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Abstract

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The Electricity Intensity of Firms in Special Economic Zones*

Ronald B. Davies†
(University College Dublin)

T. Huw Edwards
(Loughborough University)

Arman Mazhikeyev
(University College Dublin)

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Abstract

In the light of concern over the environmental impact of Special Economic Zones located in developing countries where environmental regulation is weak, we analyse the electricity intensity of firms in SEZs. We use firm level data from Africa and Asia, and we find that SEZ firms have higher electricity intensity as opposed to non-SEZ firms. This difference is influenced by measures indicative of access to finance, suggesting that the difference may be driven by SEZ firms being able to obtain funding to upgrade to more modern, yet more energy intensive, production methods.

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†Corresponding author: University College Dublin. Email: ronbdavies@gmail.com.

1 Introduction

Special Economic Zones (SEZs) have become a prevalent policy instrument for promoting export oriented economic growth. Between 1986 to 2014, the number of SEZs went from 176 to 4000 (Farole, 2011; The Economist, 2015). By offering preferential policies such as lower export/import barriers or reduced tax rates, SEZs are intended to provide an environment that attracts FDI, encourages skill upgrading, and the adoption of new technologies, all of which can help developing economies to diversify their production base into manufacturing. For example, in part due to its use of SEZs, Costa Rica increased the share of manufacturing in its exports from 10% in 1999 to 61% by 2013 (CID, 2015). With the explosion of SEZs in the developing world (60% are in Asia-Pacific countries with another 20% in the Middle East and Africa), the World Bank (2008) reports that over 40% of global exports are done by SEZs in the developing world. Alongside this increase in manufacturing comes the potential for significant environmental damages. Studies like Eskeland and Harrison (2003) and Cole, et al. (2005) show that there is a strong link between activities of manufacturing firms and green house gas (GHG) emissions resulting from the intensive energy use by firms. In particular, as discussed by the ILO (1998), because most SEZs are in developing countries where environmental regulations are weaker this raises the concern that SEZs may have significant environmental consequences. In this paper, we use data on over 11,000 manufacturing firms across 32 developing countries to examine whether firms in SEZs are indeed more energy intensive relative to their counterparts. We find that, even after controlling for factors such as productivity and industry, firms in SEZs are approximately 4% more electricity intensive than comparable non-SEZ firms. In particular, we find that this gap is higher when firms face greater financial barriers, suggesting that SEZ firms (which typically report better access to funding) may be upgrading to more modern yet energy-intensive technologies.

While most of the literature on SEZs studies productivity (World Bank 2008), backward and forward linkages (Din, 1994), exporting behaviour (Davies and Mazhikeyev, 2015), working conditions (Milberg and Amengual, 2008), welfare gains (Hamilton and Svensson, 1982), or compares the experiences of implementation of the policy in different regions (Aci, et al., 2009; Cling et al., 2005; Farole, 2011, World Bank 2008, KPMG, 2011), the environmental aspects of SEZs have not received significant attention. According to Farole (2011) and Zeng (2015), SEZs are geographically distinct territories where (foreign and local) firms can benefit from lower export fees, taxes, import tariffs, and less bureaucracy, inspections and paperwork. In SEZs, therefore, firms can produce, export and import more easily and quickly, compared to firms in other non-SEZ parts of a country. This gives an advantage for SEZ-based firms, potentially leading to an inter-firm reallocation of production ala Melitz (2003) in favor of SEZs. In fact, we do observe that firms in SEZs are larger and export more often. This greater size then has knock-on environmental consequences depending on the relative emissions of SEZ and non-SEZ firms. As emissions data is typically unavailable, as with the bulk of the literature, we focus on energy intensity which, as demonstrated by Becker and Henderson (2000), Greenstone (2002), and Broner, et al., (2013) is correlated with GHG emissions. Thus our aim here is to compare the energy intensity, and specifically the electricity intensity (electricity expenditures relative to sales) of SEZ and non-SEZ firms.[1]

A priori, one can envision a number of potentially conflicting differences between SEZ firms and non-SEZ firms that can affect their electricity intensity. First, if SEZ firms have more modern technologies, these may reduce the overall energy needs of production. Alternatively, if these more modern and more automated plants use electricity rather than coal or oil, this would increase electricity intensity.[2] Further, SEZ firms may produce a different mix of products. Note that these possibilities may well be linked to a firm's funding opportunities since they represent a costly change in technology. Second, if an SEZ leads a firm alter its product mix so that it manufactures more energy intensive goods within its industry, then SEZ firms may be more electricity intensive compared to their non-SEZ counterparts. Third,

[1] Our focus on electricity is driven by data availability. We acknowledge that this is nevertheless only one source of energy and that the results must be interpreted in that light.

[2] Roy and Yasar (2015) find that exporting results in a shift from other energy sources towards electricity.

if SEZs are dominated by foreign multinationals seeking lower environmental regulation due to their energy use, firms in SEZs may be more energy intensive.[3] Finally, it may be that electricity provision in SEZs is more reliable than outside of such zones, leading to higher reliance on this energy type (and perhaps energy overall). Therefore the net effect of SEZs on electricity intensity is an open question.

Against this backdrop, we estimate the electricity intensity of 11,186 firms across African and Asian countries as it depends on firm, country, and time characteristics. In our main specification, we find that SEZ firms are on average 4.2% more electricity intensive than their non-SEZ counterparts. In order to provide insight into what may be driving this higher energy intensity, we undertake several additional robustness checks. First, we omit the foreign-owned firms, something which does not affect the SEZ result. This suggests that the difference is not driven by multinationals seeking low environmental regulation hosts. Second, we exploit cross-country and cross-firm variation in measures related to regulation and barriers to doing business. The rational behind this is derived from studies such as Bagaev (2015) which finds that access to finance has a significant impact on the pollution intensity of Eastern European exports, potentially via firms' ability to upgrade their technology. Using firm level data for Central European and Central Asian countries, Bagaev and Najman (2012) similarly find that country financial development has a significant effect on firm-level energy intensity. Trianni, et al. (2012) find similar effects for Italy while Fafchamps and Schündeln (2013) do so for Morocco. Other studies consider factors such as government and business regulations (Cling and Letilly, 2001), imperfect information (Gillingham and Palmer, 2014), and infrastructure (Petersen and Rajan, 2002) with regards to the energy intensity for manufacturing firms (although none these studies specifically consider SEZs). In particular, we find that greater regulatory burdens and greater financial barriers increase the electricity intensity of SEZ relative to non-SEZ firms. This latter result is telling as, in our data, non-SEZ firms more often indicate that financial barriers are a

[3]Hanna (2010) find that energy intensive US multinationals relocate their production to developing countries with weak environmental regulations.

detriment to doing business than do SEZ firms. Thus, SEZ firms, particularly when funding is difficult to obtain, may be more apt to upgrade their technology. This suggests that the effect of SEZs may be coming from such firms having more modern, yet more electricity intensive, production methods.

It should be noted, however, that even if electricity intensity is higher for SEZ firms, this does not necessarily translate into higher emissions and lower environmental quality. More advanced technologies, although requiring more energy, may also result in less emissions from that energy use. In addition, if the effect comes from a shift from coal or oil burning towards electricity, this too can lower the environmental impact of higher energy use. Finally, if SEZs have superior infrastructure that allows firms to rely on centrally-provided electricity as opposed to their own generators, this can also offset the environmental damages or greater electricity intensity.

The rest of the paper is organised as follows. Section 2 provides a statistical description and correlation analyses of data. Section 3 describes our empirical model and regression results. Section 4 provides a brief summary and draws conclusions.

2 Data and Summary Statistics

In this section, we describe our data and make some preliminary comparisons between SEZ and non-SEZ firms.

2.1 Data

Our primary data come from the World Bank's Enterprise Surveys.[4] Although the bulk of the research uses the standardised version of these surveys, we instead use the more recent unstandardised versions as they contain information on whether or not firms are in SEZs.[5]

[4] These can be found at `http://www.enterprisesurveys.org/`.

[5] Some of these surveys only ask whether or not a firm is in an SEZ whereas others distinguish between export processing zones and industrial parks. We do not make use of this distinction as the difference is not obviously comparable across surveys and that it would preclude including some countries where the survey

In some countries, surveys were conducted twice; in these cases we kept the survey with the greatest number of observations. Note that since there is no indication whether a firm was surveyed twice when multiple surveys exist, we cannot use a panel data approach, making our data cross-sectional. We restrict our data to the manufacturing sector only, which is generally seen as being more energy intensive than services.[6] After cleaning, matching, and harmonising the surveys, we were left with 32 surveys covering African and South Asian countries and a total of 11,186 firms. Table 1 lists the countries and years of surveys in our sample, along with the number of SEZ and non-SEZ observations.

Along with SEZ data, surveys contain other information about firms. First, it includes information on the firm's electricity usage and total sales, the ratio of which is our proxy for the electricity intensity of a firm (i.e. the electricity expenditure divided by total sales).[7] This measure is commonly used to proxy for energy intensity in the literature (see, e.g. Bagaev (2015) or Batrakova and Davies (2012)).[8] Sales are also used to construct a proxy for labour productivity, which is the ratio of sales to employment.[9] In addition, we use employment separately as a proxy of firm size. We also have information the age of the firm and a set of dummy variables indicating when a firm is foreign-owned, multi-product, possesses an international quality certificate, licenses foreign technologies, imports, and exports. In particular, Cole, et al. (2006) find that trade openness leads to higher energy intensity. All non-binary firm variables are logged and the summary statistics are found in Table 2.

As shown by Davies and Mazhikeyev (2015), the impact of SEZs on firm exporting behaviour varies with national characteristics such as government regulation. With that in mind, in addition to firm-level information, we utilize information on at the national

does not distinguish between the two. Finally, as some countries do not have surveys including the SEZ question in any form, these were excluded.

[6]Specifically, we use firms with ISIC 3.1 classification codes from 15 to 37.

[7] Sales and electricity costs are reported in local currencies. We convert these into constant 2010 US dollars, using the US consumer price index and the official exchange rates obtained from the World Bank's Development Indicators database. Years of all deflator variables correspond with year of enterprise surveys.

[8]We nevertheless acknowledge that as it represents only one type of energy consumption, that it is at best a proxy.

[9]This measure is common in the literature for labour productivity. See for example, Pavcnik, 2002.

level to construct country-specific measures of fiscal, financial and environmental regulatory burdens. Data to construct these measures comes from Inter-American Development Bank's DataGob.[10] More specifically, to construct the fiscal regulation burden measure, we used (scale based) indicators of the burden of local government regulation, the business impact of custom procedures, the efficiency of customs procedures, and the organized efforts to improve competitiveness. For the financial regulation burden measure, we include data on the inefficiency of the tax system, the irregular payments in loan applications, and the resolutions in courts for overdue payments. For environmental regulation burden measure, we used the environmental regulation stringency and the sustainable development indicators. All indicators used to construct our regulatory measures are highly and positively correlated with each other, therefore we combine them using principle component analysis so that we have mean zero regulatory measures where higher values indicate a greater burden to doing business. Details of this process are in Table 3. In addition, we use a variable NTB, which is the ad valorem equivalent form of Trade Restrictiveness Indicators from Kee, et al. (2009).

As an alternative to these national level measures of regulatory burden, we additionally employ firm-level measures derived from the firm's self-revealed biggest obstacle.[11] Specifically, we construct two dummy variables, the first equal to one for those firms listing access to finance as their largest problem and the second equal to one for firms listing electricity provision as their biggest difficulty. In our data, 15.9% of non-SEZ firms report financial barriers as their greatest problem. In contrast, only 11.8% of SEZ firms do so suggesting that these firms typically have better access to funding.[12] Similarly, 23.2% of non-SEZ firms report electricity as their greatest problem whereas only 16.2% of SEZ firms do so. Although one might well be concerned with endogeneity in these (i.e. that firms using more electricity find access to electricity their primary difficulty), we utilize them in a subset of our regressions with the caveat that they need to be interpreted in light of that possibility.

[10] These are available at `http://www.iadb.org/datagob`.

[11] Other firm-level responses on the barriers created by factors such as corruption or taxes were also used. These, however, were insignificant and therefore are omitted for space.

[12] Indeed, some SEZs include financial sources unavailable to firms outside the zone.

2.2 SEZ vs non-SEZ Firm Characteristics

In Table 4 we present the means of energy intensity and firm characteristics of those in and outside SEZs (columns 1 and 2). Column 3 presents the difference between the two with the $*$s indicating the significance of an SEZ dummy variable in a regression also controlling for country, year and industry effects. The final column indicates this estimated difference as a percentage term.

Beginning with the variable of interest, we see that firms in SEZs are more electricity intensive than their non-SEZ counterparts. This difference, however, is not significant. It should be noted, however, that this comparison does not control for other firm-level characteristics. As the rest of the table shows, there are a number of significant differences between SEZ and non-SEZ firms. SEZ firms are larger (in terms of sales and employment), younger, more productive, and more likely to be foreign-owned, have a quality certification, license a foreign technology, export, and import. SEZ firms, on the other hand, are less likely to be multi-product firms.

3 Regression Results

As noted above, we found no differences in the electricity intensity of SEZ firms. That analysis, however, did not control for other firm characteristics such as size or productivity which may influence energy use. Therefore, in this section we turn to regression analysis. Our baseline specification is:

$$EI_i = \beta_0 + \beta_1 SEZ_i + \beta_2 Z_i + \theta_j + \theta_s + \theta_t + \varepsilon_i \tag{1}$$

where $EI_{i,j,s,t}$ is electricity intensity, SEZ_i is a dummy equal to 1 if the firm is in an SEZ, Z_i is a vector of controls as discussed above, and the θs are a set of country j, sector s, and year t dummy variables. These latter serve as fixed effects to control for unobservables factors common across firms in a given country (which are all observed in the same year), common across firms in a given sector, and common to all firms surveyed in a particular year. Because the data come from a stratified survey, we weight the observations according to the strata in the survey, specifically employment in three categories (under 20, 20-99, and 100+) and country.[13] Further, we cluster the standard errors by country. To this baseline, as described below, we introduce additional country-level NTM measures.

3.1 Baseline Results

Table 5 presents the baseline regression results. Column 1 includes the firm-level controls excluding the SEZ, importer, and exporter dummies. Excepting the licensing of foreign technology, all of these controls are highly significant. In particular, we find that more productive and older firms are less electricity intensive. The same is true for larger and multi-product firms which may indicate some economies of scale in electricity usage. In contrast, foreign-owned firms and those with a quality certificate use more electricity relative to output. As we are controlling for sector dummies, this may suggest that these firms are making more energy intensive products compared to the average firm in their industry.

Column 2 introduces the SEZ dummy. In contrast to Table 4 we find that after controlling for additional firm-level characteristics, the higher electricity intensity of SEZ firms is significant. In any case, this is consistent with SEZ firms relying more on electricity use due to more reliable provision within the zone, using more modern and energy-intensive technologies, and/or specializing in more energy-intensive products within their sectors. With the exception of age, which is now less significant, introducing the SEZ dummy does not overly affect the other estimates. It is important to recognize that their continued significance, combined with their significant differences between SEZ and non-SEZ firms, is why we now find a significantly higher electricity intensity for SEZ firms whereas we did not in Table 4.

In columns 3 and 4, we introduce the exporter and importer dummies, both on their own and interacted with the SEZ variable (column 4). Firms that export and import have higher

[13] See `http://www.enterprisesurveys.org/methodology` for discussion on the survey stratification.

electricity intensity. This is consistent with the average exporter effect found by Batrakova and Davies (2012). This difference, however, does not vary with whether or not the firm is in an SEZ. Using the sample average (logged) electricity intensity of -4.097 and the results of our preferred specification in column 3, being located in an SEZ would increase the electricity intensity from -4.097 to -3.923, an increase of 4.2%.

Finally, in column 5, we omit foreign-owned firms out of concern that for this group, high electricity using firms may be seeking out low regulation countries and the locating within their SEZs. However, as can be seen, omitting these firms does not impact the SEZ coefficient (although it does eliminate the significance of the labour productivity measure).

3.2 Propensity Score Matching

One possible issue with our estimates is endogeneity, i.e. firms that are more electricity intensive choose to locate within SEZs. In particular, MNEs, which choose their locations in part based on environmental regulatory pressures, may seek out SEZs due to their relatively suitable conditions for importing intermediates and exporting their final products.

In an attempt to examine this, in Table 6 we employ a propensity score matching technique to estimate:

$$\tau_{ATT} = EI_{SEZ=1,p(X)}(EI(EXP(1)|_{SEZ=1,p(X)}) - EI(EXP(0)|_{SEZ=1,p(X)})) \quad (2)$$

where we estimate the difference in electricity intensity between SEZ firms (i.e. treated group) and non-SEZ firms (i.e. control group) while holding the probability of being in an SEZ constant (following Caliendo and Kopeinig, 2008).[14] As any remaining differences in the productivity of the matched sample of SEZ and non-SEZ firms is attributed to the treatment, it is paramount to ensure that all observable factors influencing the firm's selection into an SEZ as well as the firm's electricity intensity, are controlled for. Although several matching approaches are available, using a caliper of .0001 worked best with respect to the tests of

[14] We still control for country, sector, and year effects with fixed effect dummies.

appropriateness. When doing so, we see in Panel A that in both the unmatched and matched sample, there is a significant difference between SEZ and non-SEZ firms. When matching, the size of the difference falls marginally (from -4.02 to -4.01), however there is a large decline in significance (with the associated t-statistic falling from 6.14 to 2.96). Nevertheless, this provides some reassurance that endogeneity is not driving the result.

This approach, however, relies on an appropriate matching. With this, there are two factors to consider. First, it relies only on firms for which a match could be found, resulting in only 4044 non-SEZ firms and 2419 SEZ firms for which there was common support (i.e. slightly over half the sample). Second, as shown in Panel B, even after matching, there are some significant differences in size and age. However, as shown in Panel C, the low pseudo-R2 after matching supports the quality of the process. Finally, we perform a likelihood test on the joint significance of all the variables included in the probit model before and after matching. Following the same logic, we should expect to reject this test on the matched sample only (Caliendo and Kopeinig, 2008) which is again the case. Thus, these tests support the validity of the matching with these caveats in mind.

3.3 The extended baseline results

As shown in Davies and Mazhikeyev (2015), the impact of SEZs can depend crucially on the national environment in which they are used. With this in mind, here we extend the baseline equation by including interacting measures of local barriers with the SEZ dummy. When the barrier is at the national level, the impact of the barrier itself is absorbed by the country fixed effect, thus we only include the barrier itself when using the ones derived from the World Bank survey's question on what the firm perceives as its biggest barrier. Thus, the extended baseline is:

$$EI_{i,j,s,t} = \beta_0 + \beta_1 SEZ_i + \beta_2 X_{i/j} + \alpha_1 SEZ_i * X_{i,j} + \beta_2 Z_i + \theta_j + \theta_s + \theta_t + \varepsilon_i. \qquad (3)$$

where $X_{i/j}$ is the additional NTM (measured at the firm i or the country j level). Note that in this case, the net effect of an SEZ on electricity intensity is $\beta_1 + \alpha_1 * X_{i/j}$. That said, since the means of the X_j variables are zero by the PCA construction, when using these country-level NTMs, at the sample mean the net impact of an SEZ is simply β_1.

Table 7 presents these results with the different columns utilizing different barrier measures. In column 1, we include the interaction between the regulation burden variable and the SEZ variable (again, as the regulation burden is a country-specific measure, its non-interacted effect is absorbed by the country fixed effect). As can be seen, in countries where the regulatory burden is higher, the electricity intensity difference between SEZ and non-SEZ firms is significantly higher. Similarly, the results in column 2 show that the gap is higher in countries where financial barriers are large. To put this in context, whereas the average country has a financial barrier of zero (meaning that SEZ firm's electricity intensity is .184 higher than non-SEZ firms), a high fiscal barrier country would see a difference of .184+.0853*2.84 = .427, i.e. a difference more than twice as large. This might be consistent with SEZ firms having better access to funding, leading them to upgrade to more modern and energy intensive production methods, with this advantage mattering more where financing is difficult. In contrast, column 3 indicates that the difference between SEZ and non-SEZ firms does not depend on the environmental stringency of the country in question. This potentially argues against pollution haven concerns based on the fear that the higher SEZ electricity intensity is driven by either more lax regulation in the zones and/or multinationals (which are more common in SEZs) seeking out weak environmental standards. Likewise, column 4 indicates that there is no difference in the relative energy-intensity of SEZ firms in more versus less open economies.

In the last two specifications, we use the firm-level variable indicating whether they find financial barriers their largest difficulty (column 5) and whether electricity provision is their greatest problem (column 6). Beginning with the financial barrier, for firms outside of an SEZ, those listing financial barriers as their greatest problem have lower energy intensity than those that do not. As with column 2, this suggests that financially constrained firms may not be upgrading to more modern, energy-intensive technologies. For firms in an SEZ, however, the sum of the financial variable and its SEZ interaction cancels out, i.e. for firms within an SEZ, there is no difference in the electricity intensity of those that are severely financially constrained and those that are not. Finally, turning to the electricity variable we see that, for firms outside SEZs, those for which report electricity provision as their greatest problem have significantly higher electricity intensity than those that do not. The same is true for firms within SEZs, although that gap is smaller due to the negative coefficient on the interaction term. This result, however, should be interpreted with caution as this electricity variable may well be endogenous, i.e. those firms that are electricity intensive are more apt to report electricity provision as a major issue.

Combining these results indicates that there may well be an important interaction between access to finance and the electricity impact of SEZs. This, combined with the insignificance of the environmental burden interaction suggests that our results may be driven primarily by SEZ firms having more advanced technology that results in higher electricity usage. Recognizing this is important because, if those technologies are cleaner despite their higher energy use, this may alleviate some concerns over the environmental impact of SEZs.

4 Conclusion

With increasing concern over climate change, increased focus has been put on production, particularly in developing countries where environmental regulations are relatively lax. Special economic zones form a key part of the evolving manufacturing process in these nations and their use is rapidly rising. In this study, using firm-level data across Africa and Asia, we provide evidence that SEZs are linked to greater electricity intensity. This, combined with the greater size of SEZ firms, gives some credence to concerns that SEZs may have significant environmental impacts. However, we also find that this difference depends on the ability of firms to access finances (among other regulatory barriers). As such, this difference may be due to SEZ firms using more modern, yet electricity intensive technologies. To the extent that such production methods reduce emissions in other ways, this does not necessarily mean that SEZs increase pollution. Nevertheless, it does point towards the need to be cognizant of potential environmental impacts from the formation of SEZs.

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Table 1: Countries in the Sample

Country	N	N*	Year
Afghanistan	25	11	2013
Angola	107	21	2010
Bangladesh	1071	162	2013
Botswana	75	41	2010
Burkina Faso	56	25	2009
Cameroon	61	18	2009
Cabo Verde	36	22	2009
Central African Republic	21	10	2011
Chad	34	13	2009
Congo, Rep.	6	3	2008
Congo, Dem. Rep.	177	0	2013
Cote d'Ivoire	122	44	2008
Eritrea	41	10	2009
Ethiopia	110	27	2011
Gabon	12	4	2008
India	6332	4241	2014
Lesotho	18	3	2008
Madagascar	84	26	2008
Mali	281	281	2007
Mauritius	102	25	2008
Mozambique	244	244	2007
Myanmar	281	0	2014
Nepal	237	160	2013
Nigeria	24	5	2009
Rwanda	38	18	2011
Senegal	170	170	2007
Sierra Leone	34	4	2008
South Africa	501	501	2007
Sri Lanka	303	12	2011
Tanzania	180	0	2013
Uganda	162	0	2013
Zambia	241	241	2007
Total	11186	6342	

Table 2: Summary Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Firm Level Variables					
Electricity Intensity	11186	-4.096737	1.400718	-17.53568	-0.3156215
Labour Productivity	11186	9.834382	1.745475	2.991356	20.28038
Size (Employment)	11186	3.643287	1.339936	0	9.21034
Age	11186	2.654669	0.8147293	0	5.241747
Foreign Owned	11186	0.0574826	0.2327728	0	1
Quality Certificate	11186	0.3558019	0.478777	0	1
Multi-product	11186	0.3881638	0.487354	0	1
License	11186	0.1252458	0.3310123	0	1
Import	11186	0.1497407	0.3568331	0	1
Export	11186	0.2007867	0.4006067	0	1
Finance Barrier	11186	0.1358841	0.3426808	0	1
Electricity Barrier	11186	0.1922045	0.3940506	0	1
Country Level Variables					
NTB	11186	-2.674039	0.6577328	-5.550375	-0.9298908
Regulation Barrier	11098	1.41E-08	1	-0.8432723	2.699249
Financial Barrier	11098	5.51E-09	1	-0.79444	2.846229
Environmental Barrier	11098	-3.28E-09	1	-0.6182633	3.704062

Table 3: Construction of Regulation, Finance, and Environmental Burden Variables

Regulatory Burden		
Observations		11098
Retained Factors		1
No of Parameters		4
	Eigenvalue	Proportion
Factor1	3.8763	0.9691
Factor2	0.09652	0.0241
Factor3	0.0248	0.0062
Factor4	0.00237	0.0006
Variables	Factor 1	Uniqueness
greg	0.9726	0.0541
cust	0.9967	0.0067
ecus	0.9903	0.0193
comp	0.9779	0.0437

Financial Burden		
Observations		11098
Retained Factors		1
No of Parameters		3
	Eigenvalue	Proportion
Factor1	2.34622	0.7821
Factor2	0.51553	0.1718
Factor3	0.13825	0.0461
Variables	Factor 1	Uniqueness
taxs	0.9067	0.1779
payl	0.9444	0.1082
opay	0.7952	0.3677

Environmental Burden		
Observations		11098
Retained Factors		1
No of Parameters		1
	Eigenvalue	Proportion
Factor1	1.28473	0.6424
Factor2	0.71527	0.3576
Variables	Factor 1	Uniqueness
pres	0.8015	0.3576
erst	0.8015	0.3576

Table 4: SEZ Versus non-SEZ Firms

Variable	SEZ	nonSEZ	Difference	Perc. Change
lnelecint	-4.04	-4.17	0.134	-3%
lnsales	13.93	12.88	1.053***	8%
exporter	0.20	0.20	0.008***	4%
lnLP	10.20	9.35	0.849***	8%
lnemp	3.73	3.53	0.204***	5%
lnage	2.62	2.69	-0.069***	-3%
Foreign10	0.06	0.05	0.006***	11%
qcert	0.45	0.23	0.215***	48%
multi	0.37	0.42	-0.051***	-14%
license	0.15	0.10	0.053***	36%
import	0.15	0.15	0.002***	1%

Notes: SEZ coefficient comes from a regression using SEZ,country, sector, and year dummies. ***, **, and * on difference denote significance at the 1%, 5%, and 10% levels respectively. Percent change is $100(e^{\beta} - 1)$ where β is the SEZ coefficient.

Table 5: Baseline Regression Results

	(1)	(2)	(3)	(4)	(5)
Export*SEZ				-0.0508	
				(0.0649)	
Import*SEZ				-0.0687	
				(0.0750)	
SEZ		0.173***	0.174***	0.193***	0.172***
		(0.0281)	(0.0280)	(0.0299)	(0.0282)
Export			0.0809**	0.113**	-0.478***
			(0.0345)	(0.0541)	(0.0139)
Import			0.200***	0.240***	-0.174***
			(0.0405)	(0.0609)	(0.0114)
Productivity	-0.483***	-0.484***	-0.492***	-0.492***	-0.0227
	(0.0130)	(0.0130)	(0.0131)	(0.0131)	(0.0149)
Size	-0.147***	-0.149***	-0.173***	-0.175***	0.0758***
	(0.0106)	(0.0106)	(0.0114)	(0.0114)	(0.0272)
Age	-0.0316**	-0.0256*	-0.0297**	-0.0295**	-0.0756***
	(0.0147)	(0.0147)	(0.0147)	(0.0147)	(0.0249)
Fgn Owned	0.199***	0.195***	0.149**	0.150**	
	(0.0652)	(0.0652)	(0.0651)	(0.0651)	
Q. Cert.	0.0955***	0.0810***	0.0680**	0.0669**	-0.0277
	(0.0268)	(0.0269)	(0.0270)	(0.0270)	(0.0371)
Multi	-0.0799***	-0.0763***	-0.0768***	-0.0773***	0.199***
	(0.0247)	(0.0247)	(0.0246)	(0.0247)	(0.0418)
License	0.00220	-0.0113	-0.0170	-0.0175	0.466
	(0.0359)	(0.0360)	(0.0359)	(0.0359)	(0.498)
Constant	3.815***	3.673***	3.834***	3.833***	0.172***
	(0.222)	(0.222)	(0.225)	(0.226)	(0.0282)
Observations	11,186	11,186	11,186	11,186	10,543
R-squared	0.333	0.336	0.338	0.338	0.328

Notes: ***, **, and * on difference denote significance at .
the 1%, 5%, and 10% levels respectively.
Country, industry and year dummies included in all.

Table 6: Propensity Score Matching: Energy Intensity

Panel A: Selection

Variable	Sample	Treated	Controls	Difference	S.E.	T-stat
Elec. Int.	Unmatched	-4.02140314	-4.20254291	0.181139768	0.029489388	6.14
	ATT	-4.01002853	-4.15979414	0.149765611	0.050619263	2.96

Panel B: Sensitivity Test

Variable	Sample	Treated	Control	%bias	t-test	Prob. Val.
Productivity	Unmatched	10.167	9.5103	47	22.3	0
Productivity	Matched	10.071	10.104	-2.4	-0.87	0.383
Size	Unmatched	3.8786	3.584	22.4	10.63	0
Size	Matched	3.7944	3.8789	-6.4	-2.25	0.025
Age	Unmatched	2.7038	2.7395	-4.5	-2.14	0.033
Age	Matched	2.7282	2.7805	-6.6	-2.31	0.021
Fgn. Owned	Unmatched	0.03588	0.04105	-2.7	-1.27	0.205
Fgn. Owned	Matched	0.03592	0.03509	0.4	0.16	0.876
Q. Cert	Unmatched	0.5158	0.25247	56.2	26.3	0
Q. Cert	Matched	0.45781	0.4787	-4.5	-1.45	0.148
Multi	Unmatched	0.26972	0.3954	-26.9	-12.73	0
Multi	Matched	0.27444	0.29574	-4.6	-1.63	0.103
License	Unmatched	0.13986	0.08828	16.3	7.59	0
License	Matched	0.10777	0.09733	3.3	1.19	0.234

	Sample	Ps. R^2	LR χ^2	$p > \chi^2$	Mean Bias	Med Bias
	Unmatched	0.234	2885.7	0	16.2	11.2
	Matched	0.007	47.81	0.522	2.2	1.6

Table 7: Extended Baseline Regression Results

	(1)	(2)	(3)	(4)	(5)	(6)
SEZ	0.180***	0.184***	0.182***	-0.0380	0.145***	0.210***
	(0.0285)	(0.0290)	(0.0326)	(0.145)	(0.0289)	(0.0297)
Regulation*SEZ	0.0910**					
	(0.0354)					
Financial*SEZ		0.0853**				
		(0.0339)				
Environmental*SEZ			0.0400			
			(0.0465)			
NTB*SEZ				-0.0800		
				(0.0544)		
Financial*SEZ					0.235***	
					(0.0649)	
Financial					-0.226***	
					(0.0506)	
Electric*SEZ						-0.188***
						(0.0563)
Electric						0.271***
						(0.0413)
Productivity	-0.482***	-0.482***	-0.481***	-0.484***	-0.486***	-0.484***
	(0.0124)	(0.0124)	(0.0124)	(0.0130)	(0.0130)	(0.0129)
Size	-0.151***	-0.151***	-0.150***	-0.150***	-0.152***	-0.151***
	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0106)	(0.0106)
Age	-0.0252*	-0.0253*	-0.0242	-0.0264*	-0.0275*	-0.0235
	(0.0147)	(0.0147)	(0.0147)	(0.0147)	(0.0147)	(0.0146)
Fgn. Owned	0.203***	0.204***	0.205***	0.195***	0.190***	0.193***
	(0.0654)	(0.0654)	(0.0655)	(0.0652)	(0.0652)	(0.0652)
Q. Cert.	0.0877***	0.0877***	0.0848***	0.0821***	0.0811***	0.0839***
	(0.0268)	(0.0268)	(0.0268)	(0.0269)	(0.0269)	(0.0269)
Multi	-0.0736***	-0.0736***	-0.0739***	-0.0765***	-0.0760***	-0.0767***
	(0.0246)	(0.0246)	(0.0247)	(0.0247)	(0.0247)	(0.0246)
License	-0.0128	-0.0124	-0.0131	-0.0100	-0.0142	-0.0121
	(0.0357)	(0.0357)	(0.0358)	(0.0360)	(0.0360)	(0.0359)
Constant	0.211	0.204	0.266	3.742***	3.743***	3.609***
	(0.439)	(0.439)	(0.436)	(0.225)	(0.224)	(0.221)
Observations	11,098	11,098	11,098	11,186	11,186	11,186
R-squared	0.326	0.325	0.325	0.336	0.337	0.339

Notes: ***, **, and * on difference denote significance at the 1%, 5%, and 10% levels respectively.
Net SEZ Effect=0 at the sample mean is significant at the 1% for all NTM variables.
Country, industry and year dummies included in all regressions.