RESEARCH ARTICLE

The Effect of Environmental Regulatory Burden on the Profit Growth Rate of Philippine SMEs

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Abstract: Countries across the world, including the Philippines, are imposing environmental regulations in response to the negative effects of climate change. However, SMEs may have to deal with burdensome environmental regulations that may negatively affect their financial performance and competitiveness as these may increase the cost of doing business. This paper aims to test and is among the first to test the association between environmental regulatory burden and profit growth rate of Philippine SMEs using ordinary least squares (OLS) regression. This is based on a sample of 590 SMEs located in the three biggest metropolitan areas in the Philippines, namely: Metro Manila, Metro Cebu, and Metro Davao. The paper is important because Philippine SMEs contribute greatly to Philippine employment and gross value added figures and because the Philippines is among the most vulnerable countries to the consequences of climate change. Although we do not find a statistically significant association between environmental regulatory burden and profit growth rate among Philippine SMEs, we find that when SMEs perceive the extent of corruption to be low, the environmental regulatory burden may have a positive association with SME profit growth rate. Our findings also suggest that, among others, the government must strengthen the implementation of anti-corruption initiatives to help improve the ease-of-doing-business.

Keywords: Corruption, environmental regulation, environmental regulatory burden, governance, Philippines, SMEs

Climate change is currently among the most pressing issues the world is facing as the increasing usage of greenhouse gases exacerbates the effects of climate change, such as intensifying storms, melting of polar ice, and rising sea levels and global temperatures (Grossman, 2018; Hallegatte et al., 2016). This has led governments across the world to impose environmental regulations to help mitigate and even reverse the effects of climate change (Dechezlepretre & Sato, 2017).

This is also the case in the Philippines, which is considered among the most disaster-prone countries in the world and is expected to experience more intense flooding and storms, leaving its coastal cities and populations highly vulnerable to the effects of climate change (Bollettino et al., 2020; Eckstein et al., 2019). Acknowledging the need to act against climate change, the Philippines has been implementing laws that help address them, such as the Climate Change Act of 2009. Moreover, the country has been participating in global efforts to combat climate change, such as the Kyoto Protocol and the Paris Agreement, in which the Philippines sets targets for reducing its greenhouse gas emissions (Flores, 2018; Mayuga, 2019).

However, past studies mentioned that government regulations, while being created with good intentions, may impose time and monetary costs on businesses (Djankov et al., 2002; Mauro, 1995; Shleifer, 2005; Stigler, 1971; Tullock, 1967). Small and medium enterprises (SMEs) may therefore find it burdensome to comply with government regulations compared to larger firms (Smallbone & Welter, 2001). There are literatures that cover Philippine SMEs and the environment (Rao et al., 2006; Roxas et al., 2016; Roxas & Chadee, 2016). Nevertheless, literature on the association between environmental regulatory burden and profit growth rate of Philippine SMEs remains scarce.

The question and research gap now become, "how does the environmental regulatory burden affect the profit growth rate of Philippine SMEs?" Filling in this research gap is important because of two points. On the one hand, does Philippine SMEs provide important employment opportunities for Filipinos, significantly contribute to the country's gross value added (GVA) and exports, and are becoming more integrated into regional and global value chains (Department of Trade and Industry, 2018; Vandenberg et al., 2015). Philippine SMEs may therefore experience negative financial performance due to the imposition of regulations that they may find burdensome. On the other hand, as mentioned earlier, the Philippines sees the importance of implementing environmental regulations because it is among the most vulnerable countries to climate change (Enano, 2020).

The objective of this paper is to test and be among the first to test the association between environmental regulatory burden and profit growth rate of Philippine SMEs while controlling for factors such as perception of the extent of corruption, firm age, SME owner's sex, firm size, firms with foreign ownership, and industry where the SME belongs to using data of 590 SMEs in Metro Manila, Metro Cebu, and Metro Davao from the 2019 AIM Rizalino S. Navarro Policy Center for Competitiveness (2019) Survey on SME Cost of Regulatory Compliance. The association between these two variables is measured using ordinary least square (OLS) regression. This paper, however, does not prove the causality between environmental regulatory burden and profit growth rate. Instead, this study focuses more on the correlation between the two variables.

Although we did not find a statistically significant association between environmental regulatory burden and profit growth rate among Philippine SMEs, we nevertheless find that when SMEs perceive corruption levels to be low, environmental regulatory burden may have a positive association with SME profit growth rate. This suggests that when firms perceive corruption to be low, the environmental regulatory burden may still have a positive effect on the profit growth rate.

Literature Review

Governments regulate economies with the goal of promoting consumer welfare and preventing excessive market concentration and other anti-competitive behaviors among firms (Bonbright, 1960; Moore, 1970; Pigou, 1920; Posner, 1974; Stavropoulos et al., 2018). They are also said to play an important role in facilitating commerce and leveling the playing field among firms, especially SMEs (Smallbone & Welter 2001). The government is responsible for crafting policies and regulations that aim to facilitate SME development, such as ensuring a stable banking system and assisting them in moving up the regional and global value chains (Natsuda et al., 2012; Smallbone & Welter, 2001).

In addition, there is increasing awareness that businesses create negative externalities that affect the public and the environment (Coase, 1960; Stavropoulos et al., 2018). Specifically, businesses only bear the costs of utilizing resources, whereas the environment and society must bear the costs of pollution and environmental degradation (Coase, 1960; Stavropoulos et al., 2018; Stewart, 1992). Acknowledging the need to protect the environment, governments across the world are responding by implementing environmental regulations to protect the environment (Coase, 1960; Stavropoulos et al., 2018; Stewart, 1992).

Nevertheless, some economists and policymakers argue that government interventions in economic and business activities exacerbate market inefficiencies and can lead to "regulatory capture" among regulatory agencies (Djankov et al., 2002; Friedman, 2002; Stigler, 1971). This also includes corruption in terms of industries being able to circumvent regulations in "low trust" states or societies where people have low interpersonal trust (Dincer & Fredriksson, 2018). Based on previous literatures (Djankov et al., 2002; Mauro, 1995; Shleifer, 2005; Stigler, 1971; Tullock, 1967), government regulations and corruption lead to

worse performance among firms as corruption raises the cost of regulatory compliance and doing business. Heavy regulation also serves as a barrier to entry for firms, resulting in those entrepreneurs with greater capital being more likely than others to start a business (Capellaras et al., 2008).

The negative effects of environmental regulation on firm performance and the economy are explained by the interconnected concepts of the "pollution haven hypothesis" and the "race-to-the-bottom hypothesis" (Stavropoulos et al., 2018). Under these hypotheses, countries or states would want to grab the opportunity of attracting polluting firms by lowering their regulatory standards and undercutting other countries or states that have also lowered their standards (Dong et al., 2012; Simmons & Elkins, 2004; Stewart, 1993). Developing countries can also experience higher levels of environmental degradation because they either lower their standards or do not increase their environmental standards compared to their richer counterparts, who can afford more energy-efficient and cleaner technologies (Dong et al., 2012; Shafik, 1994). These stricter environmental regulations increase the cost of compliance among firms, which may pass on those costs to consumers and may lead to fewer output produced to cut costs (Gollop & Roberts, 1983; Levinson & Taylor, 2008; McGuire, 1982).   Picazo-Tadeo et al. (2005), for example, estimated that the potential output of ceramics manufacturers in Spain would only increase by 2.2% when they are subject to environmental regulations compared to the 7% increase when they are not subject to such regulations. Given this context, SMEs may instead focus on short-term business strategies that may not necessarily be "green" (Bianchi & Noci, 1998; Smallbone & Welter, 2001).

On the other hand, the Porter hypothesis states that the cost of complying with environmental regulations or the extent of environmental regulatory burden can serve as a catalyst for increased research and development (R&D) spending for innovations (Mohr, 2002; Porter & van der Linde, 1995). This is true especially when regulations are clear and flexible, provide incentives to businesses, and are crafted with industry participation and inputs (Porter & van der Linde, 1995). Stavropoulos et al. (2018), for example, found that when regulations are well-designed, firms in China become competitive when adopting innovations to deal with these new regulations. This increased spending on R&D and innovations, in turn, can boost firm productivity, competitiveness, and profit growth and allow the firm to offset the cost of regulatory compliance (Hamamoto, 2006; Mohr, 2002; Porter & van der Linde, 1995).

Sta. Romana (2017) wrote that the Philippines is recognized as among the trailblazers in terms of enacting legislations and regulations that aim to protect the environment and the public. Among those legislations cited by Sta. Romana (2017) is the Philippine Clean Air Act of 1999, which grants the government the power to impose emission taxes and fees on motor vehicles and factories to minimize the negative externality of greenhouse gases and to fund government air quality cleanups, among others. Another legislation mentioned is the Climate Change Act of 2009, which aims to incorporate climate change in every aspect of policy formulation and development plans, and creates the Climate Change Commission to monitor the government's climate change programs. Given that the Philippines is considered among the most disaster-prone countries in the world (Eckstein et al., 2019) and is expected to experience intense flooding and storms due to climate change, the Philippine government has also been participating in global efforts to protect the environment and address climate change by being part of international agreements such as the Kyoto Protocol and the Paris Agreement (Flores, 2018; Mayuga, 2019).

There are also literatures that cover Philippine SMEs and their environmental practices. Roxas and Chadee (2016) found a significant positive association between a firm's "relational capital" or the quality and extent of its social and business networks, and a firm's environmental management practices. This significant positive association remains when mediated by the firm's "innovation capability" or the extent to which a firm adopts different innovations such as new production and technologies. Rao et al. (2006) wrote about the different environmental performance indicators, such as raw material efficiency and total waste to output ratio, and how SMEs can adopt these indicators in their operations. Roxas et al. (2016) mentioned that a firm with an environmental sustainability orientation sees high firm performance in terms of, among others, revenue and productivity. However, the literature on the association between environmental regulatory burden and profit growth rate of Philippine SMEs remains scarce. Filling in this research gap is important as Philippine SMEs

contribute greatly to the Philippine economy and with the Philippines being among the most vulnerable countries to climate change. Hence, in this study, we hypothesize that:

H1: There is a negative association between environmental regulatory burden and SME profit growth rate.

Data and Methodology

Data

The purpose of this study is to analyze the association between environmental regulatory burden (*enviregburden*) and profit growth rate of Philippine SMEs (*profit*) using OLS regression. We used data from the 2019 AIM Rizalino S. Navarro Policy Center for Competitiveness (2019) Survey on SME Cost of Regulatory Compliance. Francisco et al. (2020) also used this data for their study on how compliance costs hinder Philippine SMEs' growth. The survey's questionnaire has 93 questions on SMEs' experience of complying with national and local government regulations and the effects of these regulations on their business operations, among others.

The survey has 590 SME respondents from the National Capital Region (NCR), Metro Cebu, and Metro Davao. Slightly more than half of all respondents are from NCR, whereas about a quarter of respondents are from Metro Cebu and about a quarter of respondents are from Metro Davao (Appendix A). An establishment shall be considered an SME respondent for this study if it has a valid business permit for 2019, has an asset size not less than PHP3 million and not more than PHP100 million (excluding land), and has 10 to 199 employees.

To select the respondents, field interviews were conducted from August to September 2019. During this period, multi-stage random sampling was implemented to initially determine the cities in Metro Manila, Metro Cebu, and Metro Davao where the respondents would come from. Then, in the same manner, the districts were selected from the chosen cities, and the barangays were identified from the chosen districts. At the barangay level, a business near a predetermined point within the barangay was first interviewed. After that, every fifth business that qualifies as an SME under this study was interviewed.

Dependent Variable

The dependent variable is *profit growth rate*, which is a continuous variable and is based on the question, "By what percent has your business's profit increased or decreased during the past two years?"

Main Independent Variable

The main independent variable is *environmental regulatory burden*, which is based on the question, "How burdensome are environmental regulations to your business?" We re-coded it from being a four-point categorical variable, that is, *Not burdensome* (1), *Moderately burdensome* (2), *Burdensome* (3), and *Very burdensome* (4), into a binary variable, with (1) being *burdensome* (i.e., combining *Moderately burdensome*, *Burdensome*, and *Very burdensome* into one response) and (0) being *not burdensome* (i.e., recoding the original *Not burdensome* from (1) to (0)).

As mentioned earlier, the literature differs on the effects of environmental regulatory burden on firm profit growth. Those who subscribe to the pollution haven hypothesis and race-to-the-bottom hypothesis believe that regulations may burden firms, especially SMEs, as the latter are said to experience higher operating costs and lower revenues (Dong et al., 2012; Simmons & Elkins, 2004; Stavropoulos et al., 2018; Stewart, 1993). On the other hand, those who subscribe to the Porter hypothesis believe that environmental regulations and regulatory burdens can help firms be more productive and profitable in the long run as they can encourage firms to be innovative and invest in R&D—this is especially true for firms located in countries or localities with clear regulations that also provide some incentives to firms (Mohr, 2002; Porter & van der Linde, 1995; Stavropoulos et al., 2018).

Control Variables

We also include control variables such as the perceived extent of corruption (*corruption*), educational attainment (*collgrad*) of owner, sex of SME owner (*male*), firm age (*firmage*), risk appetite (*risktaker*), firm size (*medium*), firms with foreign ownership (*withforeign*), and industry dummy variables (*industrydummy)* that would help understand the association between environmental regulatory burden and profit growth.

The perceived extent of corruption is based on the question, "How much do you agree or disagree with

the following statement: 'Sometimes businesses are asked to give gifts, or tokens to government officials (i.e., give bribes) to process necessary requirements in customs, taxes, licenses, regulations, services, et cetera'". It is a categorical variable, with *agree* (3), *neutral* (2), and *disagree* (1). *Neutral* (2) will be used as the base category to clearly differentiate between respondents who *agree* (labeled as "corruption (high)" in Table 2) and *disagree* (labeled as "corruption (low)" in Table 2) and to see how they fared relative to respondents who answered *neutral*. There are opposing views in the literature on whether corruption affects the financial performance of businesses. One perspective is that corruption can help businesses, especially in developing countries, navigate through bureaucratic mazes and weak institutions by bribing public officials to help entrepreneurs jump through these barriers (Mendoza et al., 2015; Xheneti & Bartlett, 2012). Many entrepreneurs even initiate bribery to help them get the necessary permits and get ahead of the competition (Wu, 2009). The opposite perspective is that corruption increases the cost of doing business and dampens a firm's return on investment potential (Mauro, 1995). O'Toole and Tarp (2014) wrote that the negative effects of corruption on business' financial performance is more evident among SMEs compared to their larger counterparts as the former have fewer resources to help them cope with the government inefficiencies and corruption.

The sex of owner, which is a binary variable, is based on the question, "Is the owner or majority owner male or female?" *Males* are coded with (1), while *females* are coded with (0). Some studies mention that female owners tend to be in a more disadvantageous position than their male counterparts in firm performance (Chaudhuri et al., 2018; Essel et al., 2019). This may be because female entrepreneurs tend to be from lower-paying sectors such as retail (Klapper & Parker, 2011). The difference between the two sexes may also be attributed to their difference in terms of long-term business goals (Coleman, 2007; Du Rietz & Henrekson, 2000). Lastly, females also tend to get less financing from formal financial institutions than males due to lenders discriminating against women, negatively affecting women-owned firms in general (Chaudhuri et al., 2018).

Firm age is a continuous variable based on the question, "How old is the owner or majority owner?" In some of the literature, a higher firm age can negatively affect a firm's financial performance. For example, Lwango et al. (2017) found that firms that are family-owned and are actively managed by the family see negative profitability when factoring in firm age. In another study, older firms tend to be more innovative than younger firms but are also less agile to meet the demands of an ever-changing economy, potentially affecting the overall performance of older firms (Sorensen & Stuart, 2000). Other studies see a positive association. Pervan et al. (2019), for example, mentioned that older firms tend to be more profitable because they have accumulated the knowledge needed to thrive and to lower their operational costs in the long run.

Firm size is a binary variable based on the question, "How much is the current asset size of your business, excluding land?" Those that answered (1) have an asset size of greater than PHP15 million up to PHP100 million and are coded as *medium,* whereas those that answered (0) have an asset size of greater than PHP3 million up to PHP15 million and are coded as *small*. The literature offers different conclusions on the effect of firm size on SME financial performance. Some studies, such as Morone and Testa (2008) and Pervan and Visic (2012), found a positive association between the two variables because larger firms have the resources to fund research and development (R&D). This helps firms innovate and streamline products and processes. Others see a negative association between firm size and SME financial performance. One reason is that larger firms often face more stringent anti-trust regulations and stronger pushback from rival firms (Goddard et al., 2005). Dhawan (2001), in another study, posited that smaller firms tend to be more productive than larger firms, allowing them to command greater profit growth rates.

In addition, the variable firm having one or multiple foreign owners is a binary variable based on the question, "What is the business' type of ownership in terms of the nationality of its owner/s*?*" Firms that are *100% Filipino-owned* are coded as (1), whereas firms that are *jointly Filipino-foreign owned* are coded as (0). Several studies cover the association between a firm having one or multiple foreign owners and its profits. In Tee et al. (2016), foreign ownership per se may not have a significant effect on a firm's returns. However, the number of foreigners sitting on a firm's board has a significant effect on a firm's returns. In another study, Bentivogli and Mirenda (2017) found

that firms see improvements in terms of returns on equity and sales after foreign acquisition due to factors such as increased knowledge transfer.

Lastly, the industry dummy variable is a binary variable based on the firm's Philippine Standard Industrial Classification (PSIC) code. *Firms belonging to the industry sector* are coded (1), whereas those otherwise are coded (0). Morone and Testa (2008) and Yazdanfar (2013) included the firm's sector as either a control variable or an explanatory variable in their respective models as various sectors differ with respect to entry barriers and market concentration levels, and SMEs' profit and revenue levels.

There are also two interaction terms added to the regression, namely: the environmental regulatory burden-perceived extent of the corruption interaction term (enviregburdenxcorr), and the environmental regulatory burden-industry interaction term (enviregburdenxindus). The former interaction term is added to the regression analysis somewhat akin to

what Chen and Cheng (2019) did to see the extent to which the environmental regulatory burden depends on corruption. According to several studies (Djankov et al., 2002; Mauro, 1995; Shleifer, 2005; Stigler, 1971; Tullock, 1967), government regulations, coupled with corruption, can lead to worse performance among firms and economies as corruption is deemed as an additional tax on top of the cost of complying with regulations, both of which, in turn, add to the cost of doing business. The latter interaction term is added as different industries face different kinds of environmental regulations and different levels of regulatory burdens (Dechezlepretre & Sato, 2017). Because of the differences in regulations and regulatory burdens, firms across different industries may face different levels of profit and competitiveness (Dechezlepretre & Sato, 2017). Figures 1 and 2 show the diagram of how the perceived extent of corruption and industry variables moderate the association between environmental regulatory burden and SME profit growth.
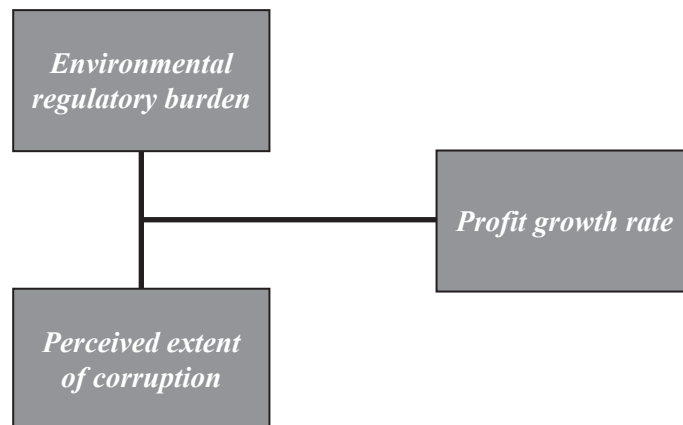
Figure 1. Moderation Effects of Perceived Extent of Corruption on Environmental Regulatory Burden and Profit Growth Rate
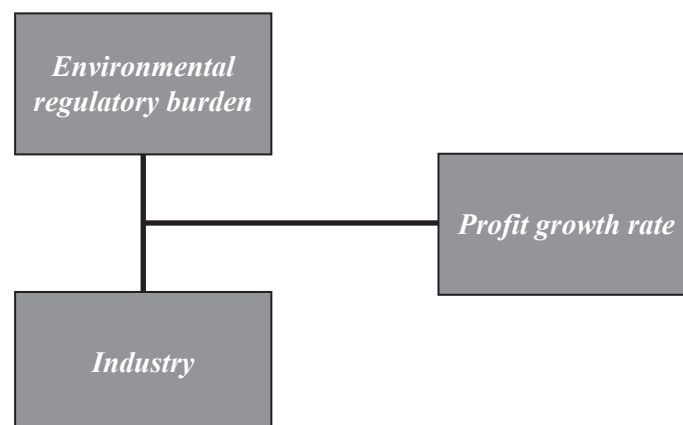
Figure 2. Moderation Effects of Industry on Environmental Regulatory Burden and Profit Growth Rate

Equation 1 is our estimation model and will guide this study. enviregburden represents the effect of environmental regulatory burden on SME profit growth rate, corruption represents the effect of perceived extent of corruption on profit growth rate, firmage represents the effect of SME age on firm profit growth rate, male represents the effect of being male on profit growth rate, medium represents the effect of being a medium-sized firm on SME profit growth rate, withforeign represents the effect of being a firm with foreign owner/s on its profit growth rate, industrydummy represents the effect of an industry firm on its profit growth rate, enviregburdenxcorr is the effect of the environmental regulatory burden-perceived extent of corruption interaction term on SME profit growth rate, and β_9 enviregburdenxindus refers to the effect of the environmental regulatory burden-industry interaction term on SME profit growth rate. The summary statistics are shown in Table 1, whereas Appendix B provides more details on each of the variables and interaction terms.

$$profitg = \beta_0 + \beta_1 (enviregburden) + \beta_2 (corruption) + \beta_3 (firmage) + \beta_4 (male) + \beta_5 (medium) + \beta_6 (withforeign) + \beta_7 (industrydummy) + \beta_8 (enviregburdenxcorr) + \beta_9 (enviregburdenxindus) + \varepsilon \tag{1}$$

Table 1

Summary Statistics

Variable	Variable shorthand	Mean	Std. Dev.	Min.	Max.	Median	Mode	Range
Profit growth rate	*profitg*	14.486	15.059	-80	100	10	10	180
Environmental regulatory burden	*enviregburden*			0	1	0	0	1
Perceived extent of corruption	*corruption*			1	3	1	1	2
Firm age	*firmage*	13.421	10.061	0.167	62	10	10	61.833
Sex of owner	*male*			0	1	1	1	1
Firm size	*medium*			0	1	0	0	1
Firms with foreign ownership	*withforeign*			0	1	0	0	1
Industry	industrydummy			0	1	0	0	1
Environmental regulatory burden-Perceived extent of the corruption interaction term	*enviregburdenxcorr*			0	3	0	0	3
Environmental regulatory burden-Industry interaction term	*enviregburdenxindus*			0	1	0	0	1

Results, Discussion, and Policy Implications

Results

OLS regression results are shown in Table 2. The *corruption* variable is segregated into *corruption (low)* and *corruption (high),* whereas the *enviregburdenxcorr* interaction term is segregated by level to have a better view of their respective effects on profit growth rate. Model 1 shows the association between *enviregburden* and *profitg,* controlling for *corruption, firmage, male, medium, withforeign* and *industrydummy*. Model 2 adds the interaction term *enviregburdenxcorr*. Model 3 adds the interaction term *enviregburdenxindus* to Model 1. Model 4 adds both interaction terms to the baseline model.

Although we find no significant association between environmental regulatory burden and profit growth rate even after performing alternative regressions, we find that when SMEs perceive the extent of corruption to be low, the environmental regulatory burden may have a positive association with SME profit growth rate (i.e., positive association between *enviregburdenxcorr (L1)* and *profitg*). Table 2 shows that the SME profit growth rate still increased by 5.057 percentage points (see Model 2) and by 5.188 percentage points (see Model 4) when SMEs are located in areas with high levels of environmental regulatory burden and low levels of perceived extent of corruption. In terms of the association between firm profit growth rate and low levels of perceived extent of corruption, we find a positive association between these two variables (see "corruption (low)" in all models).

We would like to emphasize that this study does not prove causality between environmental regulatory burden and profit growth rate. Instead, this study focuses more on the correlation between the two variables. The regressions presented in this study used robust standard errors, taking care of any heteroskedasticity and serial correlation that may occur. We also ruled out omitted variable bias after conducting the Ramset RESET test.

Discussion

As mentioned earlier, one key finding is that SME profit growth rate continues to grow when faced with high levels of environmental regulatory burden but with low levels of perceived extent corruption. This suggests that the existence of burdensome regulations is associated with higher firm profit levels when corruption is low due to the lower transaction costs that a less corrupt regulatory environment (i.e., fewer occurrences of bribery) imposes on firms (Fisman & Svensson, 2007; O'Toole & Tarp, 2014; Rand & Tarp, 2012; Shleifer & Vishny, 1993). It was shown in other studies that when firms are burdened by regulations and are also in an environment conducive to bribery, they may choose to give bribes even though this may undermine their profits to speed up government services (Mendoza et al., 2015; Xheneti & Bartlett, 2012). SMEs also cannot get away easily from corrupt bureaucrats and officials as SMEs tend to operate locally—they cannot easily transfer to another jurisdiction to avoid requests for bribes (O'Toole & Tarp, 2014).

In connection with the previous finding, the paper also suggests that low levels of the perceived extent of corruption positively affect SME profit growth rate. Aside from implying that lower corruption levels lead to lower costs of doing business (Fisman & Svensson, 2007; Mauro, 1995; Rand & Tarp, 2012; Wu, 2009), this also implies that firm profit growth rate is more tied to the regulatory enforcement environment (i.e., perceived extent of corruption) rather than the regulations themselves. And having an interaction term between the perceived extent of corruption and environmental regulatory burden matters more to SME profit growth rate than the individual environmental regulatory burden variable.

These findings are especially relevant in the context of a developing country such as the Philippines. Corruption has been an endemic problem in the country, given the systemic weaknesses of its institutions (Batalla, 2015; Nolasco et al., 2014; Overholt, 1986; Quah, 2004, 2009). This is despite the establishment of institutions such as the Office of the Ombudsman and the anti-corruption court, the Sandiganbayan, to weed out the corruption that has been plaguing the country for decades (Batalla, 2015; Quah, 2004). These agencies, however, do not fully coordinate their actions with each other, leading to the inconsistent and weak application of anti-corruption laws (Quah, 2004, 2009; Quimson, 2006). Although SME profit growth rate continues to grow when faced with high levels of environmental regulatory burden but with low levels of perceived extent of corruption, our main hypothesis, which is the existence of an association

Table 2

Regression Results

Variable	(1) *profitg*	(2) *profitg*	(3) *profitg*	(4) *profitg*
enviregburden	0.719	-2.078	0.0680	-2.851
	(1.273)	(2.321)	(1.501)	(2.512)
corruption (low)	5.597***	3.236*	5.612***	3.195*
	(1.483)	(1.766)	(1.482)	(1.757)
corruption (high)	2.949	3.758	2.993	3.670
	(1.832)	(2.537)	(1.826)	(2.564)
firmage	-0.0255	-0.0293	-0.0287	-0.0321
	(0.0713)	(0.0715)	(0.0714)	(0.0716)
male	1.601	1.731	1.546	1.675
	(1.279)	(1.285)	(1.284)	(1.290)
medium	0.894	0.833	0.835	0.774
	(1.621)	(1.612)	(1.634)	(1.624)
withforeign	2.584	2. 849	2.530	2.797
	(1.816)	(1.823)	(1.809)	(1.817)
industrydummy	-0.932	-1.000	-2.403	-2.466
	(1.411)	(1.409)	(1.795)	(1.786)
enviregburdenxcorr (L0)		–		–
		–		–
enviregburdenxcorr (L1)		5.057*		5.188*
		(2.920)		(2.915)
enviregburdenxcorr (L3)		-1.308		-1.020
		(3.597)		(3.667)
enviregburdenxindus			2.961	2.956
			(2.827)	(2.884)
Constant	9.382***	10.52***	9.782***	10.97***
	(1.701)	(1.641)	(1.757)	(1.707)
Observations	564	564	564	564
R-squared	0.040	0.048	0.041	0.049

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

between environmental regulatory burden and profit growth rate, yields no statistically significant result even when controlling for factors such as corruption and industry dummy variables. This suggests that neither the pollution haven hypothesis and race-to-the-bottom hypothesis (Dong et al., 2012; Simmons & Elkins, 2004; Stavropoulos et al., 2018; Stewart, 1993), which predict a negative association, nor the Porter's hypothesis (Mohr, 2002; Porter & van der Linde 1995),

which predict a positive one, is observed in the case of Philippine SMEs.

One possible reason for such insignificant association maybe because the Philippines, even when controlling for industry, may have a less clear track record in enacting and enforcing environmental regulations. For context, the Philippine government formulates environmental protection and protection policies under the Philippine Development Plan (PDP)

2017-2022 (National Economic and Development Authority, 2017). The Department of Environment and Natural Resources (DENR) and the different local governments have the responsibility of implementing environmental regulations and policies from solid waste management to forest conservation, with the former having more of a supervisory role and with the latter having a more hands-on role (Sta. Romana, 2017). As these regulations are crafted and implemented by different agencies at different government levels, this results in a lack of coordination and logistical support in their implementation (Hudson, 2019; Sta. Romana, 2017). In another study, the Philippines ranked 82nd out of 180 countries surveyed in the 2018 Environmental Performance Index (Wendling et al., 2018). While the overall ranking places the Philippines in the middle of the pack, the country ranked 133rd out of 180 countries in subfactors such as exposure to heavy metals (e.g., lead; Wendling et al., 2018) despite the presence of legislation such as Republic Act 6969 that regulates toxic substances. This lack of proper implementation and monitoring, in turn, may cause SMEs to have a general lack of awareness about environmental regulations, which may lead these firms not to account for regulatory burdens when making business decisions (Gunningham, 2002; Organisation for Economic Co-operation and Development & Economic Research Institute for ASEAN and East Asia, 2018).

Policy Implications

The results above have several policy implications. First, policymakers need to be cognizant that the effects of the environmental regulatory burden on SME financial performance are aggravated or mitigated by the perceived extent of corruption in the regulatory environment. Second, the huge contribution of SMEs to the Philippine economy and the environmental threats the Philippines faces signifies that policymakers should not think that protecting the environment and economic growth are mutually exclusive.

For the first implication, mitigating or eliminating corruption is a big step in making the regulatory environment more conducive to business growth. On a macro-level, there is a need for the Philippines to establish a single independent anti-corruption agency that has comprehensive and extraordinary powers to fulfill its anti-corruption mandate, akin to what Indonesia has (Umam et al., 2018). This is to ensure that there is no overlapping and duplication of powers

and responsibilities and that there is better enforcement of anti-corruption legislation and programs as there would be only one agency in charge of that. This is also to ensure that people and businesses can easily identify which agency to go to when they have complaints against public officials and bureaucrats. On the firm level, business chambers and organizations should encourage firms, especially SMEs, to join them as the former can be a bridge between the firms and the government in helping eliminate red tape and corruption in the government (Doner & Schneider, 2000; Nguyen, 2014; Over & Henkel, 2013). They can make a case to SMEs that while one firm cannot effect change, many firms acting as one can tear down barriers to SME development. Aside from helping minimize corruption, these business chambers and organizations can also help disseminate information to the SMEs on the different regulations that they must follow, which, in turn, would allow them to take into account environmental regulatory burdens when developing their business models.

For the second implication, the government should still continue crafting environmental policies and regulations that are certain and stable yet flexible at the same time to mitigate the negative effects of climate change while also not stifling SME growth (Feiock & Stream, 2001; Porter & van der Linde, 1995). As an example, when faced with well-designed regulations, firms in China become competitive through the adoption of innovations developed to deal with these new regulations (Stavropolous et al., 2018). Parker et al. (2009) wrote that well-designed and fairly implemented regulations are beneficial, especially for firms that are "advantage-driven" or those that pursue environmentally-friendly practices without sacrificing their financial health. They are often innovative, proactive, and willing to explore new business opportunities. Although this study shows that the imposition of environmental regulations does not necessarily affect SME profit growth, the presence of these regulations nevertheless means that environmental issues are already part of a society's consciousness (Hoogendoorn et al., 2014). This, in turn, can stimulate demand for environmental-friendly goods and services, allowing innovative and environmentally conscious firms to generate more revenues and profits (Parker et al., 2009).

Although having well-designed regulations is important, policymakers also need to consider

the capacity of existing institutions to implement environmental regulations. As implementations of these regulations are dispersed and are handled by different levels of government, there is a need to establish an office or unit responsible for tracking the implementation of policies and regulations, akin to the suggestion of Hudson et al. (2019). Other responsibilities of this office include problem-solving, which involves troubleshooting challenges to program delivery, and program monitoring and evaluation that will provide senior government officials with frequent status updates on policy and program implementation (Hudson et al., 2019). Of course, the success of this is hinged on the quality of the data collected (Hudson et al., 2019). Once policymakers have already gotten a sense of how existing environmental policies and regulations are implemented and their effects on both the environments and businesses, the government can then decide on whether to keep, tweak, or abolish these regulations altogether.

Conclusion

With the disastrous effects of climate change expected to worsen in the coming years, the Philippines has decided to impose laws to address them. However, government regulations may impose time and monetary costs on businesses, especially SMEs (Djankov et al., 2002; Mauro, 1995; Shleifer, 2005; Smallbone & Welter, 2001; Stigler, 1971; Tullock, 1967). Although there are literatures that cover Philippine SMEs and the environment (Rao et al., 2006; Roxas et al., 2016; Roxas & Chadee, 2016), there are only a few literatures covering the association between environmental regulatory burden and profit growth rate of Philippine SMEs. Finding possible answers to this research gap is important given that SMEs contribute a significant amount to the country's economy and that the Philippines is among the countries most affected by climate change (Eckstein et al., 2019; Enano, 2020; Department of Trade and Industry, 2018; Vandenberg et al., 2015).

The objective of this paper is to test and be among the first to test the association between environmental regulatory burden and profit growth rate of Philippine SMEs while controlling for factors such as perception of extent of corruption and firm size using OLS regression. The data used is from the 2019 AIM Rizalino S. Navarro Policy Center for Competitiveness (2019) Survey on SME Cost of Regulatory Compliance. We hypothesized that there is a negative association between environmental regulatory burden and SME profit growth.

This study does not find a statistically significant association between environmental regulatory burden and profit growth rate among Philippine SMEs even when controlling for factors such as corruption, firm age, and industry dummy variables. This may be because the Philippines has a less clear track record in enacting and enforcing environmental regulations (Sta. Romana, 2017; Wendling et al., 2018). This, in turn, leads to businesses not taking into consideration regulatory burdens when planning for their business. We would like to stress, however, that this paper does not aim to prove the causality between environmental regulatory burden and profit growth rate. Instead, this study focuses more on the correlation between the two variables.

One interesting finding in this study, however, is that a high environmental regulatory burden in a low corruption environment has a positive association with SME profit growth rate. Even when there is a burdensome environmental regulatory environment, SME profit growth rate remains positive when there is a low perceived extent of corruption due to the lower cost of doing business as they need not pay bribes to expedite government services. This study also finds that corruption consistently has a negative effect on SME profit, echoing the studies of Fisman and Svensson (2007) and Rand and Tarp (2012).

Based on these results, policymakers need to take into consideration the following. Firstly, how the perceived extent of corruption aggravates or mitigates the effects of environmental regulatory burden on SME financial performance. Minimizing or eliminating corruption is a big step in making the regulatory environment more conducive to business growth. One solution for doing away with corruption is by establishing a single independent anti-corruption agency that has powers to fulfill its anti-corruption mandate while preventing the overlapping and duplication of powers and responsibilities of enforcing these anti-corruption statutes and regulations (Umam et al., 2018). Another solution is that business chambers and organizations should encourage firms, especially SMEs, to join them so that firms can act as one in helping stamp

out corruption (Doner & Schneider, 2000; Nguyen, 2014; Over & Henkel, 2013).

Secondly, the importance of SMEs to Philippine economic development and the environmental threats the Philippines is facing means that policymakers and stakeholders must bear in mind that environmental regulations need not be mutually exclusive with SMEs and economic development. The presence of environmental regulations already signifies that environmental issues are part of a society's consciousness and that there is a demand for environmental-friend products and services (Hoogendoorn et al., 2014). Thus, well-designed and fairly implemented regulations can still benefit firms, especially those that are advantage-driven, innovative, and environmentally conscious in terms of revenue and profit generation (Parker et al., 2009). However, the capacity of existing institutions to implement environmental regulations must be taken into consideration. One solution is to establish an office or unit responsible for tracking the implementation of policies and regulations (Hudson et al., 2019). Once policymakers have already gotten a sense of how existing environmental policies and regulations are implemented and their effects on both the environments and businesses, the government can then decide whether to keep, tweak, or abolish these regulations altogether.

We would nevertheless like to note the following limitations in this analysis. One limitation is that the question that the environmental regulatory burden variable is based on has the following options: "1" Not burdensome, "2" Moderately burdensome, "3" Burdensome, and "4" Very burdensome. It would have been better if the option were as follows: "1" Very not burdensome, "2" Not burdensome, "3" Neutral, "4" Burdensome, and "5" Very burdensome. Neutral, in this context, means that firms have an indifferent view of the environmental regulatory burden. Having a five-point Likert scale is said to be the optimal scale for surveys as it prevents respondents from giving negative responses if they are forced to take a stand (i.e., when the survey only has even-numbered choices; Chen et al., 2015; Weijters et al., 2010). In connection with the previous point, the dataset also does not specify which environmental regulation/s are SME familiar with and which ones SMEs find burdensome. Adding them would have allowed us to see the extent of their knowledge of these different environmental regulations

and see their respective effects on profit growth. Lastly, another limitation is that the dataset used does not include any question on innovation or R&D. It would have been better to include innovation and R&D in the list of regressors to control better the relationship between environmental regulatory burden and SME profit growth given that the Porter hypothesis posits that firms innovate and invest in R&D once faced with environmental regulatory burdens (Mohr, 2002; Porter & van der Linde, 1995).

Future studies may be conducted to collect data on the specific environmental regulations in place in the Philippines and on the innovation or R&D practices of SMEs. Furthermore, future studies may be explored finding the specific right balance between environmental protection and SME growth and innovation.

Declaration of Ownership

This report is my original work.

Conflict of Interest

The author declares no conflict of interests.

Ethical Clearance

This study was approved by the institution.

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Appendix A

Number of Respondents Per City and Region

City	Frequency	Percentage
TOTAL METRO CEBU	145	24.6
Danao City	3	0.5
Cebu City	81	13.7
Lapu-Lapu City	18	3.1
Mandaue City	43	7.3
TOTAL METRO DAVAO	145	24.6
Davao City	145	24.6
TOTAL METRO MANILA	300	50.8
Las Piñas City	7	1.2
Makati City	50	8.5
Mandaluyong City	15	2.5
Manila	45	7.6
Marikina City	6	1.0
Muntinlupa City	11	1.9
Parañaque City	17	2.9
Pasay	11	1.9
Pasig	26	4.4
Quezon City	83	14.1
Taguig	13	2.2
Valenzuela	16	2.7
GROSS TOTAL	590	100.0

Appendix B

Variables and Their Basis

Variable	Type of variable	Remarks
Profit growth rate (profitg)	Continuous	Based on the question, "By what percent has your business's profit increased or decreased during the past two years?"
Environmental regulatory burden (enviregburden)	Binary	Based on the question, "How burdensome are environmental regulations to your business?" 1 – Burdensome 0 – Not burdensome
Perceived extent of corruption (corruption)	Categorical	Based on the question, "How much do you agree or disagree with the following statement: 'Sometimes businesses are asked to give gifts, or tokens to government officials (i.e. give bribes) to process necessary requirements in customs, taxes, licenses, regulations, services, et cetera.'?" 3 – Agree 2 – Neutral 1 – Disagree
Sex of owner (male)	Binary	Based on the question, "Is the owner or majority owner male or female" 1 – Male 0 – Female
Firm age (firmage)	Continuous	Based on the question, "How old is the owner or majority owner?"
Firm size (medium)	Binary	Based on the question, "How much is the current asset size of your business, excluding land?" 1 – Medium (i.e. firm has asset size of *greater than P15 million up to P100 million)* 0 – Small (i.e. firm has asset size of greater *than P3 million up to P15 million*)
Firms with foreign ownership (withforeign)	Binary	Based on the question, "What is the business' type of ownership in terms of the nationality of its owner/s?" 1 – Joint Filipino-foreign owned 0 %– 100% Filipino-owned
Industry (industrydummy)	Binary	Based on the firm's Philippine Standard Industrial Classification (PSIC) code. 1 – Industry sector firm 2 – Non-industry sector firm
Environmental regulatory burden-Perceived extent of corruption interaction term (enviregburdenxcorr)	Categorical	Interaction term of environmental regulatory and perceived extent of corruption. 3 – Firms experience environmental regulatory burden and are coded "3" (i.e. agree) in the perceived extent of corruption variable 2 – Firms experience environmental regulatory burden and are coded "2" (i.e. neutral) in the perceived extent of corruption variable 1 – Firms experience environmental regulatory burden and are coded "1" (i.e. disagree) in the perceived extent of corruption variable 0 – Firms do not experience environmental regulatory burden regardless of their response to the perceived extent of corruption variable
Environmental regulatory burden-Industry interaction term (enviregburdenxindus)	Binary	Interaction term of environmental regulatory and industry. 1 – Firms both experience environmental regulatory burden AND belong to the industry sector 0 – Firms do not experience environmental regulatory burden AND/OR do not belong to the industry sector