corporate Social Responsibility in the Oil and Gas Industry: The Importance of Reputational Risk." IIT Chicago-Kent College of Law, 2010, scholarship.kentlaw.iit.edu/cklawreview/vol86/iss1/4.

observed diversity in spending patterns. Further research into these areas could provide valuable insights into CSR investment trends across different firms.

Table 2: Summary Statistics

Variable	Mean	Std. Dev.	N
Sales	3440.984	5434.983	33622
Total Assets	3064.25	5304.309	36116
Net Profit Return on Capital Employed	3.17	10.563	34975
Debt to Equity Ratio	1.26	1.516	32233
Total Liabilities	2237.712	3855.7	36282
CSR Spent	6.679	100.942	36282
CSR Expected Exp	25.952	177.937	9833

All the values are minorized here. The high standard deviation is due to the vast dataset we have.

3.1 Measures of CSR and CFP

CSR serves as the independent variable here. Since there is no consistent definition of CSR and how to evaluate it, scholars use different methods to assess CSR performance. Several studies use surveys to measure CEO or manager perceptions of their company's CSR performance. Some papers tried to measure the reduction in their greenhouse emissions and employee and locals' happiness with the firm as a measure of CSR. Furthermore, scholars have also established their evaluation systems. For our paper, we will be using the CSR expenditure by firms according to the definition set by the Indian government.

In CMIE’s dataset, around 90% of the firms do not spend on CSR. The dependent variable - Return on Capital Employed - will be our representative of CFP. For the manufacturing sector specifically, RoCE is a very important metric since unlike IT or the financial sector, this sector is very dependent on the capital employed to generate revenue

and their net income. By dividing net income by capital employed by a firm, we can gauge how successfully the firm is utilizing its capital to develop a profit for the company.

4. Empirical Strategy

$$RoCE_{it} = \beta 0 + \beta 1 \frac{CSR}{Total\ Assets_{it}} + \beta 1 \frac{CSR}{Total\ Assets_{i(t-1)}} + \beta 1 \frac{CSR}{Total\ Assets_{i(t-2)}} + \sum_{\boldsymbol{n}} \boldsymbol{\beta}\ trend * X_{it} + \delta_i + \mu_{jt} \nu_k + \epsilon_{ijkt}$$

We would be flexibly controlling for firm and time-fixed effects affecting the firm's performance. Here *i* represents the firm, *j* represents the industry, *t* indicates the time, δ represents the firm's fixed effects, and μ represents industry-time fixed effects, and ν represents the firm's age fixed effects. We are also representing industry-time fixed effects, ν_k represents the firm's age-fixed effects.

For the dependent variable - CSR, we are dividing it by total assets to control for firm size. This paper also focuses on previous year's CSR expenditure by a lag of 1 and 2 years since CSR expenditure can't show its influence on the financial performance of the firm in the same year. We are still incorporating it in our regression model to check for robustness. For our other controls, we want to control for size and risk of a firm so we will be using sales, total liabilities, and debt to equity ratio of the firm. We would be considering the average of these variables from the financial year 2011 to 2013 since the historical data would give an idea about the size and risk, and by doing so, we can avoid the risk of controls affecting our independent variables. We created a variable called trend assuming values 1 to 6 for year 2014 to 2019, respectively, for each firm. We interacted this trend variable with our controls to account for the time variation**.** Subsequent models would

incorporate having the age of the firm as fixed effects and having interaction variables for our controls.

We anticipate a positive correlation between performance and CSR investment, particularly given the intricate stakeholder landscape within the manufacturing sector. Stakeholders such as final-good businesses, regulators, and governmental bodies play pivotal roles, with expectations for ethical conduct and regulatory compliance. This multifaceted stakeholder environment underscores the necessity for manufacturing firms to build trust and credibility through CSR initiatives. The paper anticipates potential variations in results across sub-sectors, offering intriguing insights that could pave the way for further research in this area.

5. Results and Discussion

As stated in the Data section, my statistical analysis uses CSR data from 2014-2019 to form the independent variable (CFP) and main dependent variable (CSR/Total Assets). For controls, we are using averages of previous years, 2010-2013, of the mentioned variables. I also used lagged CSR data to assess how improved CSR is associated with CFP. We will test our hypothesis on whether CSR has a positive impact on CFP on firms belonging to the manufacturing sector, we begin with a small model first. Here, CFP was measured using profit after tax/capital employed.

$$RoCE_{it} = \beta_0 + \beta_{CSR\ Controlled_{it}} + \beta_{CSR\ Controlled_{i(t-1)}} + \beta_{CSR\ Controlled_{i(t-2)}} + \delta_i + \epsilon_{it}$$

For this model, firm fixed effects were also absorbed. Expanding on the above model, a sub-industry type variable was added that interacted with year-fixed effects. The

age of the firm was also controlled for. Furthermore, for our last and updated model, we have included the control variables which are an interaction variable between trend variables and controls.

Table 3: Main Model Regression Table

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)	(3)	(4)
VARIABLES	Firm FE	With Industry-Time FE	With Age FE	With Controls
CSR Spent Controlled	-61.1129	-133.8259**	-133.1562**	-72.8021**
	(40.6069)	(49.6460)	(51.3481)	(31.7739)
CSR Spent Controlled$_{(t-1)}$	17.9249	-43.2034	-43.3052	-143.2153*
	(40.3128)	(104.0622)	(104.1193)	(72.2917)
CSR Spent Controlled$_{(t-2)}$	-155.4237***	-277.9305	-269.1361	-241.8883
	(48.3911)	(168.9240)	(166.9244)	(150.4710)
Trend*Debt/Equity				0.0007
				(0.0023)
Trend*Sales				-0.0000
				(0.0000)
Trend*Liabilities				0.0000
				(0.0000)
Constant	3.5271***	3.9004***	-8.8747***	-9.1345***
	(0.0509)	(0.0802)	(2.9433)	(2.4555)
Observations	23,411	23,411	23,411	18,113
R-squared	0.7641	0.7692	0.7721	0.7754

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Upon conducting the initial regression analysis, the results appeared to contradict my hypothesis. I had anticipated that firms would primarily utilize CSR expenditures for their own benefit. However, as evidenced by the negative coefficients across the majority of the models, this does not appear to be the case. In the fourth column, we have -72 as coefficients which means that a 1 percentage point increase in CSR spent controlled leads to a decrease of 7 percentage points in return on capital employed. The result is significant at a 5% significance level.

With the result being negative, the argument that spending on CSR leads to an increase in social capital and higher profits for a firm does not hold. This increase in profit was hypothesized to be due to the heightened importance of CSR to buyers of the goods.

In response to this CSR demand, companies would try to become more socially responsible to improve their brand, and thus, customer relations. However, the results show a negative association. A possible reason for this could be that most of the firms in our data are in the metal, chemicals, pharmaceuticals, and textile industries. A significant amount of their customers would be B2B, i.e., their customers are other businesses and not consumers like us. Therefore, it is a possibility that their clients do not care about CSR as much as consumers do.

For the second argument, where the paper discussed how firms engage in CSR to counter the social and environmental pollution their factories do, we would need to see the results for firms specifically in environmentally and socially bad areas, like tobacco, petroleum, etc. We will do regression analysis for these specific industries.

Table 4: Regression Results from Splitting Data Based on Year of Incorporation and Firm Age

Splitting data by incorporation year of a firm

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)
VARIABLES	Pre 1991	Post 1991
CSR Spent Controlled	-97.7873*	15.2235
	(50.1878)	(92.5043)
CSR Spent Controlled$_{(t-1)}$	-129.0598	-123.1741
	(77.3826)	(116.7430)
CSR Spent Controlled$_{(t-2)}$	-168.0413	-506.3159***
	(126.0560)	(177.3108)
Trend*Debt/Equity	0.0350**	0.0003
	(0.0132)	(0.0020)
Trend*sales	-0.0000*	0.0000
	(0.0000)	(0.0000)
Trend*liabilities	0.0000	-0.0000
	(0.0000)	(0.0000)
Constant	-3.4002**	3.7186***
	(1.2663)	(0.8672)
Observations	8,936	9,763
R-squared	0.7880	0.7687

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Splitting data by age of the firm

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)
VARIABLES	Age $\leq$ *Median(Age)*	Age $\geq$ *Median(Age)*
CSR Spent Controlled	-49.3571	-105.7698**
	(82.1408)	(46.7913)
CSR Spent Controlled$_{(t-1)}$	-74.6567	-158.3251*
	(134.3448)	(78.7075)
CSR Spent Controlled$_{(t-2)}$	-408.9218*	-216.2615
	(221.0110)	(145.1929)
Trend*Debt/Equity	-0.0002	0.0032
	(0.0014)	(0.0054)
Trend*Sales	0.0000	-0.0000**
	(0.0000)	(0.0000)
Trend*Liabilities	-0.0000	0.0000**
	(0.0000)	(0.0000)
Constant	3.9896***	-2.1087**
	(0.7193)	(0.9086)
Observations	7,443	11,324
R-squared	0.7785	0.7914

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Here the data has been split by incorporation year, specifically, with an indicator for whether the company was incorporated before or after 1991 - which is the year India liberalized. We couldn't find much difference here either, the results are still negative. Here, companies that were incorporated before 1991 have a decrease of almost 10

Splitting data by Sales of a firm

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)
VARIABLES	Sales $\leq Median(Sales)$	Sales $\geq Median(Sales$
CSR Spent Controlled	-91.1464	-44.3203
	(74.1258)	(46.1100)
CSR Spent Controlled$_{(t-1)}$	-198.7483*	-87.7766
	(108.2056)	(70.9605)
CSR Spent Controlled$_{(t-2)}$	-410.5816*	-169.4489
	(229.6555)	(129.5023)
Trend*Debt/Equity	0.0015	0.0009
	(0.0030)	(0.0022)
Trend*Sales	-0.0001	-0.0000
	(0.0004)	(0.0000)
Trend*Liabilities	0.0000	0.0000
	(0.0000)	(0.0000)
Constant	-3.4735	8.3063**
	(2.8544)	(3.4253)
Observations	8,741	9,372
R-squared	0.7509	0.8005

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Splitting data by Debt/Equity of a firm

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)
VARIABLES	D/E $\leq Median(D/E)$	D/E $\geq Median(D/E)$
CSR Spent Controlled	-112.3785***	10.8876
	(34.7848)	(27.3565)
CSR Spent Controlled$_{(t-1)}$	-215.7834***	-253.7119
	(67.1232)	(265.0541)
CSR Spent Controlled$_{(t-2)}$	-265.9937***	-1,138.5061***
	(90.3639)	(237.4658)
Trend*Debt/Equity	0.0054*	0.0012
	(0.0028)	(0.0024)
Trend*Sales	0.0000	-0.0000
	(0.0000)	(0.0000)
Trend*Liabilities	-0.0000	-0.0000
	(0.0000)	(0.0000)
Constant	4.0844	-1.4710
	(2.5316)	(4.8317)
Observations	9,012	9,101
R-squared	0.7990	0.7413

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

percentage points in return on capital employed if they increase the CSR spending by 1 percentage point.

A possible reason for this could be that older companies are already well known and have brand capital which is why there may be no upside to increasing their CSR expenditure. Now, this story would have made even more sense if the post-1991 companies had a positive significant coefficient but here it is positive but highly insignificant. This is supported by the results we get from splitting data by age of the firm. Firms older than the median age have a higher negative coefficient and significance for at least 10% p-levels for both controlled CSR spent for the given year and the year lagged by 1.

Figure 2: Regression Results from Splitting Data Based on Sales and Debt/Equity Ratio

In terms of sales, although the results may lack statistical significance, an observable trend indicates that firms with sales below the median experience more negative outcomes.

This suggests that firms with insufficient revenue may not derive substantial benefits from CSR expenditures

As for debt to equity, we mostly have significant results and can point out that firms that are more leveraged than the others also have a higher negative coefficient. A reason for this could be that these firms would benefit more from paying their interest payments on their borrowings than spending on CSR if they want to better their financial health. We find significant results for a 1% p-level for controlled CSR spent year lagged by 2.

Table 5: Comparison of CSR Expenditure

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)	
VARIABLES	CSR Exp $\geq Median(CSRExp)$	CSR Exp $\leq Median(CSRExp)$	CSR Exp $\geq 3\% of profit$
CSR Spent Controlled	-72.6865**		135.4274
	(31.7821)		(1,005.2498)
CSR Spent Controlled$_{(t-1)}$	-143.2450*	-272.8733	187.1267
	(72.3267)	(354.8220)	(316.5900)
CSR Spent Controlled$_{(t-2)}$	-241.8780	-333.1999	-309.4636
	(150.4686)	(306.5224)	(536.9432)
Trend*Debt/Equity	0.0007	0.0016	-0.1033
	(0.0023)	(0.0026)	(0.2278)
Trend*Sales	-0.0000	0.0000*	0.0000
	(0.0000)	(0.0000)	(0.0000)
Trend*Liabilities	0.0000	-0.0000	-0.0000
	(0.0000)	(0.0000)	(0.0000)
Constant	-9.0341***	1.3125	15.9294
	(2.4539)	(3.1150)	(13.5116)
Observations	18,112	11,605	898
R-squared	0.7754	0.7462	0.9419

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

The results are mostly insignificant here but this supports our hypothesis that if a company spends a significant amount of money on CSR, it is going to be beneficial for the

firm. A positive coefficient is observed for firms that spent more than 3% of their profit on CSR. What is inconsistent with this result is the excessive negative coefficient for the year lagged by 2. For it, firms that are spending less than the median on CSR have a lesser negative coefficient than firms that are spending more than the median and firms that are spending more than 3% of the profits. We can only verify this result when we get a significant relationship.

Table 6: Industry-Specific Regression Analysis

RoCE (Winsorized (0.05) and Deflated (2014 levels))	(1)	(2)		
Industry	Tobacco	Coke & Petroleum	Light Vehicles	Heavy Vehicles
CSR Spent Controlled	-28.8362	-1,208.5527	461.6456	-6,086.7602**
	(596.7896)	(1,091.6200)	(286.5357)	(2,842.9824)
CSR Spent Controlled$_{t-1}$	-449.6505	-759.9852	-266.8963	-2,287.2491
	(614.0149)	(1,155.8545)	(318.7735)	(2,058.7608)
CSR Spent Controlled$_{t-2}$	127.0544	-1,385.6594	-399.5353	-1,223.0620
	(904.7052)	(1,010.8648)	(356.7003)	(1,894.6084)
Trend*Debt/Equity	1.8704	-0.1575	-0.0019	-0.7083**
	(1.8447)	(0.1450)	(0.0017)	(0.3365)
Trend*Sales	0.0003	-0.0000	-0.0000	-0.0000
	(0.0008)	(0.0000)	(0.0000)	(0.0000)
Trend*Liabilities	-0.0002	0.0000	0.0000	-0.0000
	(0.0007)	(0.0000)	(0.0000)	(0.0000)
Constant	-22.8196	-8.3801	-10.2770	-4.5880
	(48.5438)	(10.0858)	(7.8513)	(13.0486)
Observations	81	211	1,218	156
R-squared	0.9608	0.8940	0.7950	0.9094

Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Finally, we did some industry-specific regression analysis on tobacco, coke, and petroleum, light vehicles and their equipment, and heavy vehicles (Railway, air, military vehicles) and their equipment. We chose these industries in particular because these are the industries that spent a lot on CSR in absolute terms. Almost all of the results are insignificant here except the one for heavy vehicles. But the result does not appear feasible or interpretable. The coefficient indicates that for a 1 percentage point increase in CSR spending would lead to a decrease of 60 percentage points in RoCE.

6. Conclusion

When taken as a whole, my study shows that CSR expenditure has had a significant negative impact on Return on Capital Employed. The negative association can be explained by the nature of our dataset. Most of the firms in our data are in the metal, chemicals, pharmaceuticals, and textile industries. A significant amount of their customers would be B2B, i.e., their customers are other businesses and not consumers like us. Therefore, it is a possibility that their clients do not care about CSR as much as consumers do. Although recent surveys and studies have shown that CSR is becoming increasingly important to consumers' buying decisions, my results suggest otherwise. Perhaps, we can have a more conclusive result with more data since we are only considering 6 years of data here. Secondly, it would be beneficial to do some analysis on consumer vs non-consumer industries. We might not even find positive results in consumer industries (B2C). India is a very price-sensitive market. Prices may override buyers' desire for CSR since they are sensitive to prices. Subsequently, consumer firms may be doing business with less socially responsible non-consumer firms to save money.

It is when we dwell deeper in the dataset that we find out how results fluctuate. When the data is split by age and incorporation year of the firm, there is a much more negative CSR-RoCE association for older firms than for younger firms. The idea behind this is that companies that are so old are already well known and have brand capital which is why maybe there is no upside to increasing their CSR expenditure. Secondly, firms with lower sales do not benefit from spending on CSR since they already don't have enough revenue and highly leveraged firms would benefit more from paying back their interest payments than spending on CSR. An interesting result comes when we do a regression analysis for companies that are spending more than 3% of their profits on CSR. It has a

positive association with RoCE but a highly insignificant one. Further research is needed to confirm this result which would require more data.

These conclusions contribute to prior studies examining the CSR and financial performance relationship, which is an area of research that provides valuable insights to managers who oversee their CSR programs. A number of these studies have examined the general impact of CSR on financial performance by assessing a variety of metrics. This study extends past research by looking at the Indian manufacturing sector and it subsectors. While this study showed a negative correlation between CSR and financial performance, by breaking down the dataset we got some interesting results which can open up new avenues for further research. Lastly, an important observation was that CSR amounts mentioned on financial statements also included administrative and marketing expenses related to CSR so that’s another issue but it's more on the policy level. A systemic measure of CSR for the whole world would make research in this area much more interesting and results would help firms, governments, etc in real life. Despite the existence of informative research, there are still questions to be answered about the relationship between CSR and financial performance.

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