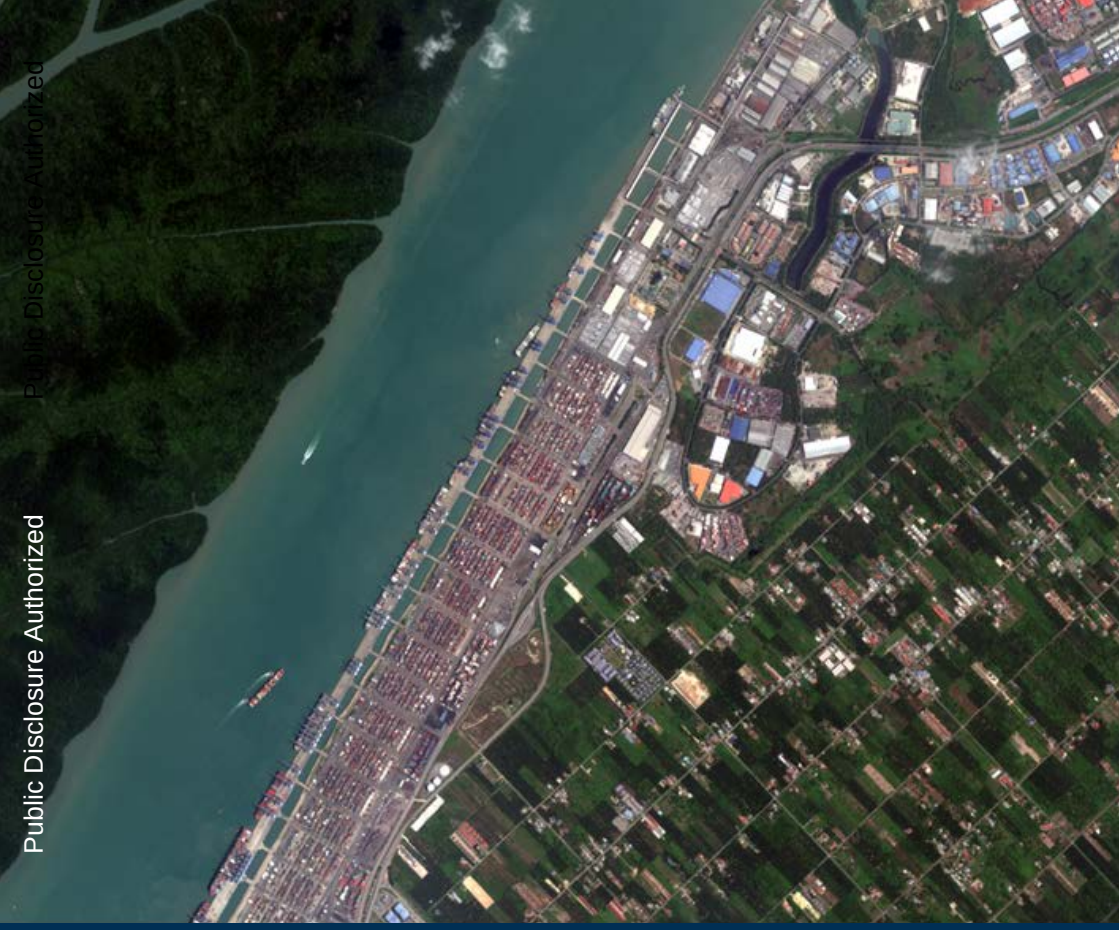

Special Economic Zones

An Operational Review of Their Impacts

CIIP Competitive Industries and Innovation Program

Financed by

in partnership with WORLD BANK GROUP

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About the Competitive Industries and Innovation Program (CIIP)

The CIIP partnership was created to enhance country growth and employment prospects by supporting public policies and investments that promote competitiveness and innovation within and across industries. As the Trustee and Administrator for CIIP, the World Bank Group is responsible for program development, implementation, and monitoring and evaluation. For more information, visit www.theciip.org

Cover picture: Port Klang and Special Economic Zone, Malaysia.
Source: DigitalGlobe

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Abbreviations

AGOA	African Growth and Opportunity Act
CIIP	Competitive Industries and Innovative Program (World Bank)
DMSPUS	Air Force Defense Meteorological Satellite Program
DN	digital number
DOD	US Department of Defense
DPO	Development Policy Operation
ECOSOC	United Nations Economic and Social Council
EPZ	export processing zone
ERR	economic rate of return
ES	Enterprise Survey
ETDZ	economic and technological development zone
EZ	economic zone
FDI	foreign direct investment
FIAS	Facility for Investment Climate Advisory Services (WBG)
FIL	financial intermediary loan
FIZ	foreign investment zone
FTZ	free trade zone
FZ	free zone
GDP	gross domestic product
GDPpc	gross domestic product per capita
GoK	Government of Korea
HTP	high-tech park
IC	investment climate; industrial complex
ICR	Implementation Completion Report (WBG)
IDA	International Development Association (WBG)
IDZ	industrial development zone
IEG	Independent Evaluation Group (WBG)
IFC	International Finance Corporation (WBG)
ILO	International Labour Organization
IMF	International Monetary Fund
IRR	internal rate of return
ISR	Implementation Status and Results Report (WBG)
ITi	nformation technology
ITES	information-technology-enabled services

IZ	industrial zone
km	kilometer
LAC	Latin America and Caribbean
LN	natural log
MAR	Marshall-Arrow-Romer
MSME	micro, small and medium enterprise
NCEI	National Centers for Environmental Information (NOAA)
NEG	New Economic Geofigurey
NLDI	Night Light Development Index
NOAAUS	National Oceanic and Atmospheric Administration
NTL	night-time light
OECD	Organisation for Economic Co-operation and Development
OED	Operations Evaluation Department (WBG)
OIZ	organized industrial zone
OLS	Operational Linescan System
OPCS	Operations Policy and Country Services (WBG)
OSS	one-stop-shop
p.a.	per annum
PAD	Project Appraisal Document (WBG)
PCR	Project Completion Report (WBG)
PDO	Project Development Objectives (WBG)
PoDE	Mozambique Enterprise Development (project)
PPAR	Project Performance Assessment Report
PPP	public-private partnership; purchasing power parity
PSC	public service commission
PSD	private sector development
SEZ	special economic zone
SME	small and medium-sized enterprise
SSA	Sub-Saharan Africa
STIP	science and technology industrial park
TFP	total factor productivity
UNCTAD	United Nations Conference on Trade and Development
VAT	value-added tax
WBG	World Bank Group
WGI	World Governance Indicators
WTO	World Trade Organization
ZF	Zona Franca
ZFIS	Zona Franca Industriales o Servicios
ZFPM	Zona Franca Permanente Multi-usuario
ZOLI	Zona Libre
ZIP	Zona Industrialiales de Procesamento para Exportaciones

Executive Summary

Special Economic Zones (SEZs) have become an increasingly popular instrument to promote economic development. Over the last two decades, in particular, SEZs have proliferated in emerging and transition economies. States promoting zones have sought to stimulate economic development both within and outside the zone. Within the zone, states aim to attract investment that will lead to new firms and jobs, and to facilitate skills and technology transfers. Outside the zone, states aim to generate synergies, networks, and knowledge spillovers to foster additional economic activity.

However, whether SEZs have achieved their objectives is unclear. Most existing studies of SEZs have taken a case study approach, focusing on a limited group of zones in a select number of countries. Many of these investigations provide interesting insight into what makes a zone dynamic and successful. However, the majority of research has focused on the most successful cases. The tendency to focus on "success-only" analyses raises questions about the validity of generalizing the factors behind the success of a specific SEZ, which is embedded in specific economic, social, political, and legal contexts. Replicating policy and incentive models involves significant risk.

The aim of this report is to analyze both the factors driving SEZ performance in emerging market economies, and the extent to which SEZ performance drives economic growth in surrounding areas. Lack of comparable cross-country data on the performance of SEZs has been a fundamental barrier to this type of study. To conduct broader empirical analysis, this study relied on the increasingly widespread use of nightlights data in economics to overcome the lack of reliable information on the performance of individual SEZs.

Comparable information also is missing about the characteristics of the zones and about the zone-specific and regional and/or national policy

programs from which zones originate. The authors created a bespoke dataset from scratch. It encompasses: i) SEZ program factors including the incentives packages, requirements, and program characteristics that underlie setting up and operating a zone; ii) SEZ-specific factors including the size of the zone, the type of operator of the zone, years in operation, and distance to major cities and infrastructure; and iii) indicators about the zones' regional and national contexts including proximity to large markets, GDP per capita, years of schooling,

This report also reviews World Bank-financed SEZ projects to assess how they have performed, drawing on World Bank project documentation current at the time of each project. The review assesses the development objectives of individual projects; the extent to which these objectives were achieved; the challenges faced; and the lessons learned that could inform the scope and design of subsequent projects.

Typically, the success of a zone and its impact depend on factors both within and outside the zone: (1) the SEZ program and its characteristics; (2) the structure and layout of the zone; and (3) regional and country contexts.

Within the zone, the SEZ program and its characteristics generally include a combination of fiscal and nonfiscal incentive packages, a number of investment and ownership requirements, and a series of factors linked to the organizational set-up of the zone. These last factors include the degree of independence of the regulator and the date of the establishment of the zone.

Similarly, the characteristics relating to the structure and layout of the zone are key drivers of the zone's performance. Characteristics include maturity, size, type of operator, specific location, industry focus, infrastructure endowment, and specific services offered.

The regional and country contexts in which a zone operates are crucial for its economic dynamism. The skills, infrastructure, institutions, and external and agglomeration economies at the zone's disposal can help shape its performance.

Data on all these factors have been sourced from the newly gathered Competitive Industries and Innovation Program (CIIP) dataset on Spe-

cial Economic Zones, which totals 553 zones in countries and South Korea.

To conduct broader empirical analysis regarding zone performance, this study relied on the increasingly widespread use of nightlights data in economics to overcome the lack of reliable information on the performance of individual SEZs. This approach requires its SEZ sample to comply with five criteria: (1) a differentiating regulatory framework and/or incentive scheme applicable to firms within the zone; (2) focus on manufacturing or services; (3) presence of clear territorial boundaries; (4) minimum size of 50 ha and a maximum size of 1000 ha to ensure an optimal fit of the nightlights proxy as an SEZ performance indicator and to increase the comparability of the zone; and (5) operational by 2007 to enable a minimum of 5 years of activity. The resulting sample includes 346 zones in 22 countries.

The main analytical period is 2007 to 2012, for which all variables are available. To nuance these findings, two complementary sets of results are presented. First, regressions were run on the same cross-country dataset to look at the growth performance of each SEZ in the 5 years after the zone had become operational (but not 2007–12). The aim of this exercise is to uncover the factors that facilitated the success of SEZs during their initial years of operation, regardless of when they were founded. Second, the results of a "deep dive" into the performance of the Vietnamese zones are presented.

As SEZ performance proxies, two variations of the nightlights indicator are used: (1) the growth rate of the nightlights emitted from the SEZ during the analytical period, and (2) the ratio of the change of the nightlights emissions within the zone compared to the change in nightlights in the entire country. The first indicator, the growth of nightlights in the zone, indicates absolute growth. The second indicator is a relative performance measure and captures whether a zone has grown faster than the national average. The second indicator teases out differences in national growth across countries. As a consequence of the overall dynamism of these countries, less dynamic zones in rapidly growing countries often have higher rates of growth than very dynamic zones in low-growth countries.

Finally, to assess whether and to what extent SEZs contribute to growth in surrounding areas, the impact of SEZ performance on the surrounding regions up to 50 kilometers (km) from the zone is analyzed.

Key Findings

The results of the analysis have unveiled three significant findings:

1. **SEZs in the dataset have a nondistinct economic trajectory relative to that of the countries in which they are located.** Rather than catalyzing economic development, in the aggregate, most zones' performance has resembled their national average.
2. **Zone growth is difficult to sustain over time.** Generally, the economic dynamism of the most successful zones happens in their early years and slows over time, leading to the zones' economic performance becoming similar to that of their surrounding areas.
3. **The majority of SEZ program features have had little bearing on zone performance**. Features include incentive packages, and ownership and management schemes designed to attract and facilitate the dynamism of firms to/in the zone. The provision of corporate tax breaks has been of marginal importance, as have most nonfiscal benefits, such as the availability of national one-stop-shops and the independence of zone regulators.

Among the SEZ characteristics driving the economic dynamism of specific SEZs, two factors stand out: zone size and technological components. Larger zones have performed better than smaller zones. Moreover, and contrary to the expectations of policy-makers and zone designers, lower tech, labor-intensive zones have been more economically dynamic than their more high-tech counterparts.

The performance of SEZs in emerging economies has been affected first and foremost by the zones' country- and region-specific contexts. Costs, industry structure, and proximity to large markets influence SEZ dynamism. Generally, large zones in relatively poor areas that are not too far from the largest city, in countries with previous histories of industrializa-

tion, and with relatively easy access to developed country markets have performed best.

Finally, despite not displaying exceptional economic trajectories, SEZs have positively affected the economic performance of surrounding areas. Areas in the immediate vicinity of SEZs have benefited from spillovers emanating from the zone. However, this positive effect on neighboring areas suffers from steep distance decay. The effect declines sharply beyond 20 km and is barely evident beyond 50 km from the center of the zone.

The research certainly is not without limitations. Even though they greatly expand the existing research, the findings rely on a relatively small sample and are highly dependent on data availability in some countries in specific geofigureic areas (such as East Asia, compared to Africa). The use of the nightlights data to determine the success of a zone excludes small and very large zones. Zones that did not take off also are excluded from the sample as are zones that became operational after 2007, thereby constraining interpretation of the results. In addition, some information and variables were more difficult to collect, particularly those that concerned the type of industries present in the zones. Lack of this information could limit the analysis because dynamics of international markets can be critical to firm-level performance and, hence, zone performance.

At the time of this review, the Bank's portfolio of investment lending operations prepared either in direct support of an SEZ, or containing a component supporting an SEZ, consists of 37 projects, with a total commitment of US$2,380 million approved between 1973 and 2015. In this part of the study, the definition of a special economic zone is broadened to include all forms of zones because project design documents do not define exactly the type of zone being financed. The Bank's 37 projects encompass zones with different characteristics and purposes, including export processing zones, industrial estates/parks/free zones, commercial free zones, enterprise zones, agricultural zones, and investment zones.

Of the 37 lending operations, which are spread over different regions, 25 projects have closed (thereby providing a fuller basis for assessing outcomes and impacts), and 12 are under implementation. The portfolio evolved with a regional shift from Asia and Latin America to more projects in Africa.

The projects funded pre-1995 are being financed in the context of an already established Zone policy framework. The World Bank Group (WBG) is financing the implementation. The Bank is funding 50 percent of the operations as Financial Intermediary Loans, thereby enabling access to finance as a component. The components focus primarily on the inputs (land, infrastructure, and buildings) necessary to expand the Zones. Land acquisition was an important issue for the zones located in urban projects. Governments discovered that that they should have paid greater attention to the modality and legalities of land acquisition.

For the post-1995 projects, the implementation capacity for infrastructure components was critical to meet the project targets within the project period. The limited design, procurement, and project management capability did not allow for timely completion of the infrastructure services within a 4- to 6-year project period. A number of projects were found to have been under-prepared, especially regarding the technical designs for the zone construction. The inadequate preparation made it easy for unanticipated infrastructure-related problems to derail the implementation schedules.

Finally, as a more general lesson, impact assessments are a useful tool to demonstrate the benefits from a project, particularly to highlight the attribution to the project's activities. Impact assessments were not commonly done for the older projects. As a matter of good practice, these assessments should be built into project design. To ensure available resources to carry them out, the assessments could be financed by project funds.

Chapter 1. Introduction

Policy-makers across developing economies are implementing different forms of special economic zones (SEZs): programs intended to catalyze economic growth. The policy objectives can range from creating jobs, increasing household incomes, and increasing economic activity in lagging regions within countries to enabling export diversification and economic transformation. The SEZ program is aimed at attracting foreign direct investment (FDI) to increase firm-level investment and improve firm-level productivity by enhancing firm-level coordination, networks, and innovation. The purpose of this operational review is to inform and to identify and document lessons from the application of these policies across countries and across the World Bank's project portfolio.

The report reviews the SEZ programs, and the characteristics and contexts that are associated with the success of SEZ policies. For example, are smaller or larger zones more effective? Are publicly or privately run zones more effective? The report also adds to the general SEZ debate of whether the benefits generated by SEZs are restricted to the firms within the walls of the SEZs with limited social benefit; or whether SEZs eventually lead to spillovers that support structural change generating high social benefits.

Methodology and Data

Today, various reports put the number of SEZs at approximately 4,300. However, no exact census exists of the number of SEZs. The definitions of SEZs also differ across countries, making estimating the number of SEZs even more difficult.

To establish a database of operating SEZs based on the most recent version of the International Labour Organization-Export Processing Zone (ILO-EPZ) database, the report conducted desk research as well as email outreach to zone management companies. The resulting database covers

over 250 SEZs in 23 countries (chapter 3). The database describes each SEZ in four dimensions:

1. Legal and institutional background, including data points on a country's SEZ legislation and regulatory mechanisms
2. Fiscal incentives available to tenant companies, including tax exemptions, fiscal subsidies, and cash disbursements
3. On-site amenities, including customs office and procedures, and one-stop-shop
4. Country context, including regional characteristics, access to markets and transportation centers, and length of experience with SEZ-type programs.

In addition to the lack of a census on SEZs, data are missing for key performance indicators, such as job creation (direct and indirect), revenues growth, export performance, and spillovers. Therefore, the report will use nightlights data as the proxy for the economic performance of an individual SEZ and surrounding areas. The nightlights data that proxy for economic activity are freely available for 1992 to 2012. These data are collected by satellite images every day at night and averaged over the course of the year. A country then is divided into cells of roughly 1 square kilometer. The luminosity of the light in each cell is reported in lumen measured from 0 to 63 (chapter 3).

Beginning as early as the 1970s, the World Bank has funded a series of projects focused on limited-enclave export processing zones (EPZs). Bank Advisory Services also support promotion, management, and regulation of EPZs. The review focuses on the lending operations using the Bank's Internal Evaluation Group (IEG) criteria: effectiveness, efficiency, and sustainability. The review relies on the main operational project documents. Project Appraisal Documents (PADs), Implementation Completion Reports (ICRs), and Implementation Support Reports (ISRs) were used for this part of the review.

To continue the review work, the team plans to use the existing Enterprise Survey (ES) dataset and supplement these in selected locations to (1) assess the performance of firms operating inside a zone vis-à-vis firms operating outside a zone and (2) recommend additional questions

for the ES questionnaire to better assess firm-level performance. This ongoing work is not part of this report.

Report's Definition of Special Economic Zone

The first modern zone is said to have been established in Brooklyn, New York's Navy Yard in 1937. Occupying 92 acres and located on the East River side of New York Harbor, the first zone was a catalyst for the development of similar zones in other US ports including in New Orleans, San Francisco, and Seattle. These seminal US-based zones were export oriented. These zones provided locations in which exports could be warehoused, produced, sold, or serviced; and provided supporting legislation that included a series of fiscal benefits for exporters.

The first European Zone, the Shannon Free Zone in Ireland, was established in 1959 by the Irish government to repurpose the Shannon International Airport. It was no longer in demand as a refuel hub after the advent of the jet airliner, which could travel longer distances. In Latin America, zone development began in the mid-1960s, first in Colombia, which established the Barranquilla Zone in 1964; then in the Dominican Republic, which established the La Romana Zone in 1965. Zone development in Asia began shortly thereafter, starting with Kandla in India in 1965 and Kaohsiung in Taipei in 1965. These soon were followed by Masan in South Korea in 1970, Sungei Way in Malaysia in 1971, Bataan in the Philippines in 1972, and Tanjun Priok in Indonesia in 1973. By the 1970s, the United Nations Economic and Social Council (ECOSOC) adopted a resolution suggesting the improvement of port, customs, and trade zone facilities in developing countries. Thereafter, zones made their way to Africa, beginning in Mauritius, Ghana, Liberia, and Senegal.

Special economic zones (SEZs) have evolved into various forms and often are called by different names in different countries. A general definition of a special economic zone is a delimited geofigureic area within a country with a zone management providing infrastructure and services to tenant companies, where the rules for doing business are different—promoted by a set of policy instruments that are not generally applicable to the rest of the country (Ge 1999; Hamada 1974).

Literature on SEZs generally emphasizes four critical characteristics:

1. **SEZs occupy geofigureically delimited areas**, unlike many growth poles and clusters, which can be spread out across multiple locations.
2. **SEZs contain multiple companies**. Unlike the single-factory export zones found in many countries (such as Costa Rica and Ghana), SEZs originally were constructed to bring together multiple companies in one geofigureic location to ease transaction costs and generate both vertical and horizontal agglomeration (Hamada 1974; Ge 1999). The basic economic model, established by Hamada (1974), is based on a 2-factor, 2-commodity trade model that assumes that more than 1 domestic firm is involved in the production of goods.[1]
3. **SEZs have a zone management facility or administration**. The function of the management facility is to coordinate activities within the zone, ensure that tenant companies are receiving promised services and advocate for companies in the zone in interactions with government. In China, for example, one unique feature of the SEZ program is that it has decentralized implementation (Huang 1998; Xu 2011). The local government commonly selects an administrative committee to oversee the economic and social management of the zone. The administrative committee also approves FDI projects, building and improving the infrastructure, and regulating the land use on behalf of the local administration (Zeng 2011).
4. **SEZs have a government land policy** that has zoned land specifically for the purpose of the SEZ and includes a special regulatory regime. For example,a regime may be a separate customs area or have streamlined export procedures. Both the zone management facility and the zoned land policy are inherent to the SEZ regime and have been found consistently in zones categorized as SEZs since the 1960s. These characteristics also clarify how SEZs may be different

[1] As policies have evolved, several countries have adopted single-factory export-processing zones that display the characteristics of traditional SEZs but are not located together in one geofigureic area. Theoretically, these single factories are not traditional SEZs but are an outcome of traditional SEZ policy. They are responses to government policy in countries in which the costs of moving firms closer together outweighed the benefits accrued by having an SEZ, or where it otherwise did not make sense to develop an SEZ with multiple companies (such as Intel in Costa Rica). These single-factory zones often share resources associated with a nearby traditional SEZ

in their operations from other similar types of agglomeration or industrial parks.

When compared to the domestic economic environment in which they are placed, SEZs can be considered "special" in several ways. They provide infrastructure (access, quality, reliability, cost, flexibility); customs regimes (efficient customs, duty, or value-added tax (VAT), free or deferred); regulatory regimes (efficient licensing, planning, flexibility), and fiscal regimes (capital freedoms, tax incentives, subsidies) (Farole and Akinki 2011; Gokhan and Crittle 2008; Engman and others 2007).

Structure of the Report

The report is structure as follows. Chapter 2, provides a brief literature review of SEZ theory and performance. Chapter 3 provides an overview of the dataset developed for this work. Chapter 4 presents the econometric estimation using the dataset (for the explanatory variables) and nighttime lights data over 5 years as a measure of success (and dependent variable). Finally, chapter 5 focuses on the World-Bank-Group-funded projects that contain an SEZ component and assess the factors determining success and failures of SEZs.

Chapter 2. Literature Review of Special Economic Zones, Rationale, and Impact

Chapter 2 provides a brief literature review of the theory or rationale for SEZ policies and views concerning their success or failure.

Agglomeration to Reduce Costs

The Industrial Revolution changed the concept of space-economy by transforming industrial processes. With the help of technology, firms were able maintain constant returns to scale and fragment their production with few or no cost implications. The mechanization of industrial processes introduced increasing returns to scale, that is, the larger the quantity produced, the lower the average unit cost. With increasing returns to scale, the concentration of activities encouraged enterprises to develop larger plants. Furthermore, the Industrial Revolution saw improved transportation systems, leading to a dramatic drop in transportation costs. According to Bairoch (1997), "…on the whole, between 1800 and 1910, it can be estimated that the lowering of the real (weighted) average prices of transportation was on the order of 10 to 1." Lower trade costs enabled large plants in central locations to serve distant locations and cities. Overall, the existence of increasing returns to scale and nonprohibitive trade costs advanced the idea of space-economy and generated a new economic field, economic geofigurey. Without these two assumptions, space would not matter: firms would not need to choose the number of their production units and their location.

Why do firms tend to agglomerate instead of spreading evenly over space? The first economist to provide a theory and a model for agglomeration was Alfred Marshall in 1920. Firms tend to cluster near to one another because industrial agglomeration reduces transport costs, hence resulting in "agglomeration economies." Marshall (1920) defined three categories of transport costs: moving goods, labor, and ideas. For exam-

ple, when firms concentrate their production in SEZs, they benefit from the presence of backward and forward linkages related to internal (firms located in SEZs) and external companies, thereby lowering the cost of moving final or intermediate goods. In other words, there are two key channels through which SEZs can develop networks of economic efficiency and interdependence (Ottaviano and Puga, 1998). The first channel consists of the "backward linkages." They arise when suppliers and companies locate in close proximity, which reduces transport costs for raw materials and intermediate goods for SEZ-based firms. The second channel occurs when the agglomeration externalities are reinforced via a demand channel, the "forward linkages" (Marshall 1920; Ottaviano and Puga 1998; Farole 2011). Additionally, the agglomeration of producers of final goods, intermediate suppliers, and consumers can build an ecosystem which attracts more firms to SEZs or nearby locations, thereby creating a self-reinforcing agglomeration mechanism.

Box 2.1 Core-Periphery Model and Agglomeration Mechanism

Agglomeration economies have been emphasized and investigated by the economists of the "new economic geofigurey." The model presented in Krugman (1991) describes a phenomenon whereby firms locate where they incur lower transportation costs, that is, in the largest market. In this larger market, workers face lower prices for manufacturing goods and thus earn higher real wages. This dynamic leads to a migration of workers from the Periphery region to the Core region, which in turn enlarges the market of the Core region. As a result, more firms decide to locate close to the Core market which eventually leads to the agglomeration of all industrial activities in one region (the Core region). This Core-Periphery model has received great attention, and its assumptions have been refined in many ways (Ottaviano and Puga 1998). Every variant attempts to simulate this agglomeration effect.

Clustering of firms in and around SEZs can also create "thick" skilled labor pools that can benefit SEZ-based firms (Neumark and Simpson 2014). This concentrated labor is particularly relevant for SEZs that focus on a specific industry or supply chain. Labor pooling improves the matching between firms and workforce (Combes and Duranton 2006). SEZs can generate a large skilled labor pool, due to natural (workers being attracted by the higher wages or job opportunities) and intended (SEZ-specific policies or strategies to attract workers) forces. Firms can benefit from higher labor productivity, sustain lower search costs,

and obtain better labor matches for jobs (Rodríguez-Pose and Crescenzi, 2008; Combes and Duranton 2006). In addition, employees can take advantage of a wider choice of employment opportunities. These conclusions are drawn from the assumption that workers are able to move across firms and industries. The tradeoff for employers is that easy job mobility leads to poaching (Combes and Duranton 2006). As competition for skilled workers intensifies, employers raise the wages of these workers to avoid losing them or to attract the more productive ones.

Last, the agglomeration of firms in SEZs is expected to lead to technological spillovers. The agglomeration of firms in specialized SEZs promotes Marshall-Arrow-Romer (MAR) externalities (Hu 2007; Rodríguez-Pose and Crescenzi 2008). Concentrating firms within a common industry facilitates industry-related knowledge spillovers among workers and promotes further specialization and industry-specific innovation, leading to firm growth (Henderson 2004). Multisectoral SEZs create an environment for Jacobian externalities (Carlino and others 2001; Rodríguez-Pose and Crescenzi 2008). The diversity of firms and their activities in SEZs enable firms to take advantage of knowledge complementarities and cross-industry transfer of ideas.

Fiscal and Nonfiscal Investment Incentives

Most SEZ policies feature special fiscal incentives for firms that locate in SEZs. Fiscal incentives are rules- and legislation- based, aimed at reducing taxes for companies and sometimes for key employees. Incentives take the form of reduced corporate taxes or tax holidays; investment tax credits or accelerated depreciation allowances to encourage capital formation; or sometimes lower import taxes and tariffs. Financial incentives also are offered to attract companies or to induce them to invest. SEZs tend to compensate investors for the disadvantages of a particular location via special infrastructure developments, job training, expatriation support, or even wage subsidies.

However, incentives can create additional imbalances for the economies. First, fiscal incentives create important tax revenue losses for governments (Zee and others 2002). These losses may be acceptable in a case in which the investments are additional and generate positive externalities. Second, tax breaks and holidays can create resource allocation problems. In other words, fiscal incentives targeting companies located in the zones

draw resources into zone-based companies at the expense of those located outside those zones (Zee and others 2002). In addition, some activities can be promoted over others not because they are more productive but because they are located in SEZs (Zee and others 2002).

The effectiveness of tax incentives (not necessarily related to SEZs) for both foreign and domestic investment deserves special attention. When looking to find the impact of tax incentives provided by SEZs, data on tax incentives are limited in general, and are even scarcer. Klemm and Parys (2012) analyze whether tax incentives are effective in attracting domestic and foreign investment to countries and regions. The authors highlight that lower corporate income tax rates and longer tax holidays are effective in attracting FDI in Latin America and the Caribbean but not in Africa (Klemm and Parys 2012). However, neither of these tax incentives is effective in boosting gross private fixed capital formation. Hence, the impacts of tax incentives vary depending on the level of the country's development (Klemm and Parys 2012). Nonetheless, the empirical estimates indicate that export-oriented investments (by multinational corporations) are particularly sensitive to host countries taxation, that this sensitivity appears to be greater in developing countries than in developed countries, and that this sensitivity becomes even more significant over time (Mutti and Grubert 2004).

An often-stated objective of SEZ policies is to attract foreign direct investment (FDI) to drive growth. To what extent do SEZs attract FDI to the regions? A large strand of the literature has focused on Chinese trade zones. Other conditions being equal (location, infrastructure, skills, or proximity to large markets), the findings highlight that SEZs seem to play a role in attracting more FDI. In China, SEZs were discovered to be influential drivers of FDI. SEZs in China accounted for approximately 50 percent of national FDI (2012) (ADB 2015). Wang (2013) uses a panel dataset of 321 Chinese prefecture-level municipalities. That author finds that SEZs have a strong positive effect on FDI per capita, not only through resource reallocation within a country but also via new, incoming investments. Importantly, SEZs do not seem to crowd out domestic investment. Furthermore, Cheng and Kwan (2000) explore what explains the location of FDI in China. They find that, in addition to good infrastructure and proximity to large markets, SEZs and other similar policies play an important role. Cheng and Kwan (2000) compare the impacts of

SEZ policies versus other types of zones in China. Even though all zones seemed to be meaningful determinants of the location of FDI in China, a comparison of the magnitude of the coefficients for SEZs and other areas suggests that an SEZ on average is 4 to 8 times more effective. In fact, among all the analyzed zones in China, SEZs rank at the top in benefits provided to businesses because the Chinese SEZs give more favorable treatment to FDI than to any other policy incentives. Hu (2005) reports that, by attracting FDI, economic and technological development zones (ETDZs) make an overall positive contribution to local economies.

Finally, Arce-Alpizar and others (2005) present a cost-benefit analysis of the free trade zones and FDI in Costa Rica. They conclude that SEZs not only increased FDI but also improved investments in high-technology fields, especially in sectors such as microprocessors, call centers, and medical accessories.

SEZs and Exports

Stimulating exports, including regional exports, is a very common objective of many SEZ policies. Exports from SEZs account for a significant share of national exports. Examples abound: 17 percent in Bangladesh (2013); 44 percent in China (2012); 11 percent in the Republic of Korea (2007); 49 percent in the Philippines (2011); and 67 percent in Sri Lanka (2007) (ADB 2015). However, when using a more analytical and/or empirical approach to assess the effects of SEZs on magnitude and diversity of exports, the results are mixed.

Schminke and Van Biesebroeck (2013) evaluate whether the preferential regional policy programs in China's manufacturing sector, namely, the economic and technological development zones (ETDZs) and science and technology industrial parks (STIPs),[2] influence Chinese exports. Scholars compared startups located inside these zones versus those located outside. The results suggest that firms operating in ETDZs and STIPs achieve much higher exports and number of trade destinations, perform better on quality measurements, and are more likely to export to high-income countries. Similarly, Amirahmadi and Wu (1995) focus

[2] The key difference between ETDZs and STIPs is that the former facilitate internationalization strategies whereas the latter generate technology spillovers.

on export processing zones (EPZs) in Asia and reveal that the performance of the Asian zones in promoting exports is significant.

In contrast, Johanssen and Nilsson (1997) find mixed results regarding the impact of EPZs on exports in Asia.[3] Their findings indicate that SEZs are more likely to have stronger export-generating outcomes when countries adopt outward-looking and export-oriented policies at the national level. In particular, scholars highlight the case of Malaysia, which unlike other analyzed countries, experienced a "catalyst" export-generating effect (Johanssen and Nilsson 1997, 2123). In other instances, such as the garment industry in Bangladesh, more observable linkages exist between SEZs and increases in exports.

The implications regarding the imprints of SEZs on export diversification are mixed. Aggarwal and others (2008) assess the impact of export processing zones (EPZs) on export diversification in Bangladesh, India, and Sri Lanka and find that export diversification varies by country across sectors and products. In some sectors, SEZs' activities contributed to already existing exports and also brought entirely new production processes to their countries. Aggarwal and others (2008) also highlight some research challenges. For instance, sectors with the highest export levels, such as IT in Southern India, already were outward oriented before SEZs appeared in the market, making it difficult to attribute any causality between SEZs and export performance.

SEZs and Firm Performance

SEZ-based firms outperform non-SEZ-based firms. Lu and others (2015) analyze the influence of Chinese SEZs on firm economic activity in the targeted areas. Those authors find that SEZ-based firms are influenced positively in capital, capital-to-labor ratio, employment, outputs, and labor productivity. SEZ programs in China generally increased the number of firms around SEZs and generated a large positive effect on newly entered and relocated firms. SEZs had a modest effect on incumbents. Firms in capital-intensive industries generated larger effects than labor-intensive firms. When comparing endowments of these zones on firm-level performance, zones with higher market potential or better

[3] Included in the analysis were the Dominican Republic, Egypt, Hong Kong, Malaysia, Mauritius, the Philippines, Singapore, South Korea, Sri Lanka, and Tunisia. EPZs have a minor role in South Korea.

transportation accessibility had a higher impact than zones with lower market potential or those with worse transportation accessibility.

EPZs bring benefits to both local and SEZ-based firms (Johansson 1994). First, they provide domestic firms with technical, marketing, and managerial know-how. Second, they award domestic firms access to international distribution channels and support from international companies. Finally, EPZs provide firms with fast-track entry to international markets. As noted earlier, foreign companies also generate spillover effects on local companies by showing them how to produce, market, and distribute their goods internationally (Johansson and Nilsson 1997).

SEZs and Labor Market Outcomes

Considerable research has looked at the relationship between SEZs and various labor market outcomes, ranging from the SEZs' influence on job creation to skills upgrading to working conditions.

Findings on employment creation by SEZs are inconclusive. Although SEZs were intended to generate new employment in the Philippines, the new jobs were concentrated in a small number of regions (Sanders and Brown 2012). Areas with SEZs that had the highest job growth also had high rates of migration to the SEZ location. Due to the high levels of migration to the SEZ areas, unemployment remained high. In general, SEZs' mixed performance on employment generation seems to be the dominant outcome in Asian economies (Amirahmadi and Wu 1995). Finally, Cirera and others (2014) highlight that there is no evidence that EPZs generate additional employment in the regions in which they are based.

Regarding improvements in skills and labor productivity, the findings are more positive. Governments and SEZ investors partner with each other to identify relevant skills and then provide training to the labor force. Malaysia Penang Skills Development Centre and Polytechnic University of Honduras are examples of such public-private incentives (Kingombe and others 2013; Farole 2011). Hu (2007) discovers that different science and technology industrial parks foster regional skill convergence and upgrading.

Another factor regarding SEZs that impacts the labor force are labor rights. In some SEZs, females are segregated into lower paid occupations

or are underrepresented overall in employment (Farole 2011; Cirera and others 2014). In fact, the latter authors highlight that union rights have been legally constrained or de facto discouraged in EPZs. Similarly, in Costa Rica and Dominican Republic, males are employed in more advanced sectors or are more likely than females to be promoted within a sector. Female employment dominates in garment, textile, and other lower paid industries. Another female employment issue is fewer opportunities to rise to management positions (Farole 2011, 102). On the other hand, Shenzhen was the first place in China to implement a minimum wage, pension insurance, and other worker protections (Khandelwal and others 2016).

Finally, SEZs also impact other social issues. First, some SEZs lack strategies that are integrated with local urban planning and development. Shortages of adequate health care facilities and cultural and educational services, insufficient public transportation, and/or lack of housing can negatively impact workers in zones in remote areas. Second, some SEZs are industry specific. Industries developed in SEZs determine which labor groups will benefit. If, for example, new jobs created require medium- or high-skilled labor, the gains can go to nonpoor residents and even widen inequality. Hence, in actuality, improved aggregate regional economic indicators could mask the actual beneficiaries and the increasing disparities within the labor force in treated areas (Picarelli 2016). However, one needs to take into account that the concentration of new jobs also increases living costs in these areas. Nevertheless, Wang (2013) finds that the workers in SEZs do not suffer from increased costs of living because SEZs generate wages that are larger than the rises in the local price levels.

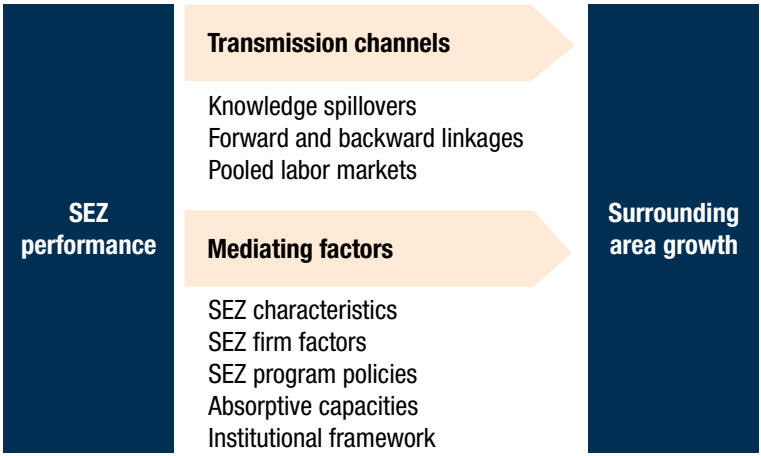
SEZs and Spillovers

SEZs often are regarded by policy-makers as an instrument to dynamize lagging territories as part of broader development strategies. By attracting new businesses and providing them with a favorable investment climate, governments expect SEZ incentives to pay off via spillovers to local economies and economic growth in the long term.

Many mediating factors and transmission channels crucial to facilitate spillovers. (Figure 2.1 provides a schematic overview.) These factors depend on both SEZ-based and non-SEZ-based firms, on the endowments

of their workforces, and on the institutional factors of host countries. Localized knowledge spillovers depend highly on the regional absorptive capacity and learning competencies of local workers and firms (Agrawal 2002; Audretschand Feldman 2004; Boschma 2005). The effective transfer of knowledge and skills requires local absorptive capacity to identify, interpret, and then transmit new knowledge to local production processes.

Figure 2.1 SEZ Performance and Surroundings Area Growth



The greater the interaction between SEZ-based and non-SEZ-based firms, the stronger the impacts of spillovers and local productivity gains will be. From the theoretical perspective, spillovers can happen within the same industry (called intra-industry, or horizontal, spillovers), or across different industries (inter-industry, or vertical). Nonetheless, both quality and quantity of backward and forward linkages matter for spillover effects. Via backward and forward interaction mechanisms SEZ-based firms transmit knowledge and technology, or upgrade standards for local production or labor (Duarte and others 2014; Farole and Winkler 2014). Backward linkages encourage local firms to train their workers to be able to meet their buyers' perspectives. Spillovers can happen within the firms when they are allowed to trade with local economies and/or are not solely export oriented. Thus, backward and forward linkages can generate multiplier effects on local employment, innovation, and growth (Farole 2011; Zeng 2016).

The spillover potential depends on the characteristics of the SEZ-based firms. The motivations behind their investments, global production, and sourcing strategies; technological intensity; and the length of their presence determine the quality and quantity of spillovers to local economies (Farole and Winkler 2014). SEZ-based firms that stick to global supplier relationships reduce the scale of vertical spillovers to local non-SEZ-based firms.

Equally, SEZ host countries influence spillovers via their own structural characteristics and institutional frameworks. Features such as labor market regulations and rigidities, availability of financial support for incoming companies, intellectual property rights, or even the levels of learning and innovation infrastructure provision shape the extent of linkages between SEZs and local markets. They also contribute to determine the industries established in SEZs. For instance, when the workforce can move freely within SEZ-based firms as well as between firms inside and outside SEZs, knowledge and technology transfers are facilitated.

The location of an SEZ and its proximity to large markets also matter for spillovers. The co-location of foreign and domestic firms in the same region can mediate the benefits from SEZs via technology and knowledge spillovers (Farole and Winkler 2014). More specifically, SEZ-based firms co-locating in the same sector and region have the potential to significantly increase productivity and employment.

Overall, spillovers depend on the characteristics and strategies of SEZ-based firms, local endowments, and the institutional environment of the host country. All of these spillover transmission channels are expected to attract FDI to the regions, upgrade local skills and technologies, and improve overall regional growth.

As argued above, both the quantity and quality of spillovers depend on complex transmission mechanisms from SEZs to local economies. Although the literature on SEZ spillovers is almost nonexistent, there is a wider literature that has delved into spillover externalities, focusing on FDI.

Because foreign companies are expected to produce significant spillover effects, attracting FDI is one of SEZs' main policy goals. The empirical literature on developed countries generally shows that FDI contributes

positive externalities to local economies. In some cases, government intervention is required to facilitate the development of the transmission mechanisms. In contrast, the literature on developing countries (and developed countries below the technological frontier) generally expresses considerable concern about the capacity of these countries to reap spillover benefits due to their limited local absorptive capacity.

For example, Duarte and others (2014) examine the impact of FDI and the prerequisites for spillovers in Mozambique. The authors find that the country's low absorptive capacity and skills have greatly limited the effects of knowledge spillovers from FDI. Those authors' conclusions are generally skeptical about the capacity of a country with the characteristics of Mozambique to benefit from FDI. They conclude that, in such contexts, policies that focus on expatriation, emigration, and tertiary education could be more suitable options to generate development.

Osabutey and others (2013) explore technology and knowledge transfer potential from multinational corporations within the construction industry in Ghana. Their findings uncover that partnering between foreign and local firms has been complicated by potentially complementary, but dissimilar, knowledge bases (such as technological vs. sociocultural and institutional knowledge). The absence of government policies and incentives to encourage foreign-local collaboration has prevented potential knowledge and technology transfers to local economies. Those authors deem that the absence of these policies and incentives limit the diffusion of knowledge spillovers.

Vahter (2011) investigates FDI's impact on knowledge-sourcing activities, innovation, and productivity growth of domestic firms in Estonia's manufacturing sector. Using firm-level panel data and an instrumental variable approach, Vahter does not find that FDI inflows to a sector were associated with more knowledge flows to domestic firms and increases in their innovative activities.

FDI does not necessarily foster technological upgrading. Garcia and others (2013) evaluate the impacts of inward FDI on host country firms as well as the degree to which inward FDI affects the innovativeness of Spanish firms. On one hand, inflows to Spain were negatively associated with subsequent innovation by local firms. On the other hand, inward FDI was positively related to subsequent labor productivity and total

factor productivity. Garcia and others (2013) conclude that even though inward FDI facilitates efficient resource allocation in the local economy, these same inflows can harm local technological development and can imbalance long-term economic growth.

Finally, location and proximity to larger markets often are regarded as factors that significantly affect spillovers. Barrios and others (2006) show that, in Ireland, foreign firms co-locating in the same sector and region significantly increased the productivity and employment of local manufacturing firms. Likewise, the co-location of firms in industry clusters has been shown to have an important positive impact on spillovers (Nadvi and Schmitz 1994; Thompson 2002). In certain cases, however, proximity to agglomerations and larger markets yields contrasting results depending of the geofigureic scale involved. In Indonesia, Sjöholm (1999) finds that co-location generated positive spillovers at the country level, but negative ones at the region-sector level.

Hence, although FDI may be the source of spillover effects, local conditions in less developed, and even in more developed territories and countries, may not always facilitate the diffusion of knowledge and, in particular, its absorption by local firms.

Some SEZs also have been found to be fundamental engines of economic growth in the surrounding areas. Wang (2013) reports an average increase in per capita FDI of 58 percent in Chinese municipalities located close to SEZs. Wang (2013) also finds that Chinese SEZs did not crowd out domestic investments and domestically owned capital stock. Also using Chinese data, Alder and others (2013) reveal that establishing major zones increased GDP levels from 6 percent to 10 percent, depending on the type of zone. This impact of SEZs stemmed primarily from the accumulation of physical capital.

However, not all studies of SEZs in China, and particularly not elsewhere, reach the same positive conclusions. According to Amirahmadi and Wu (1995), export processing zones in Asia generated very limited linkage effects to domestic economies, except in the most advanced developing areas of the continent. The pitfalls underlying the limited spillovers arose from poor location choices, insufficient infrastructure, and insufficient institutional quality. Thus, to enhance knowledge spillovers emanating from EPZs and SEZs, simplifying business regulations and training local

workforces are required. Similarly, using an instrumental variable approach for Chinese and Indian regions, Leong (2013) reports that SEZs in both countries have had a very limited impacts on the export growth of local industries.

What determines whether SEZs in developing countries can enhance economic development beyond the strict borders of a zone? According to the literature, complex combinations of factors are necessary to facilitate the transmission of spillovers to local economies. Governments and local and foreign investors are the main actors who can contribute to the generation, diffusion, and absorption of spillovers.

Conclusions

The literature suggests that (1) SEZs have the power to bring FDI and new businesses to regions and (2) to boost exports; and that (3) SEZ-based firms perform better than non-SEZ-based firms. However, regarding increasing employment and achieving spillovers in the larger region, the literature is inconclusive. The positive effects of SEZs clearly are interrelated with the contexts in which they are implemented, that is, the capacities of non-SEZ-based firms and the supporting policies.

Most of the literature that has delved into the analysis of the impacts of SEZs has adopted a case study approach, mainly as a consequence of the limited availability of cross-country data to measure SEZ outcomes. Many of these cases are solid analyses of the economic dynamism and influence of individual zones and provide interesting insights about these zones' viability and the characteristics that make them successful. The majority of this research has focused on the most successful cases. This fact raises questions about the validity of generalizing the factors behind the success of a specific SEZ, which is embedded in specific economic, social, political, and legal contexts. Thus, replicating policy and incentive models is tricky. Despite providing very interesting policy insights, extracting wide-ranging policy implications from this type of "successes-only" analysis remains risky.

Chapter 3. Toward a Better Stocktaking of Existing Zones

Nightlights Data

Ideally, the success of an individual SEZ should be measured using indicators such as job creation (direct and indirect), revenue growth, export performance of the SEZ firms, and spillovers to the national economy. However, because such data is lacking for a large number of SEZs and countries, an alternative approach is required. Where direct economic data are not readily available, the use of nightlights data as a proxy for the economic performance of an individual SEZ and its surrounding area provides a suitable and increasingly popular alternative.

The field of remote-sensing was the first to explore the economic implications of changes in nightlights data (Elvidge and others 1997, 2007). Economists and other social scientists increasingly are resorting to nightlights data as a proxy for economic activity (Florida and others 2008; Henderson and others 2012), especially when economic data are unavailable or unreliable for a specific region or period.

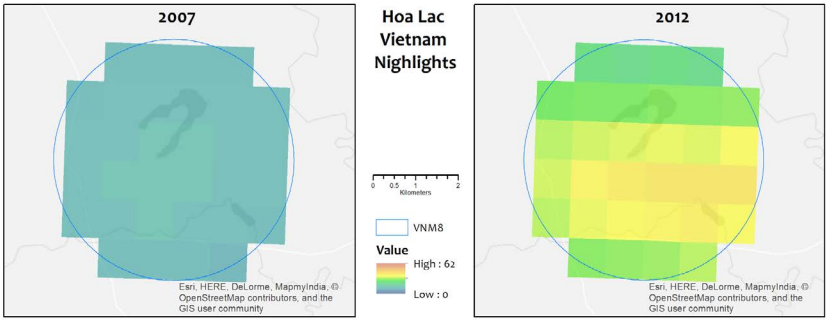
The collection of nightlights data began in the mid-1960s when the US Department of Defense (DOD) launched satellites that circled the earth 14 times per day to collect low-light imaging data with sensor technology called DMSP[4] Operational Linescan System (OLS). The original intent was to determine the extent of worldwide cloud cover. However, scientists at the US National Oceanic and Atmospheric Administration's (NOAA) National Geophysical Data Center soon realized that these imaging data also were capturing the luminosity of earth-based lights. These scientists began to process these data to identify exclusively light from human settlements on earth. This imaging included removing observations for places experiencing the bright half of the lunar cycle, the

[4] US Air Force Defense Meteorological Satellite Program.

summer months when the sun sets late, auroral activity, and forest fires. Also excluded were observations in which cloud cover obscured the earth's surface. The result is a dataset that captures the average luminosity created by human activity going from 0 to 63 in grid-cells of roughly 1 square kilometer (km) that cover the majority of the world's land area.

Since its discovery, nightlights data frequently have been used as a proxy for economic activity at the national level in cases in which data quality is poor (Elvidge and others 2007; Ghosh and others 2010; Chen and Nordhaus 2011; Henderson and others 2012). Use of this type of data at the subnational level is rarer (Ebener and others 2005; Elvidge and others 2012), and to the current authors' knowledge, nightlights data never have been used before to assess the development of SEZs. In the present review, the authors define a surface area for each SEZ comprising a collection of contiguous grid-cells (Figure 3.1). Each grid-cell records a luminosity value. The indicator used in the present analysis is the sum of luminosity values of the cells that comprise the surface area of each SEZ.

Figure 3.1 Example of Nighlights Luminosity for the HOA LAC Zone, 2007 and 2012



Source: World Bank 2016.

How reliable are nightllights data when measuring the economic performance of SEZs and their economic impacts on their surroundings? In emerging economies, in which economic data tend to be unavailable, nightlights data have two important advantages for cases such as SEZs. First, the measurement error associated with nightlights data is not correlated with conventional economic data. This lack of correlation offers the opportunity to develop a *composite measurement* that would produce

a more accurate measurement of economic activity than either individual dataset. Conventional data on economic activity—which typically are reported by statistical offices—is well known to be plagued by serious measurement error. Johnson and others (2013) compare version 6.1 with version 6.2 of the Penn World Tables, a widely used measure of GDP, and find the standard deviation of the change in average growth to be 1.1 percent per year. Given the average growth rate of 1.56 percent during the same period, Johnson and others demonstrate a significant measurement error in this commonly used dataset. The availability of nightlights data—which contain a form of measurement error not correlated with the measures reported by statistical offices—reduces the risk of measurement error. Consequently, these data can lead to more robust measurements of economic activity.

A second advantage—which is particularly important for the present study—is that nightlights data are available for regions for which standard measures of economic activity are not. Because the nightlights data are reported in grid-cells of approximately 1 square kilometer that span the earth, reliable measurements can be obtained for almost any geofigureic area. Mellander and others (2015) demonstrate that the correlation between the luminosity and alternative data for economic activity is high even at a very small scale. Those authors use data on employment and number of firms from the Swedish Statistics Bureau, which is geocoded in cells of 250m x 250m, and compare it to the nightlights data. Mellander and others find a high correlation between the data from the two sources. Similarly, in a study for Israel, Levin and Duke (2012) conclude that nightlights data are highly appropriate to proxy the extent of small-scale human activity.

Nevertheless, the use of nightlights data are not without risks. Recent criticisms advise caution when using this type of indicator as a proxy for GDP. In particular, as mentioned above, although luminosity can be considered a good proxy for GDP when measured at the country level, risks arise when nightlights data are considered at the subnational level. Studies using nightlights data to calculate economic activity have a tendency "to underestimate economic activities that emit less or no additional nighttime light as they grow" (Keola and others 2015). Underestimation is particularly problematic for areas that depend heavily on agricultural activities. Agriculture may not directly affect most SEZs, but it is a major

contributor to economic activity in many of the developing regions in which SEZs are located. Keola and others (2015) demonstrate how in Burundi, Cambodia, and Laos, using nightlights data to proxy GDP can lead to an overestimation of regional inequalities. Nightlights in these three countries are concentrated in the capital cities, suggesting that all economic activity also may be concentrated in these cities. However, agricultural and mining activities in the country's peripheral regions are not reflected in nightlights data, even though they are significant contributors to economic livelihoods in these areas. Similarly, the nightlight emissions from service activities tend to produce less luminosity than those from manufacturing activities. This phenomenon may lead to an underestimation of economic activity for service-oriented SEZs.

Finally, as stressed by Nordhaus and Chen (2014) and, although for different reasons, by Keola and others (2015), the use of nightlights data over time is troublesome. The former stress that "…there is no advantage at present [in] using lights data for time-series corrections for countries or grid cells for any countries where data are available." They conclude that "…the contribution of lights data are [sic] either unreliable or very small for middle and low income countries" (Nordhaus and Chen 2015).

Any results from nightlights data analyses must be considered in light of these caveats (Box 3.1).

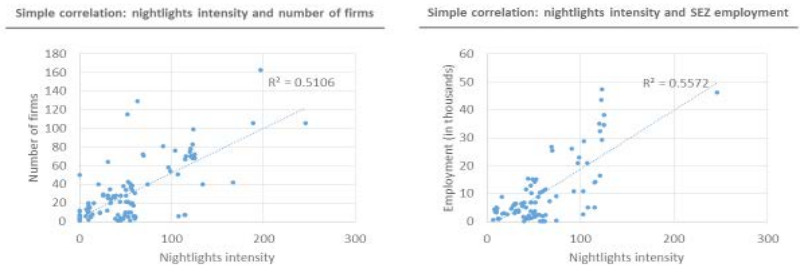
Box 3.1 Caveats and Limitations When Using Nightlights Data

The U.S. Air Force Defense Meteorological Satellite Program (DMSP) Operational Linescan System (OLS) sensors have a relatively low spatial resolution (90 arc seconds = approximately 900m at the equator). These sensors lack onboard calibration, intersatellite calibration, and records of inflight gain changes, making comparisons between any two observations (between, days, years, and/or satellites) difficult at best. The limited 6-bit quantization of digital numbers combined with the standard operation at the high gain setting means that (1) light saturation is common in highly populated urban centers and (2) the econometrician must deal with every location as being somewhere on a scale of 0–63 with whole number intervals between each number.

Another caveat is the blooming effect, which is essentially the onboard sensor misreading local atmospheric transmission and distortion of light as localized emissions. Consequently, light appears to come from areas surrounding the actual sources, at a significant distance, often 3 to 4 times as far as the original source. Blooming is best evidenced by the overflow seen in coastal cities in which light appears to come from over the water.

DMSP-OLS stops recording growth at a digital number (DN) of 63. If the zone were only 2 cells in size (one at 61 and the other at 62) and the zone emission intensity grew 300 percent to become brighter than the surrounding city, only the total growth of 3 would be seen in the DN. Once both cells reach a value of 63, no additional growth is recorded. Thus, both actual and apparent growth in light output are affected by proximity to urban areas, weather, and the number of cells included in the total value of the zone. To test the suitability of the nightlights, particularly of the measure used to assess changes in economic activity in the zone, data on the number of companies and employment were collected for a number of SEZs as an alternative performance measure. Figure 3.2 shows a simple scatterplot between the number of companies and employment and the nightlights proxy. Both figures display a clear positive correlation between the alternative measures and the authors' proxy.

Figure 3.2 Correlation of Nightlights with Number of Firms and SEZ Employment



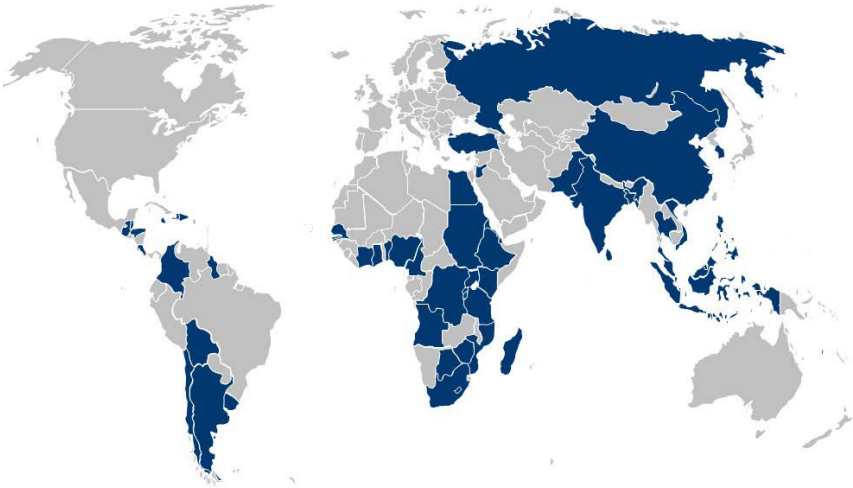
Note: Nightlights luminosity here is calculated as the sum of nightlights luminosity for all grid-cells that comprise the surface area of the SEZ. Using Google Maps satellite imagery, online sources from the national SEZ authorities, and SEZ homepages, an SEZ is defined by a size, location, and centroid. Following the identification of the centroid, a circle is drawn around it as a proxy for the surface area of the SEZ. To determine the length of the radius used to draw the circle, the authors assume the SEZ to have a squared shape identical to its overall surfaces. The authors then draw a circle around the centroid so that each corner of the square is tangent to the circumference of the circle.

To further test the fit, controlling for country fixed effects, the authors ran two simple regressions. The number of firms and SEZ employment were the dependent variables and the authors' nightlights proxy the explanatory variable. In both cases, the nightlights were a highly significant predictor of the number of firms and the employment within the zone (see Appendix K for the regression results). Therefore, it can be concluded that, despite the caveats, nightlights represent a good proxy for the economic performance of a zone.

SEZ Database

The Competitive Industries and Innovation Program (CIIP) has assembled a database that covers 553 special economic zones in 51 countries across Sub-Saharan Africa (SSA), East Asia & Pacific (EAP), Europe & Central Asia (ECA), Middle East and North Africa (MENA), South Asia (SA), and Latin America & Caribbean (LAC). This SEZ database builds on previous efforts to establish an inventory of SEZs across countries and regions.

Figure 3.3 Geofigureic Footprint of CIIP Database on Special Economic Zones



Source: Competitive Industries and Innovation SEZ Database

Table 3.1 Overview of CIIP Database

Region	Countries Researched	Types of Zones Researched	# of Zones Included
South Asia	Bangladesh, India, Pakistan, Sri Lanka	Export Processing Zones, Special Economic Zones, Economic Zones,	37
Middle East & North Africa	Egypt, Jordan	Free Zones, Special Economic Zone (Aqaba)	12
Latin America & Caribbean	Argentina, Belize, Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Guatemala, Guyana, Haiti, Honduras, Jamaica, Uruguay	Commercial Free Zones, Export Processing Zones, Free Industrial Zones, Free Trade Zones, Free Zones, Industrial Estates, Special Economic Zones	92
Eastern & Central Asia	Turkey, Russia	Free Trade Zones, Organized Industrial Zones, Special Economic Zones	66

East Asia & Pacific	China, Fiji, Indonesia, Korea, Philippines, Malaysia, Thailand, Vietnam	Economic Zones, Export Processing Zones, Foreign Investment Zones, Free Trade Zones, Free Zone, Industrial Estates[a], Industrial Complexes[a]	294
Sub-Saharan Africa	Angola, Benin, Cameroon, Cote D'Ivoire, Eritrea, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Madagascar, Mozambique, Nigeria, Republic of Congo, Rwanda, Senegal, South Africa, Sudan, Tanzania, Uganda, Zimbabwe	Industrial Free Trade Zone, Special Economic Zone, Export Processing Zone, Free Trade Zone, Free Zone, Industrial Area, Industrial Development Zone, Industrial Free Zone,	52

Note:

a. Although some literature on Special Economic Zones would exclude Industrial Parks from the definition of an SEZ, this database includes Industrial Parks on the basis that they (1) occupy a defined geofigureic location; (2) possess a dedicated management institution; and (3) offer a set of incentives or benefits available to companies that locate within the zone.

Institutional Framework

The database characterizes each zone's management structure as one of four types:

1. Private management: The zone's day-to-day management is administered by a private company. There are 170 zones in the database that use this management structure.
2. Public agency: The zone's day-to-day management is administered by a public agency. There are 176 zones in the database that use this management structure.
3. State-owned enterprise. The zone's day-to-day management is administered by a single entity that is fully or partially owned by the state. There are 114 zones in the database that use this management structure.
4. Public-Private Partnership ("PPP"): The zone's day-to-day management is administered by a joint-entity comprising at least one public

entity and at least one private entity. There are 98 zones across the database that use this management structure.

The database additional characterizes each zone's institutional set-up in terms of: i) name of management company; ii) current legal framework; iii) year in which current legal framework was established; iv) name of regulatory authority; v) independence of regulatory authority; vi) participation of private sector in zone creation; and vii) availability of fiscal incentives for zone developers.

Corporate Tax Incentives

The database characterizes the zone's corporate tax exemption offered to tenant firms as one of four types:

1. Absolute exemption: Tenant firms in the zone receive 100% exemption from corporate income tax. There are 375 zones in the database that employ this type of corporate tax incentive.
2. Exemption depends on firm qualifications: The extent of corporate tax exemption depends on firm criteria (e.g. type of economic activity, minimum investment amount, employment generation, among others). There are 97 zones in the database that employ this type of corporate tax incentive.
3. Reduced fixed-rate: Tenant firms in the zone are offered a reduced fixed-rate tax on corporate income. There are 38 zones in the database that employ this form of corporate tax incentive.
4. No exemption: Tenant firms in the zone do not receive an exemption on corporate tax. There are 43 zones in the database that do not offer corporate tax incentive to tenant firms.

The database additional characterizes each zone's corporate tax in terms of: (1) the standard corporate tax rate in the country; (2) the level of corporate tax exemption offered; (3) the duration of the corporate tax exemption offered; (4) the grace period of the corporate tax exemption offered; (5) minimum investment required of tenant firm to receive fiscal incentives; (6) minimum export level required of tenant firm to receive fiscal incentives; (7) other requirements of tenant firm to receive fiscal incentives

Other Fiscal Incentives

The database characterizes other fiscal incentives offered to tenant firms. In addition to exemption on corporate income tax, exemption on import duties is also one of the most common fiscal incentives offered to tenant firms. Import duty exemption is characterized as one of three types:

1. Import duty exemption on both capital equipment and inputs: Tenant firms in the zone receive exemption from import duty on both capital equipment and raw material inputs. There are 303 zones in the database which offer this type of import duty exemption.
2. Import duty exemption on capital equipment only: Tenant firms in the zone receive exemption from import duty on capital equipment, but not on raw material inputs. There are 223 zones in the database which offer this type of import duty exemption.
3. No import duty exemption: Tenant firms in the zone do not receive an import duty exemption on capital equipment or raw material inputs. There are 27 zones in the database which do not offer any import duty exemptions.

The database additional characterizes a zone's fiscal incentives in terms of (1) the level and duration of import duty on raw material inputs; (2) the level and duration of import duty on capital equipment; (3) exemption on repatriation tax; (4) exemption on capital gains tax; (5) exemption on withholding tax; (6) exemption on property, land, or equipment tax; (7) exemption on VAT, excise, sales, or consumption tax; (8) exemption on employment-related tax; and (9) other fiscal incentives offered.

Zone Size

Summary statistics of zone size (in hectares) indicate significant variation.The average zone size in the database is 905 hectares, the median zone size is 164 hectares.The smallest zone in the database is the World Trade Center Free Zone in Uruguay, measuring 5 hectares. The Cha Lo Border Gate Economic Zone in Vietnam is the largest zone in the database, measuring 53,923 hectares.

The largest zones in the database are in the EAP and SSA regions. Four of the 5 largest zones in the database are based in Vietnam: the Chu

Lai Open Economic Zone, the Xa Mat Border Gate Economic Zone, the Vung Ang Economic Zone, and the Cha Lo Border Gate Economic Zone all span more than 20,000 hectares.In the SSA region, the Coega Industrial Development Zone in South Africa, the Ogun Guangdong Free Trade Zone in Nigeria, the Luanda-Bengo Special Economic Zone in Angola, and the Massawa Free Trade Zone in Eritrea are all larger than 5,000 hectares.The Aqaba Special Economic Zone in Jordan is the second-largest zone in the database, and the only zone in the database outside EAP and SSA which is larger than 5,000 hectares.

The smallest zones in the database are based in the LAC region. There are 52 zones in the database that are less than 30 hectares, of which 33 are based in LAC.Three of the 5 smallest zones in the database are based in LAC: two in Uruguay (World Trade Center Free Zone, Aguada Park Free Zone) and one in the Dominican Republic (Global Industrial Free Zone)

Zone Start Date

There are only 6 zones in the database established before 1970. Two based in Uruguay (Nueva Palmira Free Zone, Colonia Free Zone), one based in the Dominican Republic (La Romana I Free Zone), one based in Colombia (Barranquilla Free Zone), one based in Guyana (Riumveldt Industrial Estate), and one based in India (Khandla Special Economic Zone).

A majority of zones in the database were established after 1990, reflecting the increasing popularity of SEZs as an industrial policy instrument. From 1990 to 1999, 19 zones were established in the Philippines and 12 zones were established in ThailandFrom 2000 to 2010, 35 zones were established in China, 35 established in South Korea, and 61 established in Vietnam

A substantial number of zones established after 2010 are based in Sub-Saharan Africa region.Out of 76 zones in the database established after 2010, 28 zones are based in Sub-Saharan Africa, demonstrating the growing role of special economic zones in African countries.

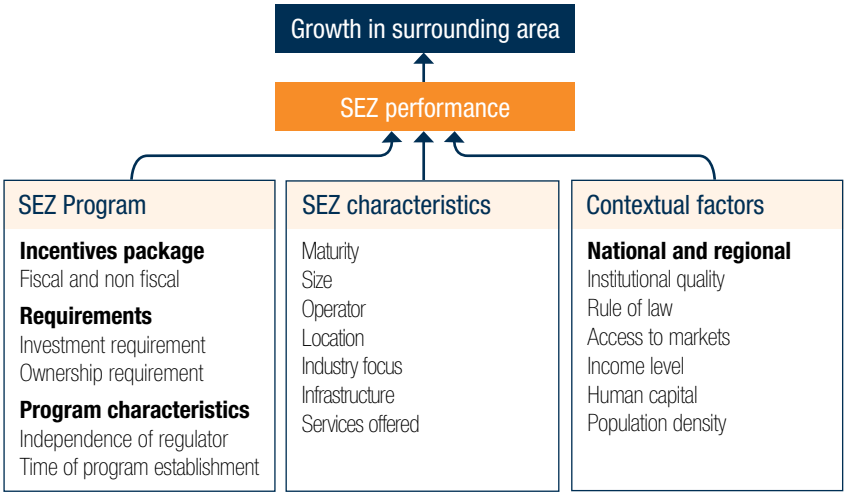
Chapter 4. Drivers of SEZ Performance

The purpose of chapter 4 is to fill a knowledge gap by shedding more light on the drivers of SEZ performance across countries from a comparative perspective. Chapter 4 uses the CIIP dataset (chapter 3) to assess which zone characteristics determine good performance. The charateristics are (1) size, age, and management type; (2) incentives and benefits provided to tenant firms at SEZs; and (3) the socioeconomic and institutional characteristics of the regions and countries in which a zone is located. The analysis of SEZ performance is based on nightlights data, which is used in lieu of other cross-country measures of economic performance of SEZs (chapter 2). The aim of the analysis is to provide decision-makers with evidence-based policy advice to formulate policy strategies, organizational set-ups, and incentive schemes that could help maximize the impacts and minimize the risks of SEZ interventions for both the zone iand the surrounding areas.

Conceptual Framework

SEZ programs and zones differ along many dimensions. Factors internal and external to the SEZ program, and to the zone itself,are likely to affect a zone's ability to attract investors, create employment, and facilitate firm performance and economic growth. The success or failure of an SEZ is highly dependent on what happens both within and outside it. Figure 4.1 provides a schematic overview of the factors that commonly are assumed to influence zone performance.

Figure 4.1 Drivers of SEZ Performance, The Conceptual Framework



The first set of factors linked to SEZ performance is related to the set-up and design of the overall *SEZ program*. The set-up and design include the incentives package, the requirements imposed on firms to benefit from the incentives, and the organizational set-up of the program. Traditionally, fiscal incentives have been at the core of any SEZ policy. The underlying reasoning is to provide companies with an advantageous, cost-reducing fiscal environment. Fiscal incentives vary from country to country and from zone to zone. However, incentives frequently include a mix of exemptions from import duties on machinery and inputs; and reductions or exemptions from various types of tax, including corporate income, value-added, and local. Many programs also offer subsidized utilities to companies, through either VAT exemptions or explicit subsidies (ADB 2015).

Studies have come to differing conclusions about the effectiveness of these tax breaks. Rolfe and others (2004) and Aggarwal (2005) underline the importance of the incentive package from an investor's point of view. In contrast, in one of the few attempts to quantitatively assess SEZ performance drivers, Farole (2011) finds no correlation between the tax holidays offered to companies and zone success in generating employment and exports. Similarly, a 2015 report by the Asian Development Bank (ADB) concludes that, although many countries feel the need to offer tax incentives, their effectiveness may be limited and well below

those of other pull factors. In the worst case scenario, tax exemptions, subsidies, and other incentive packages may engender a rent-seeking behavior by firms in the zone, undermining the entire viability of the SEZ scheme (Rodríguez-Pose and Arbix 2001; Sarif and Ismail 2006; Farole and Akinci 2011).

Exemptions from national labor regulations and the facilitation of administrative services through national one-stop-shops is another popular way to provide nonfiscal benefits to companies (OECD 2009; ADB 2015). Even though the reduction of labor protection frequently is viewed with concern regarding the social impacts (Jauch 2002; FIAS 2009), several authors claim that more flexible labor regulations have contributed to the success of many SEZ policies (Madani 1999; Watson 2001; Aggarwal 2005). In contrast, administrative facilitation through one-stop-shops generally is approved of and considered best practice by many international institutions (Farole and Kweka 2011; ADB 2015).

Programs also differ in the requirements that tenant firms must satisfy to qualify for the SEZ program's incentive package. (1) Because the aim of many programs is to attract FDI, some programs specifically target foreign companies. The result often is that only firms that are either partially or fully owned by foreign investors benefit from the incentives schemes. (2) Similarly, because the aim of many policies is to increase a country's export performance, some policies require an SEZ's tenant firms to meet a minimum level of exports. (3) Finally, certain programs also require minimum investment or minimum employment thresholds for the tenant firm to access the tax breaks.

Despite the proliferation of tax breaks and holidays, incentives, and subsidies that inevitably accompany the formation and development of an SEZ, few studies have looked into the questions of whether and how these incentives and requirements impact zone performance. Moreover, when providing policy recommendations, many of the existing studies focused on specific incentives, not necessarily on the entire package. OECD (2009), for instance, advocates the need to remove minimum export requirements to avoid a bias against local firms and to ensure compliance with World Trade Organization (WTO) regulations. However, even OECD does not say much about how such a measure would impact SEZ performance.

The organizational set-up of the SEZ program also has correlated positively with the success of the policies. An independent zone regulator—expected to be shielded from political pressures as well as equipped with sufficient resources—commonly is considered to be in a better position to efficiently develop and implement an SEZ program(OECD 2009; Farole and Kweka 2011). As a consequence, independent regulators may produce better economic outcomes at the zone level.

The second set of factors comprises *SEZ characteristics*, that is, characteristics that are related exclusively to the structure and layout of the zone. SEZ characteristics generally are linked to the dimension of the zone, the sectors targeted, its location, and the services and infrastructure provided within the zone. In recent years, there has been a shift in the literature and among policy-makers to highlight the importance of these factors as opposed to a singular focus on the incentive package provided in the SEZ program (Farole 2011; UNCTAD 2015). Furthermore, and in contrast to contextual factors, zone characteristics can be influenced and/or adjusted relatively easily. Hence, it is reasonable to expect that the SEZ-specific characteristics will affect the economic performance of the zone.

The technological content of the zone is another factor that may make a difference for economic success. Many zones in developing areas increasingly have aimed to attract investors in the high-tech sector, as opposed to the low-tech manufacturing that was the focus of many initially successful zone programs (ADB 2015). High-tech zones are regarded as a faster and more illustrious means to create employment and economic growth than low-tech, low-cost, and often massive production zones. However, questions have been raised about the viability of high-tech zones in less-developed environments because HTZs have not always been successful (Lugar and Goldstein 1991; Quintas and others 1992).

The nature of the operator has been identified as another success driver. Best practice guides frequently emphasize the advantages of private operators over publicly run zones (Watson 2001; FIAS 2008; OECD 2009; Farole and Kweka 2011). However, Farole (2011) finds no correlation between the type of zone operator and SEZ performance.

An important question also concerns the location choice. SEZ policies frequently have an explicit spatial aspect, that is, to promote the economic development of certain regions. At the same time, a strategic lo-

cation close to ports, consumer markets, and the labor pool are elements that many firms also actively consider when deciding on location (Aggarwal 2005). Several studies have stated that closeness to ports or large cities is more likely to favor economic performance than locating an SEZ in more remote areas (Madani 1999; FIAS 2009; ADB 2015).

The type of services provided within the zones also may affect the economic dynamism of the zone factor. Traditionally, many zones have provided services to ease infrastructural and other challenges in the country. These services range from providing a dedicated Customs office to providing more reliable utilities, particularly electricity supplies. Increasingly, zones also offer other "softer" services such as human resources, restaurants, housing services, and on-site one-stop-shop facilities to handle the administrative processes for the companies within the zone (Farole 2011; Farole and Akinci 2011).

Finally, the *regional and country contexts* in which the SEZs are located also matter for the success of the zone. The aim of many SEZ programs is to help overcome the local challenges that companies face. However, SEZs do not operate in a vacuum so are likely to be heavily influenced by the socioeconomic characteristics, market potential, and general business climate of their host countries. A number of authors stress the importance of the national investment environment and institutions for FDI (Daudé and Stein 2007; Portugal-Pérez and Wilson 2012) and thus the success of SEZs. Aggarwal (2005) and Farole (2011) specifically demonstrate a strong correlation between the general business climate and SEZ outcomes. Moreover, the attractiveness of a host country is enhanced/diminished by its proximity/distance and access to/lack of large markets (Madani 1999; Watson 2001; Rolfe and others 2004) as well as by its industrial structure.

Trade among countries decreases as distance and trade costs increase (Disdier and Head 2008). Hence, proximity to a large national market is an attractive feature for efficiency-seeking investors. Favorable national industrial structures with a solid pre-existing manufacturing base also increase a host country's attractiveness (Hidalgo and Hausmann 2009). Economies that rely primarily on agricultural production are likely to have a more difficult time convincing investors of the formers' capabilities to produce manufacturing goods on a large scale than countries with pre-existing industrial bases. Finally, a country's overall socioeconomic

context may be an important stimulus/deterrent to investors. Efficiency-seeking investors in labor-intensive sectors require a sufficiently large and inexpensive workforce so are prone to look for less costly locations with an abundant supply of labor. Human capital endowments affect productivity so are assumed to play a role in making places more or less attractive to firms, particularly in upgrading to higher-value-added products (Larraín and others 2000; Farole and Akinci 2011).

As this brief overview shows, a large number of factors, both internal and external to the zones and to SEZ policies, are on the table as potential drivers of zone performance. Much has been written about the impacts of these factors from a case study approach. However, a more systematic quantitative analysis of whether these factors apply universally has been missing. The following section will address this gap by presenting a tailor-made dataset that takes into consideration both internal and external factors reported as drivers of SEZ performance.

Methodology and Dataset

Methodology

To assess which factors influence SEZ performance, the authors operationalize the conceptual framework described in the previous section using the following simple econometric model (Model 1):

$$\Delta y_{i,t} = \alpha_1 + \beta_1 SEZ\ related\ factors_{i,t0} + \beta_2\ SEZ\ \text{program factors}_{i,t0} + \beta_3 Country/regional\ level\ endowments_{i,t0} + \beta_4\ Structural\ nightlights\ controls + \epsilon_i$$

where

- Δy_{it} is the dependent variable, a measure of the success of an individual SEZ *(i)* at time *t*, using changes in nightlights intensity for the surface of the SEZ (sum of light intensity of all cells in the surface) during the period of analysis as a proxy (see chapter 3 for a detailed discussion);
- *SEZ-related factors*: Characterizing the dimension of the zone, location, types of sectors targeted, and services provided within the zones. These are zone-specific variables;

- *SEZ regulatory variables*: Linked to the incentives offered, requirements imposed, and organizational set-up of the program. These variables are either national level, or SEZ specific where multiple SEZ programs could exist within a country;
- *Country/region-level endowments:* Reflecting economic, social, political, and institutional factors at the country and region levels that may impact SEZ performance as well as proximity to markets;
- *Structural nightlights controls:* Controlling for potential nightlights "overflow" from neighboring areas into the SEZ to reduce the luminosity captured by the authors' SEZ performance proxy that is driven by "outside" activities," that is, activities taking place outside the physical boundaries of the SEZ.[5]
- ϵ_i is is the robust standard error clustered at the within country/region level.

To include the maximal number of zones, the main analysis covers 2007 to 2012, for which period all variables are available. This period takes into account that, in the last few years, the SEZ phenomenon has really taken off in emerging economies and that gathering the data is time-consuming.

To nuance these findings, the authors also present two complementary sets of results. First, the authors run regressions on the same cross-country dataset. However, for that exercise, the authors look at each zone's growth performance in the 5 years after the zone became operational, but not for the fixed period of 2007–12. The aim of that exercise is to

[5] While, on average, the authors' proxy is a good predictor of SEZ performance, there is a fair amount of spread around the trend line. To identify potential sources of this heterogeneity in the fit of the nightlights as a proxy for SEZ performance, the satellite images of the outliers visible in the scatterplot were inspected. Location in a densely populated area next to large highways and/or directly on the coastline were the factors that affected the accuracy of the proxy. Zones located in densely populated areas or next to highways reflected a higher number of lights from outside the zone. This finding aligns with Levin and Duke (2012), who find that a significant amount of the light reflected in the nightlights imagery stems from streets. To minimize this reflection, the level of population density around the zone (on a scale of 1 to 3) was identified for each zone. Information as to whether specific SEZs are located next to a large water body or a highway also was recorded and introduced as structural nightlights controls in the econometric analysis.

uncover the factors that facilitated the success of SEZs during their initial years of operation, regardless of when they were founded. This analytical selection implies that the period of analysis covers the first five years in the life of a zone and varies by zone. The sample for this analysis is reduced because data are not available for every zone in the sample in the period immediately after their establishment. The reduction in the dataset fundamentally concerns older zones.

Second, the authors present the results of a "deep dive" into the performance of the Vietnamese zones. Taking this deep approach within country perspective enables focusing on zone characteristics because both the contextual environment and the policies are the same for all zones within the country.

Measuring SEZ Performance

The dependent variable, Δyit, is a proxy for SEZ performance. The analysis relies on the change in nightlights emissions for this purpose (chapter 3). The authors use two variations in the different sections: (1) the growth rate of the nightlights emitted from the SEZ during the period of analysis and (2) the ratio of the change of the nightlights emissions within the zone compared to the change in nightlights in the entire country. The first indicator, the growth rate of nightlights in the zone, measures absolute growth and is the main dependent variable. The second indicator is a relative performance measure and captures whether a zone has grown faster than the national average. This indicator enables teasing out differences in national growth across countries. As a consequence of the overall dynamism of the country, less dynamic zones in rapidly growing countries often have higher rates of growth than very dynamic zones in low-growth countries. This relative indicator is expected to better reflect the capacity of the SEZs to act as motors of national growth within a country and is used as a robustness check in the main regressions.

There are two caveats concerning using nightlights growth to measure success. First, because growth rates are being used, only SEZs that were operational at the beginning of the period of analysis can be included in the regressions. De facto, SEZs that were planned but never took off are excluded from the sample. Consequently, "failed" SEZs are underrepresented in the sample. Second, the use of nightlights growth rates means that the analysis actually captures two measures of success: (1) the

take-off of the SEZs—reflected by the number of firms operating in the SEZs—and (2) the performance of individual firms. Each measure could be driven by different variables. It would be interesting to distinguish between these two measures. For instance, financial incentives could be more important to new investors than to operating firms, whereas price fluctuations on international markets could affect sales of operating firms as well as their production volume and time.

SEZ-Specific Variables

A number of key characteristics of the zone are taken into account to determine whether zone-related factors could make a difference for SEZ performance. First, the size of the zone tests whether there are potential differences depending on the zone extension. Years operating by 2007 helps to understand whether zone performance is affected by how long the zone has been operating. A dummy for high technology is included to determine whether the zone focuses on attracting firms in the high-tech sector.[6] To understand whether the type of zone management makes a structural difference for zone performance, the analysis considers the nature of management, distinguishing between whether a zone is operated by the public sector, as a public-private partnership (PPP), or as a private entity.[7] The attractiveness of the location of the zone is measured by using the road distance to the largest city, the road distance to the closest city with at least 500K and 300K inhabitants, and the road distance to the closest major port. Finally, to reflect a zone's infrastructure, three dummies capture whether a zone offers a one-stop-shop onsite, a customs office onsite, and/or its own power substation to ensure a reliable electricity supply. A detailed list of variables for each zone appears in appendix A. The information is sourced from the dataset described in chapter 3.

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[6] The dummy takes the value of 1 if the zone either "self-proclaims" on its advertising material that it specifically targets high-tech sectors, or if the companies established are within high-tech sectors, as defined by OECD.

[7] This indicator also takes into account the development stage of the zone. For instance, if a zone was developed by a public entity but is operated privately, the indicators reflect it as a PPP.

SEZ-Regulatory Variables

As described in the conceptual framework, to capture the diversity of different SEZ policies, the analysis includes information on the incentive package provided to companies, requirements imposed on the firms to be able to locate within the SEZ, and a number of factors depicting the institutional set-up of the zone program. The level of corporate tax breaks is calculated as an index based on the level of tax exemption and the number of years granted over a 20-year horizon. This index can take values from 20—reflecting a company that is 100 percent exempt from paying corporate income tax over the entire 20-year horizon—to 0—indicating 0 percent exemption in any year. A dummy that takes the value of 1 if firms within the SEZ benefit from subsidized utilities also is included in the dataset. Nonfiscal incentives are captured using two dummies that reflect whether firms are exempt from following certain labor regulations that normally apply within the country; and if there is a national one-stop-shop available to companies to facilitate administrative processes. The existence of a minimum investment requirement is included as an explanatory variable as is the level of foreign ownership required from companies. Both of these variables reflect the potential presence of restrictions on companies to participate in the zone policy. Finally, the institutional set-up of the SEZ program is included in the dataset. As pointed out earlier, having an independent zone regulator is considered best practice so is added as a potential driver of zone performance. As with the SEZ-specific variables, the data stem from the newly built CIIP dataset (chapter 3).

Contextual Factors: Country and Region-Level Endowment

A set of variables reflecting the country and regional endowments is used as a base model to control for the contextual factors that could influence the SEZ. At the country level, controls for the proximity of a country to large markets, the level of industrialization, GDP per capita, and the general business environment as reflected in institutional variables are included in the dataset. The indicator for proximity to large markets is calculated based on the inverse distance of the country in which the SEZ is located to the US and Europe.[8] The higher this indicator, the closer the

[8] The distance is calculated using information sourced from http://www.distancefromto.net/.

country is to these markets. Given the importance to companies of access to markets, the authors would expect this coefficient to be positive. Level of industrialization is the GDP generated by a country's manufacturing sector as a percentage of the overall GDP at the beginning of the period of analysis. The data are sourced from the World Development Indicators (WDI). A higher share of pre-existing industry reflects the inherent capacity of the host country to produce manufacturing goods (Hidalgo and Hausmann 2009). Keeping other things equal, a higher value thus should be attractive to companies, leading to a positive coefficient. The natural logarithm of GDP per capita reflects a country's overall level of development and also indicates the wage level. The authors do not have a strong prior opinion on the sign of this coefficient. On the one hand, companies could require a minimum level of development to be attracted to an area. The sign thus could be positive. On the other hand, provided that salary levels are lower in poorer countries, zones in less wealthy countries could be particularly attractive to firms searching to reduce costs. Different variables are tested to capture the general institutional and business environment in the host country. The rule of law estimate is based on Kaufmann and others' (2010) Worldwide Governance Indicators (WGI) and also is sourced from the WDI. The values of this indicator range from -2.5 to 2.5. The value for the beginning of the period of analysis is used. The higher the value, the better the rule of law. A higher score, reflecting a more stable institutional environment, should be positively correlated with SEZ performance. The authors also test the Ease of Doing Business rankings. However, these results are not included in the main body of the report because the rankings do not change. Finally, a country nightlights growth is included in the regression to control for the overall level of growth in the country. This variable enables the authors to single out whether a zone's performance was driven by the other characteristics included or simply followed national growth.

These country variables are complemented by a proxy that reflects the levels of development and socioeconomic characteristics of the country and region in which the zone is located. As mentioned above, for political and social reasons, zones frequently are located in lagging regions within a country to stimulate economic activity in these areas. The ln ratio of the regional GDPpc over national GDPpc indicates how well off a region is in comparison to the national average. Values over 0 indicate that the zone has a higher GDPpc than the national average and thus

is likely to be endowed with better socioeconomic characteristics, but also higher salaries. Values below 0 indicate the opposite. The variable thus enables testing whether zones in lagging regions are performing better or worse than those located in the economic cores. This variable is sourced from the Gennaioli and others (2014) dataset and reflects the level at the beginning of the period of analysis.[9] Also noteworthy is that complementing the national controls with the ratio enables controlling for the immediate geofigureical context of the SEZ, which, particularly in large countries, could be very different from the national average. Details for all variables appear in appendix A.

Data

As mentioned, the analysis relies on the newly assembled databases presented in chapter 3. To select the study countries for the analysis, the authors considered a number of factors such as geofigurey, income levels, and maturity of zone programs. The objective was to allow for a considerable variation in SEZ experiences to be represented in the sample. The selection also was guided by more practical considerations. Data availability for a given country was an important factor as was the time of establishment of the SEZ policy. Countries in which zone policies had been designed or implemented only recently could not be considered because the number of operating zones during the period of analysis was either too low or nonexistent. The type and overall number of SEZs in a country also were important practical factors for inclusion in the dataset.

In addition, conceptual and practical considerations guided the delimitation of a set of criteria to identify zones in the countries suitable for inclusion in the analysis. On the conceptual side, a clear definition of what constitutes an SEZ as well as the desired focus of the study were taken into account. For practical purposes, the suitability of the zone for the use of nightlights data as a proxy for its performance also was considered. Based on this, the following five criteria were established:

1. A *differentiating regulatory framework and/or incentive scheme* for the SEZ is the key differentiator to define what constitutes an SEZ. This framework is in line with most literature and enables establish-

[9] http://scholar.harvard.edu/shleifer/publications/growth-regions

ing the all-important distinction between SEZs and other types of industrial parks.

2. A *focus on manufacturing or services* within the zone enables singling out and eliminating zones that are primarily commercial and logistical hubs. This focus is driven by the authors' primary interest in the performance of manufacturing- and service-oriented zones.
3. The *presence of clear territorial boundaries* enables better delimiting performance using nightlights data. This requirement for boundaries implies that some SEZ schemes, such as single factory zones or large wide zones, are excluded from the analysis.
4. *A minimum size of 50 ha* to increase the reliability of the nightlights measurement as a proxy for zone performance. This criterion is determined by the size of the grid-cells in the nightlights dataset. The data are further restricted to zones with a *maximum size of 1,000 ha* to ensure better comparability among zones.
5. The SEZs had to be *operational by the year 2007,* meaning that at least 1 company had started operations within the SEZ by then. This criterion ensures that a reasonable variation in the nightlights can be detected between start of operations and 2012, which is the last year for which nightlights are available.

The resulting sample includes 346 zones in 22 countries across the developing world and South Korea. Table 4.1 provides an overview of the resulting country coverage and number of zones per country. The sample covers countries from all over the developing world. However, it is biased toward countries in the East Asia and Pacific region. This bias reflects the strong proliferation of SEZ policies in East Asia and the fact that many Latin American zones did not fulfill the size requirements (for example, of the more than 60 zones in the Dominican Republic, only 10 had the size required to be included in the sample). Furthermore, many countries introduced their zone programs only recently so had fewer zones that fulfilled the time criterion.

Table 4.1 Overview of SEZs per Country

Countries	No. of Zones
East Asia and Pacific	**255 (73%)**
China	33
Philippines	29
Malaysia	6
South Korea	64
Thailand	20
Vietnam	103
Europe and Central Asia	**40 (10%)**
Turkey	36
Russia	4
Middle East and North Africa and Sub-Saharan Africa	**6 (2%)**
Ghana	1
Jordan	1
Kenya	1
Lesotho	1
Nigeria	1
South Africa	1
Latin America and Caribbean	**26 (7.5%)**
Argentina	4
Chile	3
Colombia	6
Dominican Republic	10
Honduras	3
South Asia	**19 (5%)**
Bangladesh	8
India	8
Pakistan	3
Total	**346 (100%)**

SEZ Characteristics

Table 4.2 provides an overview of some key characteristics of the SEZs: the time of establishment of the zones, sector focus, technology intensity, and size. The majority of zones have become operational since the year 2000 (52 percent), 30 percent in the 1990s, and 18 percent before 1990. This trend reflects their increasing popularity as a policy tool. Zones vary widely by size. Twenty percent of zones are smaller than 100 ha; 38 percent range between 100 ha and 200 ha; 33 percent between 200 ha and 500 ha; and the remainder (9 percent) above 500 ha. The largest zone included is 998 ha and the smallest 51 ha.

Table 4.2 Characteristics of SEZs Included in the Dataset

Period of Establishment	No. of Zones	Percent
Before 1990	61	18
1990 to 1999	105	30
Since 2000	180	52
Average size		
Below 100ha	70	20
Between 100ha and 200ha	130	38
Between 200ha and 500ha	113	33
Above 500ha	33	9
Sector focus		
Manufacturing	241	70
Services	1	0.3
Mixed	104	30
Technology intensity of industry		
Low and medium technology	274	79
High-technology	72	21
Zone operator		
Public	142	41
PPP	116	34
Private	85	25

In the sector, approximately 70 percent of the total are fundamentally manufacturing zones; and approximately 30 percent are mixed. There is 1 zone that is purely service focused. The near absence of service-ori-

ented zones is due to the fact that they tend to be much smaller in area and thus fall through the filter. Approximately 21 percent of zones used in the analysis have a sectoral focus on high-technology manufacturing.

The type of zone operator is distributed among public, private, or public-private partnership, depending on the set-up of the management company. Forty-one percent of all zones are entirely publicly managed; 25 percent are privately run; and 34 percent are PPPs, in which both the private and the public sector are involved. Latin American zones (60 percent) make wide use of the private management model. Only 7 percent of zones in Latin America are exclusively managed by a public agency; the remainder have a PPP structure.

The Asian context is much different than in LAC. Asian zones in the sample are dominated by publicly run zones (44 percent), followed by PPP models (33 percent). Only 22 percent of zones in the Asian dataset are run entirely privately. This distribution reflects a much stronger involvement in zone development and management by governments in this region. There is additional variation within the Asian countries: 85 percent of Filipino zones are privately managed, whereas 100 percent of Bangladeshi and Chinese zones in the sample are public.

African zones tend to prefer at least some public involvement in zone management. One hundred percent of African zones in the analysis use a public agency or a PPP structure to manage and operate the zones. African zone programs that use a PPP structure (such as East London IDZ in South Africa) typically use a state-owned corporation to handle day-to-day affairs.[10]

Descriptive Analysis of SEZ Performance

Before turning to the econometric analysis, the authors examine the performance of the 346 SEZs in the dataset for the main period of analysis (2007–12). The average of the absolute growth rate across all SEZs is 14.7 percent over the entire period. A median growth performance of 2.8 percent and a standard deviation of 28.0 percent indicate a vast spread in growth among the SEZs. Looking at the relative SEZ perfor-

[10] Considering the larger population of zones that are captured in the database but not included in the analysis, Nigeria in particular has made use of the private management structure, with 32% of zones being managed by a private entity.

mance (the ratio of zone growth to national growth) presents additional interesting insights. An average ratio of 0.98 shows that zones on average have grown at roughly the same speed as the countries in which they are located. The median ratio is 0.95, lower than the national growth level and, again, there is a large spread with a standard deviation of 0.22. Thus, far from displaying the expected stellar performance that often drove the design and launch of SEZs, SEZ growth performance on average has been rather moderate. Consequently, during the period of analysis, the ambitious goals of SEZ policies were far from fulfilled. Furthermore, zone performance was highly diverse. Appendix B shows additional details of the summary statistics per country.

For the first descriptive analysis, the zones are grouped into different performance categories. For the absolute performance, the following three groups are used: (1) shrinking, (2) stable, and (3) growing. "Shrinking" includes the zones whose absolute light emissions shrank by more than 5 percent over 2007–12. "Stable" zones are those that remained within a +/- 5 percent range over the entire period; and the "growing" group includes the SEZs with an increase in the absolute nightlights emissions of more than 5 percent.[11] The zones' growth relative to national growth performance is captured by the following categories: (1) slower, (2) equal, and (3) faster. The "slower" group includes the zones whose ratio between zone and national growth is less than 0.9; the "equal" group refers to those with a ratio between 0.9 and 1.1; and the "faster" group is all zones with a ratio larger than 1.1.

Figure 4.2 shows the number of zones in each group. The numbers reflect the large variability in zone performance already indicated through the summary statistics. From 2007 to 2012, only 33 of all zones considered shrank; 150 remained relatively stable; while 163 grew. These numbers show that less than 50 percent of the zones exhibited positive growth. Relative performance paints an even less optimistic picture: only 65 of the 346 zones grew considerably faster than the national average. The vast majority of zones grew at the speed of the national economy. Twenty-five percent of zones grew well below the national average.

[11] Growth rates refer to the entire period of analysis, not the yearly growth rate.

Figure 4.2 SEZ Nighlights Performance, 2007-12

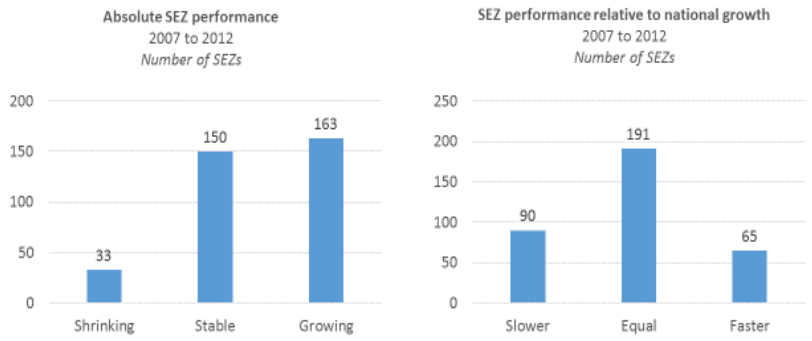


Figure 4.3 depicts the average SEZ growth performance per country. The y-axis plots the absolute growth performance; the x-axis shows the ratio of zone over national growth. Countries above the average horizontal line had SEZs that performed better than the average; SEzs below the line shrank. Among the study countries, only zones in Pakistan experienced absolute negative growth rates during the period of analysis. Zones in Jordan, Korea, Lesotho, Malaysia, and South Africa on average remained relatively stable. The remaining countries displayed a strong increase in nightlights within the zones.

Figure 4.3 National Average of the Absolute and Relative Growth Performance, 2007-12

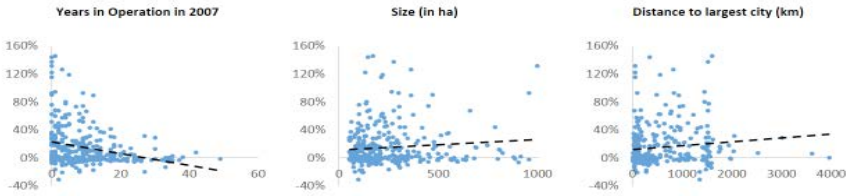
However, when considering the *relative* growth performance of the zones, the picture is less favorable. The majority of countries had an average ratio below 1 so are positioned to the left of the vertical line, indicating that nightlights in the zones grew more slowly than in the country as a whole. Even for countries whose absolute zone growth was dynamic, including Ghana, Kenya, and Turkey, SEZ growth was lower than overall growth. In other countries with a high absolute growth, such as Russia and Vietnam, zones did grow faster than the national average, but barely. The ratio of average zone growth relative to national economic growth never exceeded 1.06.

No clear patterns emerged in the geofigureical distribution of the success of SEZs. Figure 4.3 shows that successful zone programs, in both absolute and relative terms, can be found in different parts of the world. Zone performance within countries (appendix B) also displays considerable heterogeneity. In Vietnam, which figures positively in both absolute and relative growth, zones with stellar performance combined with others whose economic growth levels left much to be desired. The country's zones fell almost evenly into the faster (33), equal (38), and slower (32) categories. A similar, albeit more positive, picture emerges for absolute growth. Seventy Vietnamese zones grew during the period of analysis, while only 11 shrank, and 22 remained stable. A standard deviation of 37 percent for absolute growth demonstrates the significant differences among Vietnam's zones.

Zone Performance, SEZ Characteristics, and Policies

To obtain a first understanding of how SEZ characteristics and policies may relate to SEZ performance, the authors plot absolute SEZ performance (the SEZ growth rate) against some of the explanatory variables included in the econometric analysis. Using simple scatterplots, Figure 4.4 compares zone characteristics (x-axis)—the year the zone became operational, its size, and the distance to the largest city in the country—with the economic performance of the zone (y-axis).

Figure 4.4 SEZ Growth 2007-12 and SEZ Maturity, Size, and Location



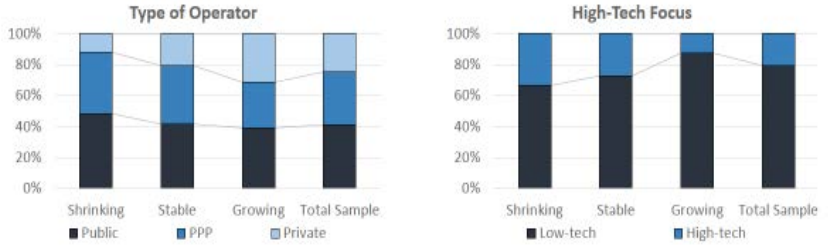
The scatterplot for years in operation displays a clear negative correlation with zone growth from 2007–12. More recently established zones seem to perform better than older ones, although the spread is large even among zones established relatively recently. The correlation between zone size on the one hand, and zone performance on the other is positive, providing some support for the positive impact of zone size on performance. The third scatterplot, which correlates the distance to the largest city with performance, reveals a slight positive correlation. This suggests counterintuitively that zones that are located farther from the largest city in the country are more dynamic. Overall, the evidence from the three scatterplots for correlations between the three specific zone characteristics and performance is limited.[12] Rather, the scatterplots underline the considerable variation in zone performance depending on which zone characteristic is being examined.

[12] The authors also tested for the presence of a nonlinear relationship between these variables and SEZ performance. The introduction of logarithmic trend lines in the relationships depicted in Figure 4.3 shows little evidence of a nonlinear relationship between the maturity and the size of the zone and zone performance (appendix C). Nonlinearity affects primarily the distance to the largest city in the country and primarily in a radius of 50 km from the main agglomeration (appendix C). However, the assumption that being in very close proximity to the largest city in the country could drastically reduce costs, generate positive externalities, and favor the performance of zones is challenged by the fact that the majority of the largest agglomerations in the countries included in the sample generated powerful negative externalities. Massive congestion, pollution, and high land-rent costs are likely to represent a burden for zones located in the immediate vicinity of agglomerations that offsets the benefits of the positive externalities associated with agglomeration. In this respect, SEZs located slightly farther from the agglomeration could be in a position to reap the positive externalities, while bearing fewer overall costs.

Moving on to the zone operator and sector focus, Figure 4.5 shows how these 2 characteristics, which frequently are considered to be important to zone performance, combine. The authors compare the share of the public, PPP, and privately operated zones in the overall sample with their representation in the shrinking, stable, and growing subgroups (Figure 4.5, left). Among the growing zones, privately operated zones are overrepresented compared to their share in the total sample whereas they are underrepresented in the shrinking group. The share of publicly run zones is larger in the shrinking group than in the overall sample. The latter, in principle, confirms the general perception in the literature that publicly operated zones tend to be less successful.

The authors apply the same procedure to the sector focus (Figure 4.4, right). A clear pattern can be detected: among the shrinking zones there is a strong presence of zones focused on high-technology sectors. This first descriptive account suggests that low-tech manufacturing firms tend to do better than their high-tech counterparts.

Figure 4.5 SEZ Growth 2007-12, Nature of Operator, and Sector Focus

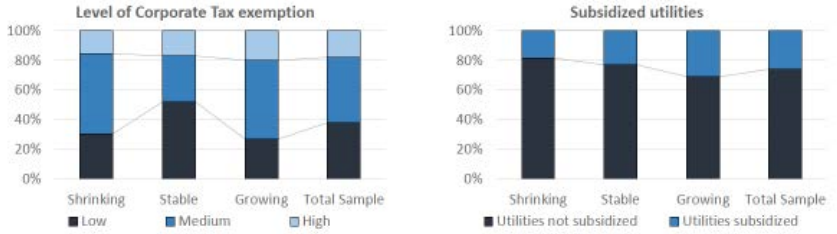


Regarding the program variables, specifically some of the incentives commonly provided to companies, Figure 4.6 shows how the level of corporate tax exemption and the availability of subsidized utilities are related to SEZ performance. For this purpose, the level of corporate tax exemption is grouped into low, medium, and high categories by using the corporate tax exemption indicator as defined in the previous section.[13] Zones with a value between 0 and 7 for this indicator are in the low in-

[13] The level of corporate tax breaks is calculated as an index based on the degree of tax exemption and the number of years granted over 20 years. The index ranges from a maximum value of 20—reflecting a company that is 100% exempt from paying corporate income tax over the entire 20 years—to 0—indicating 0% exemption in any year.

centive category; those from 7 to 14 in the medium category; and those above 14 in the high category. Again, the authors compare the representation of these groups in the overall sample with their shares in the three performance groups. Among growing SEZs, the medium incentives category is overrepresented compared to its share in the overall sample. The same is true for the shrinking group. The high incentives category in the shrinking group has a similar share to its representation in the overall sample. Thus, no clear overall pattern can be detected. These data may suggest that generous tax exemptions alone do not guarantee zone success. The picture for subsidized utilities supports the possibility that they do promote zone growth: zones with subsidized utilities are overrepresented in the growing category, whereas they are slightly underrepresented in in the shrinking group.

Figure 4.6 Fiscal Incentive Package and SEZ Performance



Period of Analysis 2007-12

The correlations presented above, although interesting, give only a very partial picture of which factors drive SEZ performance because the correlations do not control for additional factors that could influence what drives the economic dynamism of SEZs. When internal and external factors are considered together, some indicators may display a greater correlation than others with zone economic growth, or even limit the association of other factors. Hence, to be able to give a more accurate and complete picture of what drives SEZ performance, the authors conduct a simple OLS econometric analysis of Model (1). The analysis is conducted for the 345 zones considered from 2007 to 2012.

To determine which of the multitude of factors should be included in the regressions, the full model is built step by step based on simple regressions run with the absolute SEZ performance indicator. The authors

start by introducing individually each zone-related characteristic—first without controls and then including country dummies to test its robustness (Table 4.3). The authors then proceed the same way with the policy variables, using the contextual controls as base model instead of country dummies for the robustness check (Table 4.4).[14] Based on these regressions, Table 4.5 presents the full model in which the authors simultaneously include zone characteristics, policy variables, and the contextual factors. To test the robustness of these results, the authors also use the relative SEZ growth performance. Each regression also includes the structural nightlights controls as well as initial luminosity within the zone (described in section 3) to improve the fit of the nightlights as the SEZ performance proxy.

The econometric results for the zone characteristics and absolute SEZ growth present a consistent picture (Table 4.3). The maturity and size of the zone are consistently significant and robust to the inclusion of country dummies (columns 1–4). However, the high-tech focus of the zone provides a significant result only in the regression without country dummies (column 7). In contrast, for all other variables related to zone operation, the zone characteristics within one regression are considered and when contextual factors instead of country dummies are used as controls (appendix D). The insignificant results of the zone infrastructure variables are somewhat counterintuitive and should be taken with a pinch of salt due to potential measurement errors. For example, a one-stop-shop could be available on paper but not necessarily function or function efficiently in reality. The reality is something that the dataset cannot capture.

[14] Instead of country fixed effects, the base model is used because most of the policy variables apply to all zones within a country so would be omitted once country dummies are considered.

Table 4.3 Zone-Related Variables, Dependent Variable: Absolute SEZ Performance, 2007-2012

Basic zone characteristics

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years in operation	-0.00759***	-0.00450***						
	(0.00174)	(0.00170)						
Size			0.00124***	0.00103***				
			(0.000180)	(0.000202)				
Operator								
PPP					-0.0611	-0.0372		
					(0.0419)	(0.0402)		
Private					-0.0142	-0.0213		
					(0.0447)	(0.0429)		
High-tech focus							-0.0552*	-0.0384
							(0.0294)	(0.0287)
Country dummies	-	Yes	-	Yes	-	Yes	-	Yes
Structural nightlights controls and initial lights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345	345	345	345	343	343	345	345
R-squared	0.167	0.304	0.323	0.393	0.113	0.292	0.110	0.293

Zone infrastructure

	(9)	(10)	(11)	(12)	(13)	(14)
Customs office onsite	-0.0666	-0.0470				
	(0.0423)	(0.0519)				
Electricity subpower station			0.00960	-0.0190		
			(0.0362)	(0.0346)		
One-stop shop onsite					-0.0592	-0.0147
					(0.0383)	(0.0418)
Country dummies	-	Yes	-	Yes	-	Yes
Structural nightlights controls and initial lights	Yes	Yes	Yes	Yes	Yes	Yes
Observations	336	336	334	334	345	345
R-squared	0.116	0.300	0.102	0.285	0.115	0.291

Zone location

	(15)	(16)	(17)	(18)	(19)	(20)	(21)	(22)
Distance largest city	3.86e-05	-1.26e-05						
	(2.92e-05)	(3.12e-05)						
Distance closest major port			-1.25e-05	1.83e-05				
			(5.31e-05)	(5.25e-05)				
Distance closest city with min. 500k inhabitants					6.25e-05	0.000122		
					(4.98e-05)	(0.000119)		
Distance closest city with min. 300k inhabitants							0.000158	0.000174
							(0.000113)	(0.000105)
Country dummies	-	Yes	-	Yes	-	Yes	-	-
Structural night-lights controls and initial lights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345	345	344	344	344	344	344	344
R-squared	0.111	0.291	0.104	0.290	0.108	0.294	0.112	0.296

Note: Robust standard errors in parentheses, clustered at within country regional level. *** p<0.01, ** p<0.05, * p<0.1.

In contrast, the correlations between the regulatory variables and the absolute growth performance of SEZs (Table 4.4) are inconsistent. Only 2 of the 7 regulatory variables—subsidized utilities and the foreign ownership requirement—are significant even when contextual factors are controlled for. In contrast, exemption from labor regulations and the existence of an investment requirement for firms located in the zones are significant only if contextual factors are not taken into account. Thus, the results seem to pick up country effects. The remainder of the regulatory variables is insignificant. In addition, the subsidized utilities variable is negatively associated with zone performance (column 4).

Table 4.4 Regulatory Variables, Dependent Variable: Absolute Performance, 2007-2012

Fiscal and nonfiscal incentives

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Corporate tax exemption	-0.000108	-0.00328						
	(0.00343)	(0.00285)						
Subsidized utilities			-0.0488	-0.0871**				
			(0.0453)	(0.0360)				
Exemption from labor regulations					-0.155***	-0.00516		
					(0.0522)	(0.0407)		
National One-stop-shop							0.0129	0.0374
							(0.0392)	(0.0345)
Contextual controls	-	Yes	-	Yes	-	Yes	-	Yes
Structural night-lights controls and initial lights	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345	345	345	345	345	345	345	345
R-squared	0.104	0.272	0.110	0.278	0.121	0.269	0.105	0.271

Program requirements and independence of program regulator

	(9)	(10)	(11)	(12)	(13)	(14)
Foreign ownership requirement	-0.259*	-0.486***				
	(0.154)	(0.169)				
Investment requirement			-0.160***	0.0858		
			(0.0282)	(0.0571)		
Independence of zone regulator					-0.0597	-0.0405
					(0.0407)	(0.0336)
Contextual controls	-	Yes	-	Yes	-	Yes
Structural night-lights controls and initial lights	Yes	Yes	Yes	Yes	Yes	Yes
Observations	345	345	345	345	345	345
R-squared	0.109	0.281	0.159	0.273	0.113	0.272

Note: Robust standard errors in parentheses, clustered at within country regional level. *** p<0.01, ** p<0.05, * p<0.1.

As a final step in determining the baseline empirical model, the authors also run combined regressions in which the different types of variables of Model (1)—zone characteristics, SEZ program factors, and regional and country characteristics—are included in succession (appendix D). Although some individual policy variables become significant in these combined regressions, these variables again lose their significance once zone characteristics are included as controls. The R^2 also is considerably higher in the estimations that include SEZ-specific variables (appendix D, columns 1, 2, and 3) than in those that consider SEZ program variables (appendix D, columns 4 and 5). Thus, the picture that emerges is that zone-specific characteristics seem to be playing a more consistent and stronger role in driving SEZ performance. In contrast, the results for the regulatory policies are less consistent and are overshadowed by the contextual and zone-specific controls.

Based on the results of Tables 4.3 and 4.4, as well as appendix D, Table 4.5 introduces the full model. To make the estimations as parsimonious

as possible given the limited sample size, the authors introduce only the variables that were either significant in the previous regressions (such as zone size and years in operation) or for which the literature and/or policy-makers have a strong opinion on how they should affect zone performance (such as nature of the operator, location, corporate tax exemptions). Table 4.5 provides an overview of the results taking into account two dependent variables: (1) the absolute performance of the zone, and (2) how well the zone performs relative to the economic performance of the country in which it is located.

In Table 4.5, Columns 1–4 present the results for the regressions with absolute zone growth as the dependent variable. Columns 5–8 use the zone performance relative to its host country. The authors start v presenting the effect of SEZ-specific characteristics, using country fixed effects, and then sequentially add contextual and SEZ policy-specific variables.

The regressions that include country fixed effects are presented in columns 1 and 5 (Table 4.5). Columns 2 and 6 substitute the country-fixed effects with more specific regional and national contextual controls, which could affect the economic performance of the zone as well as that of the region and country in which it is located. SEZ program variables are included in columns 3–4 and 7–8. Of the 6 SEZ-specific variables included in the regressions, 4 show a consistently significant correlation with SEZ performance, whereas 1 displays a significant correlation in 4 of the 8 regressions.

Table 4.5 Main Regresson Analysis, Dependent Variable: SEZ Performance, 2007-2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	Zone growth	Zone growth	Zone growth	Zone growth	Zone/national growth	Zone/national growth	Zone/national growth	Zone/national growth
SEZ-specific variables								
Initial lights in zone	-0.000988***	-0.000990***	-0.000986***	-0.000992***	-0.000800***	-0.000804***	-0.000799***	-0.000803***
	(0.000179)	(0.000166)	(0.000167)	(0.000164)	(0.000150)	(0.000139)	(0.000140)	(0.000138)
Years in operation	-0.00303**	-0.00330***	-0.00393***	-0.00439***	-0.00262**	-0.00278***	-0.00332***	-0.00365***
	(0.00143)	(0.00125)	(0.00138)	(0.00141)	(0.00120)	(0.00104)	(0.00117)	(0.00120)
Size	0.000931***	0.000943***	0.000924***	0.000937***	0.000751***	0.000763***	0.000746***	0.000756***
	(0.0199)	(0.0186)	(0.0185)	(0.0182)	(0.0166)	(0.0155)	(0.0154)	(0.0152)
High-tech focus	-0.0400*	-0.0485**	-0.0318	-0.0372*	-0.0320	-0.0376**	-0.0241	-0.0280
	(0.0239)	(0.0214)	(0.0223)	(0.0222)	(0.0197)	(0.0179)	(0.0186)	(0.0185)
Operator								
PPP	-0.00974	-0.0190	-0.00566	-0.00288	-0.00856	-0.0166	-0.00671	-0.00470
	(0.0342)	(0.0330)	(0.0331)	(0.0329)	(0.0283)	(0.0272)	(0.0275)	(0.0273)
Private	0.0102	-0.0158	-0.0237	-0.0283	0.00890	-0.0109	-0.0191	-0.0225
	(0.0428)	(0.0329)	(0.0379)	(0.0384)	(0.0349)	(0.0270)	(0.0316)	(0.0319)
Distance to largest city	-7.25e-05***	-4.56e-05*	-4.77e-05*	-5.56e-05**	-5.91e-05***	-3.74e-05*	-3.83e-05*	-4.40e-05**
	(2.71e-05)	(2.62e-05)	(2.48e-05)	(2.53e-05)	(2.24e-05)	(2.15e-05)	(2.06e-05)	(2.09e-05)
SEZ-program variables								
Corporate tax exemption			0.00255	-0.0787**			0.00236	-0.0562**
			(0.00351)	(0.0311)			(0.00278)	(0.0261)
* GDPpc				0.00918**				0.00662**
				(0.00357)				(0.00297)
Subsidized utilities			-0.0595	-0.0240			-0.0486	-0.0230
			(0.0429)	(0.0447)			(0.0352)	(0.0378)
National one-stop-shop			-0.0201	0.0295			-0.0121	0.0237
			(0.0411)	(0.0370)			(0.0344)	(0.0310)
Foreign ownership requirement (%)			-0.414**	-0.438**			-0.339**	-0.357**
			(0.187)	(0.188)			(0.161)	(0.162)
Independent zone regulator			-0.0233	-0.0116			-0.0143	-0.00583
			(0.0279)	(0.0265)			(0.0225)	(0.0216)
Contextual factors								
Ratio regional/national GDPpc	-0.107***	-0.0848***	-0.0900***	-0.0926***	-0.0849***	-0.0659**	-0.0704**	-0.0722***
	(0.0378)	(0.0313)	(0.0338)	(0.0328)	(0.0309)	(0.0255)	(0.0277)	(0.0270)
Industry (% of GDP)		0.0104***	0.0111***	0.00939***		0.00744***	0.00810***	0.00686**

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
		(0.00327)	(0.00347)	(0.00350)		(0.00273)	(0.00287)	(0.00297)
Proximity to Large markets		0.375**	0.346**	0.374**		0.261**	0.244*	0.264**
		(0.158)	(0.166)	(0.157)		(0.125)	(0.135)	(0.132)
Rule of law		0.0145	-0.0282	-0.0474		0.00820	-0.0244	-0.0382
		(0.0392)	(0.0388)	(0.0367)		(0.0325)	(0.0332)	(0.0313)
GDPpc		-0.0268	-0.00127	-0.0711*		-0.0182	0.00279	-0.0476
		(0.0243)	(0.0275)	(0.0380)		(0.0201)	(0.0227)	(0.0331)
Country nightlights growth		0.301***	0.317**	0.101		-0.516***	-0.496***	-0.652***
		(0.113)	(0.147)	(0.140)		(0.0921)	(0.115)	(0.124)
Constant	0.295***	0.0105	-0.185	0.501	1.045***	1.017***	0.845***	1.340***
	(0.0802)	(0.210)	(0.235)	(0.371)	(0.0660)	(0.177)	(0.201)	(0.319)
Country dummies	Yes	-	-	-	Yes	-	-	-
Structural night-lights controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Observations	343	343	343	343	343	343	343	343
R-squared	0.422	0.388	0.401	0.408	0.372	0.336	0.349	0.354

Note: Robust standard errors in parentheses, clustered at within country regional level.
*** p<0.01, ** p<0.05, * p<0.1.
Structural controls are the population density around the zone and whether the zone is located directly next to a highway or a water body.

First, as expected, the results of the full model display a certain convergence in the zone growth. The initial level of lights within the zone correlate negatively with zone economic performance in all regressions, regardless of the level of controls included. This negative correlation implies that, in 2007, more established zones, which in most cases display a high level of nightlights, grew at a slower pace than younger zones and than zones that had been created at the beginning of the period of analysis. Not surprisingly, SEZs grow faster in the initial years of their lives. Their economic dynamism plateaus as they mature.

A second factor that confirms that older, more established zones tend to be less dynamic is that the coefficient for the number of years that the zone had been in operation by 2007 is consistently negative and statistically significant in all 8 regressions. This result is robust to the inclusion of initial level of lights in the estimation. Hence, the coefficient cannot

be considered driven by lower levels of initial light for newer zones. This finding points to the fact that the success of zones tends to be relatively short lived. Zone growth is higher (as in Figure 4.3 and reinforced by the degree of convergence in zone growth) in the early years and wanes with time. Once everything else is controlled for, the more established zones in the sample are less economically dynamic. This consistent slowdown aligns with much of the literature that has stressed the challenge of maintaining economic performance after initial success (Farole and Akinci 2011).

Third, size matters. The size of the SEZ correlates positively and significantly with zone performance. Larger zones have an advantage over smaller ones when it comes to growth potential.

Fourth, the results provide consistent evidence that the distance to the largest city correlates negatively with zone performance. Holding other things constant, zones located farther from the main city in the country are less dynamic. This result aligns with the large body of literature that emphasizes the strategic role of zone location (Madani 1999; FIAS 2009; ADB 2015). Thus, SEZs have benefited from proximity to the largest, and often more accessible, agglomeration in the country, but the benefits of greater agglomeration and accessibility do not expand beyond the primary city.

Fifth, the more successful SEZs in emerging economies during the period of analysis have been those with a low technological component. The indicator depicting the presence of high technology zones displays negative and statistically significant coefficients in 4 of the 8 regressions. These outcomes support the notion that, in emerging economies, the more successful zones generally are those specialized in low-tech, low-cost manufacturing products—not those that have aimed and succeeded in attracting sectors with a higher technological component and value added. This result reflects the challenge that zones located in areas with inauspicious conditions for the development of high tech often face when trying to move away from more standard manufacturing and up in the value chain (Farole and Akinci 2011; ADB 2015). Such zones lack sufficient skills to generate and/or absorb new knowledge; have research centers, universities, and firms below the technology frontier; and frequently are located in areas with limited externalities and capacity to generate and absorb knowledge spillovers. This finding also reflects the

risks of technology-driven shortcuts to economic development in the many parts of the world in which the conditions for the rapid development and assimilation of new technology simply are not there (Rodríguez-Pose and Hardy 2014).

Finally, the *nature of the zone management does not seem to matter as much as frequently assumed*. The results of the analyses do not support the idea that private operators are more effective than public ones, or vice versa. This conclusion is in line with the findings by Farole (2011) and is likely to reflect a strong contextual dependency for this variable. Whether zones are operated by the private or the public sector frequently is dependent on country-level policy-making and legislation.

Evidence exists of a nonlinear relationship between the dependent and the open-ended independent variables. As a robustness test, the authors re-estimate the regressions using the logarithmic transformations of the open-ended zone-specific explanatory variables. Appendix F includes the results. By and large, these re-estimates confirm the findings reported in this section.

In brief, the results of the zone-specific variables point to a number of structural features that are closely connected to zone performance. First, zone growth is difficult to sustain over time; and the largest benefits accrue shortly after the start of operations and wane as the zone matures. Second, larger SEZs seem to have an advantage over smaller ones. Third, despite a recent push to upgrade SEZs from purely labor intensive "sweatshops" of standard, low-value-added manufacturing products to locations for industries with a greater technology component, it was the low-tech manufacturing zones that performed well in the period of analysis. Furthermore, a strategic location in close proximity to the largest city in the country is beneficial for zone performance. The insignificant results of the other variables likely reflect a large degree of variability and context dependency in these characteristics and their impacts on growth.

Program variables (Table 4.5, columns 3–4 and 7–8) tend to have a more limited correlation with zone performance than do zone-specific characteristics. Only 2 of the 5 program variables related to incentive packages, program requirements, and set-up—and reported in the analysis—are

significant.[15] This finding suggests that specific aspects of the program design of the zones that have been the object of considerable attention in past research are not sufficient in and of themselves to explain zone-level growth.

The connection between incentive packages and SEZ economic performance appears limited. Both variables for *corporate tax exemption* and *subsidized utilities* have an insignificant coefficient in columns 3 and 7 of Table 4.5. The implication is that, by themselves, incentives do not play an important role in explaining zone performance.

However, when the authors test for a varying effect of corporate tax breaks depending on the level of development, the results become highly significant (Table 4.5, columns 4 and 8): the main term is negative, and its interaction with GDP per capita is positive. The impact of corporate tax holidays thus seems to depend to a large extent on the level of development: the impact is negative for poorer countries, but becomes positive for wealthier ones. The tipping point is approximately US$5,100 GDP per capita. At this juncture, corporate tax exemptions start to correlate positively with zone performance. Thus, tax breaks may be an effective tool to attract investments in more developed countries, but not in developing ones.

The second significant result is the negative correlation between the foreign ownership requirement and SEZ performance. This negative correlation suggests that imposing a minimum participation of foreign firms on SEZ companies hinders SEZ dynamism. This finding supports best practice guides that frequently advocate the removal of foreign ownership requirements to minimize the distortions created by favoring foreign companies over local ones (OECD 2009).

The remaining program variables—availability of an onsite one-stop-shop and the independence of the zone regulator—display insignificant coefficients throughout. Thus, they do not seem to be driving SEZ performance. These results counter the claims in many best practice guides that have underlined the importance of program characteristics for the viability of SEZs (OECD 2009; ADB 2015). However, given that the data do not capture the quality of the one-stop-shop services offered, the re-

[15] Program variables excluded from the analysis are always insignificant.

sult for the one-stop-shop should be interpreted with some caution For this reason, the authors cannot distinguish between the countries whose one-stop-shops effectively facilitate bureaucratic processes for firms and the countries whose one-stop-shops are less effective.

Thus, from a program design perspective, the authors can conclude that corporate tax exemptions can play an important role in stimulating growth in SEZs, but only under certain circumstances. Conversely, interventions such as imposing foreign ownership requirements are likely to lower SEZ performance. By contrast, the type of program set-up and other benefits play less vital roles than anticipated.

Last but not least, examining the results for the contextual factors provides interesting insights. Proximity to large markets delivers significant and positive coefficients, pointing to a beneficial effect of being close to the customer base, as is the case for the previous industrialization level. This result aligns with the case study literature that emphasizes the importance of "traditional" locational advantages (Madani 1999; Watson 2001; Rolfe and others 2004). The result also highlights the challenge that countries whose economic structures are dominated by agriculture face if they attempt to industrialize through SEZ policies.

In contrast to previous studies that stress the salience of the general business environment (Aggarwal 2005; Daudé and Stein 2007; Farole 2011), in the current analysis, the rule of law is insignificant. Experimentation with alternative measures of the quality of institutions at a national level, such as the Ease of Doing Business Rank, also deliver insignificant results (appendix E). In other words, the business environment seems to have limited sway over the performance of SEZs. This limited influence also may be related to the low-tech, low-value-added dimension behind the success of many SEZs. When the main factors of SEZ success are related to low labor costs, proximity to large markets, and some background in industry, the quality of national institutions may matter less than when the more complex networks and value chains related to high tech manufacturing are required to be in place.

The ratio between regional GDP per capita and national GDP per capita is negative and highly significant throughout, further underlining the importance of low-cost environments for SEZs to succeed. Consequently, SEZs in poorer areas of the country—albeit with a reasonable acces-

sibility to the main city—have performed better than those in better off regions. Thus, traditional wage-based advantages remain of great importance for firms seeking locations in SEZs in an developing economies.

Finally, apart from one regression (column 4), GDP per capita levels in 2007 are insignificant. Nevertheless, the growth of lights from 2007 to 2012 in the whole country is strongly significant throughout. When the authors use the absolute level of SEZ growth as dependent variable, the growth of lights correlates positively with SEZ performance. Not surprisingly, once the dependent variable is the relative performance, this relationship turns negative. The positive correlation suggests that zones grow faster in rapid growth environments. At the same time, when using the relative performance measure, it is more difficult for a zone to outperform national growth in the presence of high growth rates. Hence, the authors find a negative correlation in columns 5–8.

The analysis of the contextual factors indicates that, overall, firms in SEZs still seek low-cost locations in less developed areas of the countries, in close proximity to the main city, and with easy access to North American and European markets. Previous industrialization also plays a role in the success of zones. By contrast, institutional factors seem to be less relevant for SEZ economic dynamism.

Five-Year Growth Rate

The analysis for 2007–12 contains zones at different stages of development: some nascent, some more mature. A zone's maturity bears on its overall performance and limits the perception of what drives the success of SEZs start-ups (Table 4.5). Hence, to get a clearer picture of the factors behind the zone take-off, the authors analyze what determines zone performance in the first five years after the start of operations. This approach means that the period of analysis is different for each zone, covering the phase between t_0 (start year) and t_5 (five years later). This analysis can be done for only a reduced sample because the founding of the SEZ must have taken place after 1992, when the nightlights data became available. In contrast to the 343 considered in Table 4.5, the sample for the current analysis contains 252 zones.

Furthermore, the current SEZ dataset contains only information for the policies applicable in the years from 2007 on. Thus, the authors must

exclude the SEZ program-related explanatory variables from the 5 years' growth regressions. All other explanatory variables remain the same as in the previous section with one exception. Because each zone's performance is measured from its start date, the years-in-operation variable is substituted by a variable that reflects the year that the zone became operational. This substitution enables controlling for the fact that zones started operating at different times so may have been exposed to different economic environments. Appendix G includes the summary statistics per country.

Table 4.6 provides an overview of the results. As in the previous section, the authors use two dependent variables: the absolute growth of the zone (Table 4.3, columns 1–3) and zone growth relative to national growth (Table 4.6, columns 4–6). Columns 1 and 4 show the results taking into account only the SEZ characteristics. In columns 2 and 5, the contextual controls are introduced, whereas in columns 3 and 6, country dummies substitute those controls. in this context, country dummies have the advantages because they pick up some of the effects of the SEZ policies that cannot be included individually in this section.

The results further support some findings for SEZ-specific characteristics presented in Table 4.5. Zone size remains positively correlated with zone performance, indicating a stronger growth performance of larger zones in the first five years of establishment. The negative impact of distance to the largest city also is confirmed. The coefficient for the high-tech dummy remains negative throughout but is not significant. Neither the year of zone establishment nor the nature of the operator seems to make a difference in zone performance. In addition, the authors find no evidence of either an early mover advantage or a "learning-from-past-errors" effect. More recent zones have not performed better economically in their first five years of life than did those founded earlier.

For the contextual factors, most indicators are insignificant, with the exception of country nightlights growth and the ratio between regional and national GDPpc. The latter is, however, significant in only 2 of the 6 regressions. The national growth of nightlights displays the same dynamics as those reported in Table 4.5. The national growth is strongly positively correlated with absolute zone growth, whereas it is negatively correlated with the relative growth rate. Proximity to markets is negatively correlated but in only 1 regression and at a 10 percent significance level. The

weak correlatons suggest that the result should not be over-emphasized. The remainder of the contextual controls is insignificant.

Table 4.6 SEZ Growth in Early Years of Operation, Dependent Variable: SEZ Growth After 5 Years of Start of Operation

	(1)	(2)	(3)	(4)	(5)	(6)
Variables	Zone growth	Zone growth	Zone growth	Zone/ national growth	Zone/ national growth	Zone/ national growth
SEZ-specific variables						
Initial lights in zone	-0.00156***	-0.00136***	-0.00129***	-0.00118***	-0.00116***	-0.00111***
	(0.000246)	(0.000278)	(0.000277)	(0.000242)	(0.000252)	(0.000317)
Year established	-0.00180	0.00588	-0.0103	0.0101*	0.00485	0.00996
	(0.00864)	(0.00792)	(0.00762)	(0.00592)	(0.00655)	(0.00631)
Size	0.00145***	0.00132***	0.00108***	0.00115***	0.00114***	0.00107***
	(0.000254)	(0.000302)	(0.000312)	(0.000257)	(0.000282)	(0.000365)
High-tech focus	-0.0754	-0.0494	-0.0756	-0.0468	-0.0470	-0.0609
	(0.0544)	(0.0426)	(0.0502)	(0.0389)	(0.0359)	(0.0370)
Operator						
PPP	-0.00806	0.124	0.138	0.135*	0.117	0.176*
	(0.0647)	(0.0954)	(0.0946)	(0.0740)	(0.0790)	(0.103)
Private	-0.0386	0.00619	-0.0960	0.0345	0.0168	-0.0419
	(0.0591)	(0.0545)	(0.0778)	(0.0473)	(0.0501)	(0.0649)
Distance largest city	-7.84e-05	-9.10e-05**	-0.000101**	-9.11e-05***	-7.89e-05**	-8.38e-05**
	(6.16e-05)	(4.56e-05)	(4.85e-05)	(3.33e-05)	(3.94e-05)	(3.72e-05)
Contextual factors						
Ratio regional/national GDPpc	-0.0263	-0.0393	0.00699	-0.0791***	-0.0357	-0.0756***
	(0.0192)	(0.0246)	(0.0229)	(0.0170)	(0.0225)	(0.0273)
Industry (% of GDP)		-0.00108			0.000690	
		(0.00505)			(0.00467)	
Proximity to large markets		-0.478*			-0.324	
		(0.278)			(0.278)	
Rule of Law		-0.0133			-0.0355	
		(0.0687)			(0.0612)	
GDPpc in year operational		-0.0218			-0.0191	
		(0.0493)			(0.0428)	

	(1)	(2)	(3)	(4)	(5)	(6)
Country nightlights growth		0.557***			-0.430***	
		(0.122)			(0.106)	
Constant	3.948	-11.27	20.52	-19.14	-8.341	-19.09
	(17.27)	(15.77)	(15.21)	(11.83)	(13.01)	(12.61)
Structural controls	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed effects	-	-	Yes	-	-	Yes
Observations	252	252	252	252	252	252
R-squared	0.240	0.355	0.413	0.247	0.302	0.305

Note: Robust standard errors in parentheses, clustered at regional level.
*** p<0.01, ** p<0.05, * p<0.1.
Structural controls is whether the zone is located directly next to a water body.

These results should be interpreted with some caution due to the fewer observations. Nevertheless, the results further support the notion, found in the analysis for 2007–12 that larger zones in closer proximity to the largest city, but in relatively inexpensive locations, tend to perform best overall.

Case Study: Vietnam

To get a closer insight in the results of the analysis, the authors look into a specific case study of a developing economy that has been particularly active in promoting SEZs. Vietnam introduced its SEZ policy in 1996, first establishing industrial zones, export processing zones, and economic zones. Allowing these three types of zones was followed by introducting high-tech parks in 2003. Since then, different types of SEZs have proliferated throughout the country. The advantage of analyzing zones within one country that has been active in promoting this type of intervention is that the socioeconomic contextual factors related to the SEZ policy, institutional set-up, and the country endowment apply to all zones. The relatively uniform context enables delving more deeply into whether, in terms of socioeconomic characteristics, the role of SEZ-specific characteristics and potential interactions among them may be enhanced.

Table 4.7 Vietnam Case Study, Dependent Variable: SEZ Performance, 2007-2012

	(1)	(2)	(3)
VARIABLES	**Zone growth**	**Zone growth**	**Zone growth**
Initial lights in zone	-0.00193***	-0.00203***	-0.00220***
	(0.000356)	(0.000315)	(0.000309)
Size	0.00149***	0.00151***	0.00159***
	(0.000265)	(0.000206)	(0.000201)
Years operating	-0.0218*	-0.0249**	-0.0231**
	(0.0111)	(0.0106)	(0.0103)
High-Tech Focus	-0.00997	-0.0463	-4.669***
	(0.141)	(0.131)	(1.177)
* ln (regional GDPpc)			0.586***
			(0.150)
Operator			
PPP	-0.146	-0.0272	-0.0220
	(0.0882)	(0.0990)	(0.0984)
Private	-0.0646	-0.0589	-0.0411
	(0.0794)	(0.0661)	(0.0664)
Distance largest city	-0.000264	-0.000177**	-0.000179**
	(0.000329)	(7.70e-05)	(7.71e-05)
One-stop-shop on-site	0.0221	-0.0635	-0.0370
	(0.107)	(0.0994)	(0.101)
Power substation in zone	0.0682	0.00912	0.0142
	(0.116)	(0.0992)	(0.100)
Ln (regional GDPpc)		-0.000668	0.00221
		(0.0652)	(0.0644)
Constant	-42.37*	-49.38**	-45.86**
	(22.25)	(21.34)	(20.80)
Structural controls	Yes	Yes	Yes
Regional dummies	Yes	-	-
Observations	100	100	100
R-squared	0.692	0.437	0.451

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

Table 4.7 presents the results of the case study analysis. Because the authors are dealing with only one country, only the results of the absolute performance of the zone are reported (columns 1–3).[16] The results in column 1 include regional dummies as controls. In columns 2 and 3, the authors include the regional GDP per capita to control for the socioeconomic characteristics of the areas in which the zones are located.

The results by and large support the findings of the previous sections. Zone performance within Vietnam is much more related to the size of the zone, its (low-tech) dimension, and overall labor costs down to the specific program characteristics. The positive connection between SEZ size and zone performance, and the negative coefficients for the maturity of the zone and distance to the largest city, or stemming from previous cross-country analyses, are confirmed. An interesting nuance to the previous high-tech findings is presented in column 3, in which the authors interact the high-tech dummy with the regional GDP per capita. The main effect of a high-tech focus remains negative but turns highly significant. In contrast, the interaction term displays highly significant coefficient that is positive. This result is intuitive: high-tech zones in remote areas struggle because they lack the basic local capabilities and endowments to make SEZs viable. In contrast, a high-tech-focused zone in more developed areas of Vietnam—that is, in close proximity to Hanoi or Ho Chi Minh City—has a greater chance of success.

Two new indicators to reflect the infrastructure and services offered within the zone also were included in the analysis. Neither the dedicated subpower station nor the one-stop-shop within the zone correlate with zone performance. Similarly, the regional GDP per capita is not significant in any of the regressions. This result differs from those in the previous sections, which found that zones in less developed regions performed better than those in more developed ones.

Role of Spillovers

What is the influence of SEZs on neighboring areas? Do SEZs contribute to dynamize the economy of the areas in which they are located? Alternatively, is their influence limited to inside their borders?

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[16] The results for the growth of the SEZ relative to the rest of the country are almost identical to those reported in Table 4.6.

As mentioned earlier, policy-makers often regard SEZs as an instrument to dynamize broader territories and, thus, often to be part of broader development strategies. It is frequently believed that the fiscal and non-fiscal investment incentives offered by governments are mechanisms not only to lure firms to SEZs but also to achieve greater overall returns in regional development. Thus, zones are expected to create spillover effects that benefit local economies. By attracting new businesses and providing them with favorable investment climates, governments expect SEZs incentives to pay off via spillovers to local economies and economic growth in the long term (Farole 2011; Zeng 2016; Picarelli 2016).

Model and Data

The literature review in the previous section suggests that SEZs can generate spillovers and help to dynamize neighboring economies. However, the review also highlights the enormous difficulties faced by firms in SEZs to generate knowledge spillovers. The same difficulties are faced by societies in general, and firms outside the zone in particular, to absorb and realize the knowledge spillovers emanating from the SEZ. What is the evidence that SEZs in emerging economies are becoming motors of economic growth for neighboring areas? Are the SEZs capable of generating spillovers that seed economic dynamism? Alternatively, do local constraints limit SEZs' economic impacts beyond the immediate vicinity of the zone?

To address whether and to what extent SEZs contribute to growth in surrounding areas, it is necessary to assess the presence of knowledge spillovers from the SEZ and to examine the extent to which these spillovers expand over space.

The main barrier to this examination is that past empirical assessments of the nature and geofigureical extent of spillovers have relied on rather imperfect proxies to evaluate the territorial connections at the heart of the diffusion of knowledge over space. As discussed earlier, the existence of linkages between firms and agents inside and outside an SEZ could lead to knowledge exchange, but this knowledge may or may not result in economically viable activity. Capturing these processes cannot be done with simple proxies. Nevertheless, lack of adequate data has meant that the most influential analyses of spillovers—although sometimes trying to bring on board other types of distances, such as technological

distance—have remained firmly anchored in measures of geofigureical distance (Audretsch and Feldman 1996; Beise and Stahl 1999; Kaiser 2002; Maurseth and Verspagen 2002).

The most dominant method of measuring spillovers is to use a normalized spatial weight matrix that describes the interregional linkages among neighboring regions, using either inverse distance or the k-neighbors method as the weighting criterion.

Even more difficult has been assessing absorptive capacity. As discussed in the previous section, the capacity to assimilate knowledge generated elsewhere is dependent on, among other factors, the skills available in the recipient territory, its economic structure and institutional conditions, and its accessibility. However, the mechanisms and interaction that determine the absorptive capacity of a territory are complex and difficult to operationalize empirically. Researchers who have delved into this question have tried to gauge absorptive capacity by the use of a number of "filters": the "social filter" (Rodríguez-Pose 1999; Rodríguez-Pose and Crescenzi 2008) or the "knowledge" filter (Acs and others 2004; Acs and Plummer 2005). These analyses typically include composite indices that could facilitate the absorption of knowledge. These indices could comprise such factors as skills and education, openness, wealth, or institutional quality.

The authors follow these approaches by adapting Model (1) to evaluate the potential impact of economic activity in areas surrounding the SEZs considered in the analysis.

$$\Delta y_{j,t} = \alpha_1 + \beta_j\, y_{i,0} + \beta_2 SEZ\ performance_{i,t} + [\beta_3 SEZ\ related\ factors_{i,t0} + \beta_4\ \text{SEZ program factors}_{i,t0} + country\ or\ regional\ factors] + \epsilon_i$$

where

- Δy_{jt} is the dependent variable, the nightlights growth in the area surrounding the SEZ;
- y_{j0} is the initial luminosity in the area surrounding the SEZ;
- *SEZ performance* is the nightlights growth in the SEZ in the same period;

- *SEZ-related factors* depicting the dimension of the zone, the years of operation, and the high-tech component because they could influence the spillovers from the SEZ to surrounding areas;
- *SEZ-regulatory variable*s, including the presence of a free trade domestic market, export, and foreign ownership requirements;
- *Country-level or regional factors* that could influence the absorption capacity of neighboring areas. These comprise educational attainment (*regional years of schooling*), national wealth (*country GDPpc*), and institutional conditions (*political stability*).
- ϵ_i is is the robust standard error clustered at the within country/region level.

Once again, the main period of analysis is 2007–12. To determine the growth in the surrounding area, circles of different radii are drawn around the centroid of the SEZ, while the area of the SEZ is subtracted from it, to calculate the growth in nightlights from 2007 to 2012. The authors experiment with different radii to understand the spatial extent of the possible spillover. These radii include 10 km, 20 km, and 50 km from the centroid in the zone. Appendix H shows the summary statistics for each radius per country.

The initial luminosity in these areas also is used to control for convergence, that is, areas that start from a lower base are likely to experience higher growth.

The analysis in conducted in two stages. The first stage considers only the potential influence of changes in luminosity during the period of analysis on surrounding areas' growth to understand the spatial extent of the possible spillover. In the second stage, the factors that may facilitate or deter the absorption of spillovers from activities conducted in the SEZ are inserted in the analysis.

For SEZ-related controls, the question is which factors could affect spillovers in the surrounding areas. This question leads to including the SEZ *size* because larger SEZs can be expected to have a stronger impacts on surrounding areas than smaller SEZs. The variable, *years operating*, measures whether the impact of SEZ growth on the surroundings can be sustained over time. A zone's sector focus, reflected by dummy *high-tech*, could affect spillovers, because of both the labor intensity of the sector

and potential links to local inputs and producers. Due to lack of available data, additional variables reflecting the characteristics of the firms based in the SEZ cannot be included in the analysis.

On the policy side, the authors include a dummy to capture whether firms in SEZs are *free to trade with the domestic market* or whether they need to pay import and export duties in their interactions with local companies and consumers. SEZ firms facing import and export duties may have less of an incentive to interact with local suppliers and consumer, thus limiting their capacity to generate spillovers and spread them into surrounding areas. Imposing a *foreign ownership* and/or an *export requirement* could further limit the extent of the spillovers (World Bank 2011). The authors include two variables to control for this.

The *years of schooling* of the SEZ region and the natural logarithm of the country *GDP per capita* are used to proxy for the absorptive capacities of the surrounding area. Both indicztors reflect the local socioeconomic environment and are basic elements of most social or knowledge "filters" employed to portray assimilation of knowledge and economic activity spillovers. Finally, *political stability* controls for the country's political circumstances. SEZ firms may be less prone to build up forward and backward linkages with local markets if the country's political context is unstable. This instability could attract more efficiency-seeking "footloose" companies, which do not intend to promote local linkages, and that could move into production in a relatively short time span. Similar to SEZ firm characteristics, to add nuance, including controls for the industry base and type of firms around the SEZ would be pertinent. Again, these data are not available at this time. Appendix A includes the details of the variables.

Table 4.8 represents the first stage in the analysis and intends to assess the capacity of SEZs to generate spillovers, proxied by their effect on the growth of neighboring areas, up to a distance of 50 km from the zone. For each radius size, only the direct effect of SEZ performance is considered (Table 4.8, columns 1, 4, and 7). Country (columns 2, 5, and 8) and regional (columns 3, 6, and 9) dummies are added to examine whether differing local conditions significantly affect the capacity of SEZs to shape the performance of surrounding areas.

Table 4.8 Impact on Surrounding Areas, Dependent Variable: Change in Nighlights of SEZ Surrounding Areas, 2007-2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	10km radius	10km radius	10km radius	20km radius	20km radius	20km radius	50km radius	50km radius	50km radius
SEZ performance	0.383***	0.344***	0.268***	0.336***	0.277***	0.108***	0.218**	0.151*	0.0198
	(0.0674)	(0.0674)	(0.0390)	(0.0986)	(0.0957)	(0.0256)	(0.0934)	(0.0837)	(0.0340)
Initial lights in surrounding area	-5.85e-06***	-5.21e-06***	-5.99e-06***	-1.74e-06***	-1.68e-06**	-7.45e-07	-4.51e-07***	-4.99e-07**	-1.88e-09
	(1.43e-06)	(1.47e-06)	(2.04e-06)	(5.60e-07)	(6.95e-07)	(7.21e-07)	(1.23e-07)	(2.06e-07)	(1.39e-07)
Constant	0.172***	0.171***	0.191***	0.172***	0.179***	0.171***	0.191***	0.208***	0.156***
	(0.0254)	(0.0256)	(0.0249)	(0.0308)	(0.0337)	(0.0253)	(0.0282)	(0.0375)	(0.0190)
Regional dummies	-	-	Yes	-	-	Yes	-	-	Yes
Country dummies	-	Yes	-	-	Yes	-	-	Yes	-
Observations	346	346	346	346	346	346	346	346	346
R-squared	0.442	0.515	0.829	0.270	0.349	0.808	0.198	0.304	0.943

Note: Robust standard errors in parentheses; clustered at the within-country regional level. *** p<0.01, ** p<0.05, * p<0.1

The results of the analysis highlight that areas surrounding an SEZ in emerging economies generally benefit in economic terms from its presence. The coefficients for changes in SEZ performance are positive and significant in 8 of the 9 estimations. However, while areas surrounding a zone tend to benefit from its economic dynamism, the results also display a strong distance decay effect. The coefficients are strongest within a 10 km radius from the zone and rapidly decline with distance: if the authors only take the regressions without country and regional dummies (columns 1, 3, and 7), the coefficient already becomes 13 percent smaller at a distance of 20 km than at one of 10 kms, while at 50 km from the zone it has already declined by 43 percent (column 7).

The distance decay effect is even greater when country and, especially, regional dummies are considered. When introducing country dummies

in the analysis, the coefficient at 50 km is 56 percent lower than at 10 km (column 8). In contrast, while when regional effects are considered, distance decay becomes fully irrelevant (column 9).

This strong distance decay effect is not uncommon. The effect highlights that the strongest impact on economic growth linked to the presence of SEZs in emerging economies is felt in the zones' immediate vicinities (Wang 2013).

Does this positive but rapidly declining association between a zone in an emerging economy and its surrounding areas stand when considering SEZ-related and regulatory factors? How do regional and national factors that may condition the capacity of neighboring areas to absorb spillovers affect the capacity of zones to shape economic activity outside it? Table 4.9 provides an overview of the capacity of SEZs to generate spillovers, proxied by their effect on the growth of neighboring areas, up to 50 km from the zone. For each radius size, the authors first introduce SEZ growth and SEZ characteristics, using regional dummies as controls (columns 1, 4, and 7). Appendix I also includes the results with country dummies for this specification. The authors then insert SEZ policy-related indicators (columns 2, 5, and 8). Because the SEZ policy-related indicators apply to all zones within a country, regional or country dummies cannot be employed. The authors therefore also add the controls for contextual factors (columns 3, 6, and 9) to account for the absorptive capacity of an area and to control for variables that may be driving the surrounding area growth.

Table 4.9 presents the results of the second stage of the analysis. Columns 1–3 show the results for the immediate vicinity of the zones, that is, the area within a 10 km radius of the circle from the center of the zone, including, in turn, SEZ-related factors (column 1), SEZ regulatory factors (column 2), and regional and country factors that may facilitate or deter absorptive capacity outside the zone (column 3). At 10 km, the results mirror those of the regressions of Table 4.9: the coefficient of SEZ performance is always positive and highly significant. The result also is robust to the inclusion of regional and country fixed effects (appendix I) as well as additional SEZ policy-related and contextual factors. Consequently, the results point toward the fact that well-performing SEZs can drive growth in their immediate vicinities.

For the regressions using a 20 km radius (Table 4.9, columns 4–6) and a 50 km radius (Table 4.9, columns 7–9), SEZ growth remains significant throughout all specifications except one. Once regional effects at 50 km are controlled for, the coefficient becomes insignificant (column 7). Furthermore, the dimension of the coefficient of SEZ performance weakens considerably with distance. Considering the regional effects estimates, the coefficient goes from 0.26 at 10 km (column 1), to 0.1 at 20 km (column 4), to 0.02 (statistically insignificant) at 50 km (column 7). These results hold when country fixed effects are introduced (appendix I).

What is the effect of the other controls? Most other controls are insignificant, underlining that neither SEZ characteristics and regulatory environment nor the characteristics of the regions and countries in which the zones are located significantly affect the limited capacity of SEZs in emerging economies to shape development in surrounding zones.

There are some exceptions. Throughout Table 4.9, initial luminosity of the area is negative and highly significant, suggesting the expected convergence effect. Imposing an export requirement is negatively correlated with growth in the surrounding area throughout. These results support the notion that SEZ policies focused entirely on promoting exports are not favorable to create spillovers. SEZ size also is positive and significant in the 10 km radius regressions, but only if regional fixed effects are not included (Table 4.9, columns 2 and 3).

Other zone characteristics are unrelated to growth in the surrounding areas. Years operating is insignificant throughout the analysis with the exception of the 20 km radius regression with regional effects, for which the coefficient is significant at the 10 percent level. Hence, years of operation is not a factor that determines the capacity to generate and absorb knowledge spillovers. None of the other controls has a consistently significant coefficient. Interactions between the zone performance and zone and contextual factors were tested but resulted in insignificant coefficients.

As an additional robustness check, the authors rerun the regressions including SEZ-specific variables and country and regional effects, but using the 5-year periods after the start date of SEZ operations. The results confirm the authors' findings for 2007–12 (appendix I): the effect of SEZ

growth is positive for the surrounding area with a 10 km buffer but fades beyond this threshold.

The evidence emerging from these regressions is clear. The evidence supports the idea highlighted in the literature that, although SEZs may be at the heart of new spillovers, their impact is constrained by local conditions and generally is felt only in close proximity to the zone. The authors have seen how, although SEZs contribute to the growth of surrounding areas, their effects on neighboring areas declines steadily with distance. This result is robust when controlling for regional and national factors. Consequently, there is a strong distance decay effect in the capacity of SEZs to affect economic development in surrounding areas. This decay may be related, on the one hand, to the size and characteristics of the zones. On the other hand, the decay is more likely related to the absorptive capacity of many of the areas in which the zones are located. The combination of successful low-tech zones based in low-cost regions with skills, infrastructure, and institutions outside the zone is likely to limit the capacity of SEZs in such environments to maximize their impacts in the surrounding areas (Vather 2011; Osabutey and others 2013; García and others 2013; Duarte and others 2014).

Table 4.9 Impact on Surounding Areas, Dependent Variable: Change in Nighlights of Surrounding Area, 2007-2012

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	10km radius	10km radius	10km radius	20km radius	20km radius	20km radius	50km radius	50km radius	50km radius
SEZ performance	0.260***	0.360***	0.362***	0.0963***	0.309***	0.301***	0.0202	0.189**	0.181**
	(0.0422)	(0.0689)	(0.0694)	(0.0297)	(0.0993)	(0.0982)	(0.0346)	(0.0905)	(0.0895)
SEZ size	0.000101	0.000119***	0.000112***	1.16e-06	1.05e-05	-3.90e-06	-1.83e-05	1.35e-05	2.44e-06
	(6.58e-05)	(4.26e-05)	(4.24e-05)	(5.04e-05)	(4.93e-05)	(5.35e-05)	(2.39e-05)	(4.91e-05)	(5.29e-05)
SEZ years operating	-0.00120	-0.00107	-0.00111	-0.00247*	-0.00133	-0.00134	-3.60e-05	-0.000565	-0.000529
	(0.00111)	(0.000660)	(0.000742)	(0.00136)	(0.000910)	(0.000988)	(0.000571)	(0.00119)	(0.00124)
SEZ high-tech	-0.000585	0.00693	0.00824	-0.00302	0.00829	0.0130	-0.00641	-0.00360	4.10e-05
	(0.0183)	(0.0219)	(0.0209)	(0.0139)	(0.0185)	(0.0194)	(0.00982)	(0.0171)	(0.0185)
Free trade domestic market		-0.0270	0.00893		-0.0284	-0.00955		-0.0242	-0.0224
		(0.0245)	(0.0301)		(0.0297)	(0.0360)		(0.0343)	(0.0393)
Export requirement		-0.0637**	-0.0567*		-0.0868**	-0.0797**		-0.115***	-0.109***
		(0.0283)	(0.0301)		(0.0359)	(0.0361)		(0.0354)	(0.0380)
Foreign ownership requirement		-0.0782	-0.0220		-0.0684	-0.0412		0.0235	0.0243
		(0.101)	(0.103)		(0.110)	(0.121)		(0.127)	(0.132)
Regional years of schooling			-0.00945			-0.0166*			-0.0124
			(0.00687)			(0.00926)			(0.0117)
Country GDPpc			0.0115			0.0105			0.00653
			(0.0138)			(0.0171)			(0.0218)
Political stability			-0.0213			-0.000585			0.00921
			(0.0147)			(0.0195)			(0.0223)
Initial lights in surrounding area	-4.73e-06**	-5.90e-06***	-4.82e-06***	-3.69e-07	-1.93e-06***	-1.40e-06**	-6.29e-09	-5.34e-07***	-4.45e-07**
	(2.13e-06)	(1.47e-06)	(1.54e-06)	(7.99e-07)	(6.04e-07)	(6.73e-07)	(1.45e-07)	(1.53e-07)	(1.79e-07)
Constant	0.165***	0. 184***	0.123	0.183***	0.222***	0.240*	0.162***	0.240***	0.276*
	(0.0278)	(0.0298)	(0.0973)	(0.0321)	(0.0381)	(0.124)	(0.0219)	(0.0345)	(0.143)
Regional dummies	Yes	-	-	Yes	-	-	Yes	-	-
Observations	346	346	346	346	346	346	346	346	346
R-squared	0.835	0.466	0.475	0.811	0.283	0.294	0.944	0.220	0.226

Note: Robust standard errors in parentheses; clustered at the within-country regional level.
*** p<0.01 ** p<0.05 * p<0.1.

Conclusions

The aim of this chapter is to analyze both the factors driving SEZ performance in emerging economies and the extent to which SEZ performance drives economic growth in surrounding areas. The chapter has relied on an entirely new dataset. Data were gathered on SEZ characteristics and programs and contextual factors across 346 zones that were operational by or before 2007 in 22 emerging economies. To overcome the challenge of limited data availability for SEZ outcomes and characteristics, nightlights data have been used to proxy for SEZ performance.

There certainly is no shortage of research that has focused on the lessons learned from SEZ policies around the world using case study approaches. However, **the analysis conducted in this chapter is the first to address the economic dynamism and influence in surrounding areas of SEZs from a quantitative perspective covering a large number of zones across emerging economies.**

The analysis is a first because it covers more SEZs in more countries than any previous study. Nevertheless, as is common in quantitative analyses relying on samples but not the entire population, this analyisis is not exempt from problems. In addition to the problems of traditional selection bias and measurement error linked to the samples approach, three specific caveats apply to this study.

1. First, the analysis measures economic growth based on nightlights data. In economics, nightlights are an increasingly common alternative for economic activity in areas of the world in which economic data either do not exist or are not reliable. However, as discussed at length in the report, using nightlights as a proxy is not exempt from controversy.
2. Second, the definition of SEZs—in part because nightlights are used as the proxy for economic growth—discards a large number of small SEZs. Also not included were the SEZs that, despite having planned to do so, did not launch or become operational until after 2007. A third factor limiting inclusion is that the sample remains highly dependent on data availability in only some countries in only some specific geofigureical areas of the world (for example, in East Asia but not in Africa).

3. Third, gathering data about the characteristics, programs, and incentives associated with the SEZs is limited to the types of information that can be readily quantified. This limitation implies a loss of information, particularly regarding "soft" aspects such as those relating to the quality of services provided at zone level; or the political will driving zone implementation at both the zone and the national levels.

Thus, to sum up, the approach represents a considerable step forward in understanding what makes SEZs across emerging economies function. Nevertheless, given these three caveats associated with the approach, the results must be considered with some caution.

The change in approach and method has delivered results that, to a certain extent confirm, but in other respects refute, parts of the dominating knowledge about the viability, success, and influence of SEZs on economic development in emerging economies.

Despite considerable variation in their performances across and within countries, SEZs' overall economic dynamism does not exceed that of the countries in which they are located. Moreover the results of the zone-specific econometric analysis point to some crucial structural features behind SEZs' economic success—or lack of it. Key results include that:

1. zone growth is difficult to sustain over time;
2. trying to upgrade the technological component or value-added of SEZs is challenging because zones focused on high-tech sectors have performed worse than those in low-cost, labor-intensive sectors; and
3. size matters: larger zones seem to have an advantage in growth potential.

Country- and regional-specific context further determine SEZ performance. Large zones in relatively poor areas but not too far from the largest city in the country and in countries with relatively easy access to the main developed markets of the world have displayed the greatest economic dynamism. Zones in countries with a history of pre-existing industrialization also have prospered.

In contrast, incentive packages to attract firms to SEZs and ownership and management schemes have had limited influence in the success of the zones. Factors such as the type of operator of the zone—private, public, or public-private partnership (PPP); corporate tax exemptions; or sundry subsidized utilities do not seem to have greatly affected the success of zones across emerging economies. The backbone of most SEZ policies' corporate tax breaks also seem to have played relatively minor roles in zone dynamism, which has been limited to the more developed countries in the sample. Hence, the role of factors such as tax breaks, the presence of an independent zone regulator, or nonfiscal benefits such as the availability of a national one-stop-shop seems to be much more context dependent than hitherto thought. There is no guarantee that providing such support incentives and/or subsidies bears fruit in zone dynamism.

The second research question is the impact of SEZ on growth in surrounding areas. SEZs can contribute to the growth of surrounding areas, but this effect erodes with distance. The immediate-vicinity benefits and the influence of zones still are felt within a 50 km radius, but at that distance, their effect weakens until it is insignificant. The problems linked to generating new knowledge in zones that often are not much more dynamic—if at all—than the rest of the country combined with the inability to absorb knowledge spillovers outside it limit the capacity of SEZs in most emerging economies to dynamize their environment beyond areas in close proximity to them. This weak or lack of effect holds true regardless of zone characteristics and after controlling for SEZ performance.

The findings of the analysis point to five clear recommendations. SEZ policies in emerging economies are unlikely to perform in a vacuum. For these policies to maximize the returns to SEZs, certain preconditions must be met. Two essentials are the closeness to attractive markets and the predisposition of the economy or of its current level of capability. A country dominated by agriculture most likely will have difficulty leaping into nonagriculture-based industrialization through SEZ policies alone.

The cost advantage of a low-cost labor base is likely to remain an attractive feature for firms and will continue to affect the dynamism of zones and their surrounding areas.

Where zone programs have a greater potential to succeed, the effects are likely to be limited both in time and spatial extent. When framing policy incentives, zone policies need to take into account the transience of the positive effects.

SEZ policies cannot substitute for a country's wider structural reforms that would enhance its potential to develop economic activities and absorptive capacity.

Finally, SEZ policies are bound by a high degree of context dependency. Whether a country requires an independent zone regulator or a private or a public operator; or whether certain services are more or less needed in a specific zone depends essentially on the precise context in which the zone operates. Different combinations may be effective in different contexts.

The current research represents an important change in approach with respect to previous analyses about what determines SEZs' economic dynamism—or lack of it. However, as mentioned, the current research certainly is not without limitations. The hypotheses and, more importantly, the findings emanating from the research must be tested at both the national and zone levels. More detailed national studies studies following the typologies of zone performance emanating from the analysis will provide the necessary complements to better understand which specific factors contribute to make what is rapidly becoming one of the most popular development policies not just a policy that is in high demand but also a more effective one.

Chapter 5. Review of World Bank Portfolio

Following the analysis in chapter 4, the authors turn to the World-Bank-financed Special Economic Zone projects to assess how they have performed. These projects span several decades from the 1970s to today. Furthermore, the total number of projects is small: 35. Thus, guidance or lessons regarding policy and solutions design are not based on the larger SEZ sample. The nightlights imagery could not be obtained for the World Bank SEZ project portfolio in a way that could be applied meaningfully.

World Bank's SEZ Portfolio

This review of the Bank's SEZ portfolio assesses the developmental objectives of individual projects; the extent to which these objectives were achieved; the challenges faced; and the lessons learned that could inform the scope and design of subsequent projects. This review also sheds light on (1) the extent to which project designs were appropriate to achieve their objectives and whether they were implemented efficiently, that is, in a least-cost manner; and (2) the sustainability of project benefits and externalities derived in relation to the larger economy.

Data

The analysis draws on World Bank project documentation current at the time of each project. From earlier years, the documents include Project Appraisal Documents (PADs); Implementation Completion and Results Reports (ICRs); or their equivalent, Project Completion Reports (PCRs). Later documents include ICR Reviews and/or Project Performance Assessment Reports conducted by the Independent Evaluation Group (IEG), (earlier called the Operations Evaluation Department, or OED). Where appropriate, these documents have been supplemented by Implementation Status and Results reports (ISRs), Aide Mémoires, and other relevant documentation.

Approach

The analysis follows the current IEG approach, consistent with the Operations Policy and Country Services (OPCS)/IEG Harmonized Evaluation Criteria for ICR Reporting in the 2006 Guidelines. The achievement of overall objectives is disaggregated to evaluate the (1) *relevance* of the project, particularly the project's design (the extent to which the design facilitated the achievement of the Project Development Objective, or PDO); (2) *efficacy* of the operation (the extent to which the project actually achieved its PDO)[17]; and (3) *efficiency*—or cost effectiveness—of the project's implementation. The analysis also examines the long-term sustainability of the project's benefits and externalities to the larger economy. Additionally, the analysis highlights the principal lessons that could inform the future design of similar projects.

In this approach, data limitations will have some unavoidable impact and will need to be adjusted for. Over four decades, IEG's evaluation criteria have evolved in depth and detail. In earlier years, when project evaluation was in its formative stage, project completion reports were audited by the Operations Evaluation Department (OED) under criteria that were significantly less rigorous than today's. Of the 25 projects in the portfolio that have closed, only 11 are recent enough for the ICRs to be prepared in conformity with current guidelines. For the 14 projects that closed prior to 2004, completion reports were prepared under older guidelines that required much less detail and had a narrower methodological focus: outcomes and economic externalities. Consequently, OED reviews of these PCRs lacked specific ratings for relevance, efficacy, or efficiency. To provide a comparable basis for the analysis, for these 14 projects, proxy ratings were needed that were based on an assessment of their performance.

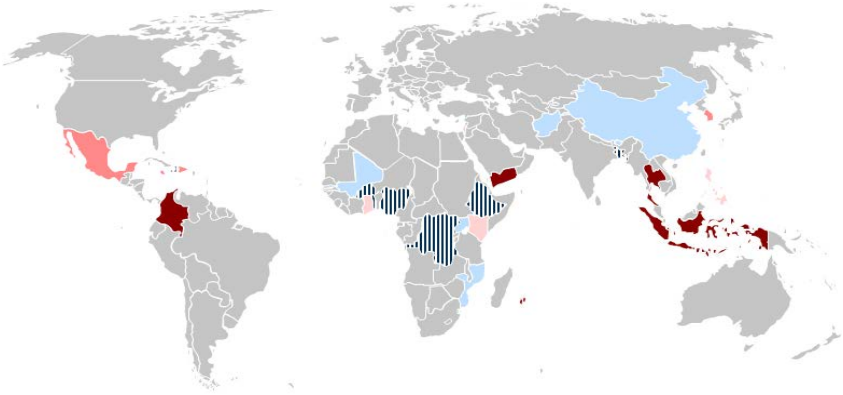
[17] Another aspect of relevance is the Relevance of Objectives: that is, the consistency of the PDOs with the country's strategic objectives and with the Bank's Country Partnership Framework. In this analysis, the authors do not assess the projects' Relevance of Objectives, in part because country strategy documents are less readily available for the older group of projects and also because this aspect is less critical to the purpose of the current inquiry.

Structure of the Portfolio

Composition

Currently, the Bank's portfolio of investment lending operations prepared either in direct support of an SEZ or containing a component supporting an SEZ comprises 35 projects approved between 1973 and 2015 for a total commitment of US$2,380 million. Four advisory projects also are recorded in the system. The definition of "special economic zone" is used broadly to include all forms of zones because project design documents do not define exactly the type of zone being financed. The 35 projects encompass zones of different characteristics and purposes including export processing zones, industrial estates/parks/free zones, commercial free zones, enterprise zones, agricultural zones, and investment zones.

Figure 5.1 World Bank Special Economic Zone Projects by Region, 1970-2015



	Number of projects by region			Funding committed by region (USD millions)
	Closed	Active	Total	
LAC	4	1	5	$253.5
MENA	2	0	2	$12.3
SSA	9	7	16	$1,346
EAP	8	0	8	$468.0
SAR	2	2	4	$182.3
TOTAL	**25**	**10**	**35**	**$2,262.1**

Source: Competitiveness Industries and Innovation Review

Of the 35 lending operations spread over 5 regions, 25 projects have closed, thereby providing a fuller basis on which to assess outcomes and impacts. Twelve are being implemented. The map and tables in Figure

5.1 show that early SEZ projects were placed mainly in Asia and South America. Bank-financed SEZ projects have been located in Africa only in recent years.

Interestingly, a sharp differentiation in context, objectives, rationale, and complexity is observed between the SEZ projects supported by the Bank and approved prior to approximately 1996 ("pre-1996"), 14 projects mainly in East Asia and Latin America, the first of which was approved in 1973, mainly in East Asia and Latin America; and those approved after approximately 1996 ("post-1996"), mainly in Africa

For projects approved pre-1996, the *contexts* within which the Bank operations were implemented differ from the contexts of the SEZ projects implemented post-1996. In nearly all of the operations funded pre-1996 (except Yemen), the SEZ framework was established; sites were developed; and the lending operation was targeting the expansion of site development (Colombia, Jamaica, and Korea). In contraxt, later SEZ projects targeted the introduction of the SEZ policy to the country.

The *development objectives* of the earlier period of projects were very focused on promoting (foreign) investment export promotion and, in some cases, the regional *spatial dispersion* of investment, especially for projects in East Asia. Piloting policy reforms to apply to the wider economy or to the firm-level agglomeration are not mentioned as economic rationales. The foci are investment, jobs, and foreign exchanges earnings, as reflected in the key indicators of success in these operations.

A number of the earlier operations supported the construction and promotion of zones in the form of Industrial Estates. Their objective was to decentralize manufacturing or agribusiness either as the means to promote economic activity in poorer regions of the country, or simply to reduce congestion and urban sprawl. Examples of these projects are the Minburi Industrial Estate project in Thailand (1977), Regional Cities Development Project in Thailand (1985), Jeonju Regional Development Project in Korea (1984), Nucleus Estate and Smallholder Project in Indonesia (1983), Pulo Gadung Industrial Estate Project near Jakarta (1973), and Cartagena Industrial Export Processing Zone in Colombia (1978).

Another clear focus is to boost foreign exchange earnings by attracting manufacturing investors for export. In some countries, the export-led

strategy is based on low labor cost (Jamaica); in others, the desire is to transition to higher value exports (Dominican Republic). For projects in Caribbean countries, given their proximity to the US market, preferential access terms and preparing a relatively good-quality work force appear to be components of a reasonable strategy. Examples of the export-led strategy include the Kingston Free Zone project in Jamaica (1982), the Industrial Free Zone Development project in the Dominican Republic (1989), the Export Development project in Kenya (1991), and the Subic Bay Freeport projects (1994 and 1996) in the Philippines.

The project components over this earlier period also are narrowly focused on zone expansion. These components therefore cover (1) land acquisition and site development, (2) infrastructure investment, (3) building factory shells, and (4) in a few cases, vocational training or access to finance or technical assistance for capacity building. In addition, six projects over this period are financed under Financial Intermediary Loans (FILs) (Colombia, Dominican Republic, Jamaica, Mauritius, Thailand, and the Republic of Yemen). A significant part of the project also provides access to long-term financing for investors. Interestingly, 4 of these 6 projects are implemented effectively.

To sum up, keeping in mind the small number of projects, up to the mid-1990s, the early years of Bank-financed lending operations are predominantly in Asia and Latin America. These projects are implemented largely within an already established policy framework. The focus is to attract manufacturing investment. Fifty percent of the operations are funded as Financial Intermediary Loans, and thus include access to finance as a component. The components all are focused primarily on the inputs (land, infrastructure, and buildings) needed to expand the zones.

The context for projects post-1996 is different. The Bank-financed projects tend to be more comprehensive. The projects are intended to increase overall private sector growth and firm level productivity. The Economic Zones framework is fairly new to the countries and their implementation experience limited. World Bank financing is being used to finance the first zones in, among others, the Gambia, Ghana, and Uganda. The Bank's financing is aimed at addressing the lack of infrastructure, lack of access to industrial land, a high-cost business environment, and the lack of capability at the firm level. The Special Economic Zone is a project component geared to establish a minimum infrastructure platform,

to provide world class infrastructure services for investors alongside an efficient public-private interface, and to ease the cost of doing business in the investment location.

Operations such as the Ghana Gateway project, Uganda Second Private Sector Competitiveness project (PSC II), or Mali Growth Support exemplify this new multi-pillar approach. The Madagascar Integrated Growth Poles project designed to develop an integrated platform of hard and soft infrastructure in three selected regional growth poles is the signature project of this new approach. The components of the Madagascar project include improving the business environment, increasing tourism-led growth, and supporting the mining sector. In fact, the one component that supported the creation of a specific zone was dropped mid-stream.

In only 1 project of the post-1996 group is establishing a zone the sole (or even primary) instrument to meet developmental objectives. The Sichuan Urban Development project in China had a strong spatial dispersion objective focused on the development of four second-tier cities in the Sichuan Province hinterland. The two components for this project were directly zone-related. They provided urban infrastructure and institutional capacity building in the areas around an industrial park and a Special Economic Development Zone (SEDZ) in the project area.

Portfolio Performance

During the 1970s and into the early 1980s, project size gradually increased. Costs of projects approved during the 1970s ranged from US$2.3 million (Yemen Industrial Estates) to US$16.5 million (Pulo Gadung Jakarta). From 1983 on, SEZ project sizes increased significantly. Several projects exceeded US$100 million. They included the US$175 million Small and Medium-Sized Enterprise (SME) project in Mexico, the US$100 million Export Development project in Kenya, the US$399.8 million Sichuan Urban Development project in China, and a number of projects with costs exceeding US$50 million. However, no clearly discernible secular trend was observed because projects approved after 2000 included a number of smaller operations (such as the Gambia Gateway at US$18.1 million and the Afghanistan Private Sector Development (PSD) at US$25 million) as well as larger ones (Madagascar Growth Poles at US$304 million).

Overall, projects disbursed less than 100 percent of their funds. The average disbursement for projects during both pre- and post-1996 was 84 percent. Both periods were marked by significant variability between projects. Some, such as Minburi Lat-Krabang Industrial Estates in Bangkok, Sichuan Urban Development, and Bhutan PSD, fully disbursed their funds. Other projects, such as Afghanistan PSD, Mali Growth Support, and Uganda Public Service Commission-II (PSC II), disbursed much less. The majority of projects experienced closing delays. The ratio was somewhat higher in the post-1996 period during which as many as 9 of 11 projects received closing date extensions, compared with 9 of 14 projects in the pre-1996 period.

Achievement of Objectives (Efficacy)

Table 5.1 summarizes the basic results for the 25 closed projects in the portfolio. Regarding objectives, little more than 50 percent (14) of the projects achieved their project development objectives (PDOs). Eleven projects failed to do so. However, successful and failed projects were distributed unevenly over the 2 periods (pre- and post-1996). For projects approved prior to 1996, 9 of 14—or more than 50 percent—achieved their objectives. For projects approved after 1996, 5 of 14—less than 50 percent—did so.

Table 5.1 Achievement of Project Development Objectives (PDOs)

Category	Achieved	Not Achieved	Total
Pre-1996 projects	9	5	**14**
Post-1996 projects	5	6	**11**
Total	**14**	**11**	**25**

Almost all of the projects in the pre-1996 group were designed with a strong focus on zone development. In other words, establishing a zone and its supporting infrastructure was the primary or, in most cases, the sole purpose. Furthermore, for the most part, project components also were directly zone-related. This zone focus was true not only for the 9 projects that achieved their objectives but also for the 5 that did not. Six projects had spatial dispersion as a specific development goal. Of these, 4 succeeded (that is, warranted a rating of Substantially Achieved or higher); 2 did not. Export development was the focus of another 6 projects.

Of these, again, 4 succeeded, and 2 did not. Of the 2 industrial development projects, 1 succeeded and the other did not).

For projects with spatial dispersion as their goal, success meant that they were able to contribute to urban decongestion to a significant degree. The industrial estates established by these projects broadly met their targets for occupancy rates and generation of economic activity. However, for various reasons, these projects did not always meet their employment generation targets. In this way, the Pulo Gadung Jakarta Industrial Estate project was successful in establishing the viability of the industrial estate concept as a means of urban decongestion; attracting 190 firms to the estate; and generating an expected 40,000 jobs. Similarly, the Minburi Lat Krabang Industrial Estates project achieved its occupancy and investment targets by project close. In addition, the infrastructure improvements carried out under the Regional Cities project in Thailand significantly positively impacted the quality of life in the four project cities with higher-than-projected economic returns from the fishport and industrial estate at Songkhla. The Jeonju Regional Development Project in Korea was another such success (Box 5.1).

Two projects with spatial dispersion as their objective failed to perform successfully: the Nucleus Estates and Smallholder project in Indonesia and the Industrial Export Processing Zone project in Cartagena, Colombia. The Indonesian project had the objective of diversifying sugarcane production away from the existing location in Java to South Kalimantan to promote the development of that region and make productive use of its underutilized resources. The project failed to meet any of its targets for land development, sugarcane plantings, and yields; and hence its higher level objectives.

Box 5.1 Success Story: Korea's Jeonju Regional Development Project (P004113)

Objectives

This project's objectives were to support the Government of Korea (Gok)'s efforts to reduce inter-regional disparities by promoting economic development and increasing employment opportunities in Jeonju Region, one of Korea's poorest regions.

Components

(1) Construction in Iri City of a 46-hectare industrial estate and 20-hectare housing estate plus supporting infrastructure; (2) to develop tourism, construction of two roads and a tourism estate at Namweon, access roads to nearby Mt. Jiri National Park, and supporting infrastructure. (The housing estate subsequently was dropped because of an oversupply of housing in the area).

WB loan

US$60 million. Project approved in 1984; closed in 1989 (15-month extension).

Total project cost: US$112 million.

Implementation Experience

Most of the project was completed within the original timeframe (1984-88). Two components added later (a cantilevered bridge and a national road) took an additional 15 months. Nevertheless, because of lower-than-expected contract prices arrived at by the implementing agency, the project was completed *under* budget. (Appraisal estimate was US$143 million, against the $112 million actuals.)

Results

Project succeeded in promoting economic development and employment opportunities in Jeonju Region. All of the industrial estates developed under the project were sold, and the region's manufacturing rate rose to 12 percent, nearing the national average. Tourism arrivals doubled due to the access roads built. However, there were fewer externalities than expected because the increase in tourist-related investments did not materialize. Nevertheless, sustainability of project benefits was rated high, so a second phase of developing the Iri City industrial estate was set in motion.

For the Cartagena project, the occupancy rates, exports, and income generation fell well below projections. This project is reported to have suffered from inadequacies in project preparation including unrealistic cost estimates, poorly defined rules for investors, and major (5-year) delays in construction of zone assets.

Projects focused on export development demonstrated success by attracting investment and generating foreign exchange earnings through exports from the zone. The Kingston Export Free Zone project in Jamaica exceeded its export revenue target of US$10.4 million per annum during 1987–91, generated 6,500 jobs (far surpassing the target of 4,000). Between 1992–99, the Subic Bay Freeport project in the Philippines attracted US$2.3 million in investments, largely meeting its target; and increased its exports significantly from US$24 million to US$1,012 million. From 1998 to 2003, the second Subic Bay project increased investments from US$2.59 billion to US$4.16 billion, with the number of firms investing in the zone more than doubling from 304 to 640, and the value of exports from the zone increasing from US$556 million to US$1.32 billion. The Dominican Republic's Industrial Free Zone project exceeded its export targets of US$40 million and 30,000 jobs by US$52 million p.a. by achieving US$52 million and 33,000 jobs, respectively.

Two projects in this category failed to achieve their objectives: the Kenya Export Development project (1992) and the Coromandel Industrial Estate project (1973) in Mauritius. The Kenya project did achieve some important trade reforms that conferred long-term benefits on the economy. However, the zone component—which involved establishing the Athi River Export Processing Zone (EPZ)—led to construction delays and a low occupancy rate by project closure. As a result, there were no exports from the zone during the project period. However, it should be noted that the EPZ, whose location near Nairobi was fairly strategic, did prove its utility many years later. The EPZ became a focus of the garment export industry, which received a boost under AGOA from approximately the year 2000 onwards.[18] The Coromandel Estate implemented by the Development Bank of Mauritius also experienced low occupancy rates and higher construction costs.

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[18] African Growth and Opportunity Act, a nonreciprocal trade preference program introduced by the USA in 2000 for Sub-Saharan Africa.

This export-oriented approach demonstrates the potential of zones to enhance exports and crowd in investment. However, the level of spillovers was questionable. During 1983–93 in the Dominican Republic, value added from zones expanded at a remarkable rate of 26 percent per annum, whereas in the rest of the economy, value added *declined* by 2.2 percent per annum.

The majority of projects in the post-1996 group were designed with more diverse objectives that support a broader PSD agenda, in which establishing an SEZ was only one of several possible instruments. Of the 11 closed projects in this group, 9 had multiple components or subcomponents of which establishing a zone was only 1. Of the remaining 2, Sichuan Urban Development had a spatial dispersion objective; Gaza Industrial Estate had a more broad-based employment and economic activity objective. In both cases, project components were focused on establishing an industrial estate as the principal means of achieving their objective. Interestingly, this trend appears to have been somewhat diluted in considering currently active projects. Of 11 active projects, 4 have components dedicated almost exclusively to zones; 7 have a broader array of components.

As mentioned, 5 of the 11 closed projects in this group were successful (including moderately successful)[19] in achieving their objectives. As described below, the zone components are observed to have contributed, albeit to a limited extent, to the success of these projects.

The Madagascar Integrated Growth Poles project achieved its broader objectives of job creation, business creation, and attracting private investment inflows, despite the fact that the zone component was dropped midstream.

The Bhutan Private Sector Development project received a moderately successful rating for meeting its broad objective of creating productive employment, although none of this ultimately was related to establishing the industrial estate, which was completed just as the project closed. Instead, the project's job creation targets were met via an unrelated Information Technology/IT Enabled Services (IT/ITES) skills development component, for which the existence of the zone was not a requirement.

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[19] In most cases, an IEG ICR Review rating or PPAR rating was available.

The industrial park was one subcomponent of the Mozambique Enterprise Development project (PoDE). After the park was established, it attracted 22 investments worth US$15 million and directly created 1,000 jobs. Although it was rated moderately satisfactory by IEG, the project more than met its training and linkage program targets. The project's successes were facilitated by the zone's location next to Mozal, one of the largest companies in the country.

The Ghana Gateway project, also rated moderately satisfactory by IEG in the Project Performance Assessment Report (PPAR), met its target of the number of firms investing in the multipurpose park and exceeded its target for export-oriented firms. The project also substantially achieved its trade facilitation objective through improvements arising from its support of customs, immigration, ports, and aviation. Although an increase in FDI to Ghana did occur, IEG was unconvinced as to how much of the inflow could be attributed directly to the multipurpose industrial park.

The only project in which the zone played a significant role in the project's success was the Sichuan Urban Development project. It attracted double the target number of new entrants to the industrial park and substantial FDI flows to the SEDZ, plus considerable local investments in nearby cities—thereby substantially achieving its spatial dispersion objectives.

As mentioned, six projects in this group failed to achieve their objectives.

1. The Mali Growth Support project (IEG rating: Unsatisfactory) underwent a major restructuring and revision of its many components. It failed to implement the infrastructure of the industrial zone or its regulatory framework or to meet any of its outcome indicators.
2. The Gambia Gateway project (IEG PPAR rating: Moderately Unsatisfactory) modestly expanded private investment, which was not entirely attributable to the zone, and negligibly increased export-oriented production. Although jobs created exceeded their target, most of them were outside the enclave area in firms using Special Investment Certificates.
3. The Uganda Private Sector Competitiveness project (Moderately Unsatisfactory) cancelled its industrial park component midstream.

4. The Ghana MSME project (Moderately Unsatisfactory) completed construction of its ICT Park only just prior to project closing; hence the park's impact could not be assessed. Job creation targets ostensibly were met but lacked attribution to the project.
5. The Afghanistan PSD project (IEG rating: Highly Unsatisfactory) could not complete implementation of the industrial park component by project closure; hence no jobs were created nor investments attracted. Neither were other components implemented that related to the government's capacity to develop a PSD strategy or to promote the country as an investment destination.
6. The Gaza Industrial Estate project achieved marginal success in the occupancy rate of its industrial estate and, hence, in creating jobs and investments.

In both Afghanistan and Gaza, it appeared that the risks of a conflict-ridden environment had been inadequately anticipated.

The overall success of economic zone components in projects depends on the implementing team's ability to design, procure, and project-manage the infrastructure required to establish the zone. Success also can be influenced by country circumstances (such as conflict in Afghanistan or Gaza), or corruption (as in Uganda), or simply an overly ambitious timeframe for such projects. On a positive note, the "white elephant syndrome" could not be found in any World-Bank-financed projects. In other words, if the zone eventually was built, it was occupied by firms.

Relevance of Design

Relevance of Design is a measure of the alignment of project components with the PDO, that is, the appropriateness of the project design in facilitating the achievement of objectives. As seen in Table 5.2, of the 25 closed projects being evaluated, 13 were observed to have a Relevance of Design that could be rated Substantial or Higher ("above-the-line"). Twelve of the projects had a relevance of design rated Modest or lower—approximately an even split.

However, significant differences emerge between the pre-1996 and post-1996 groups. For the earlier group, as many as 10 projects had above-the-line ratings compared with only 4 with ratings below-the-line. For

the latter group, the distribution is reversed with only 3 projects rated by IEG with above-the-line relevance vs. 8 projects rated below the line. This ratio is generally consistent with the observation that post-1996 projects tended to be more complex than those in earlier years, when design was more focused toward achieving a narrower set of objectives.

Table 5.2 Relevance of Design

Category	High	Substantial	Modest	Negligible	Total
Pre-1996 projects	2	8	3	1	**14**
Post-1996 projects	0	3	7	1	**11**
Total	**2**	**10**	**10**	**2**	**25**

Regarding the efficacy and relevance of design, for the 9 projects with a positive (above-the-line) efficacy rating, relevance also was rated positive. Of the 5 projects with a negative (below-the-line) efficacy rating, 4 had negative relevance ratings. Only one project had a negative efficacy rating combined with a positive relevance rating, namely, the Kenya Export Development project. Its components generally were relevant to the reform agenda being pursued and did have a positive impact in the long run, despite a Modest efficacy rating that reflected delays in zone completion due to implementation issues.

For the post-1996 group, a significantly greater divergence in the ratings is observed. Of the 5 projects with positive efficacy, only 1 had a positive relevance rating. Four had negative relevance ratings. Conversely, of the 6 projects with negative efficacy, 4 also displayed negative relevance. However, 2 of the 6 were assessed as positive relevance. In effect, the several projects that had achieved their objectives in terms of outcome targets had designs that IEG considered flawed in some way. These projects were Ghana Gateway, Mozambique PoDE, Bhutan PSD, and China Sichuan Urban Development. Conversely, it is interesting that at least two projects whose design was considered appropriate to their PDOs (Uganda PSC II and Gaza Industrial Estate) failed to achieve their objectives due to implementation issues or other reasons.

Efficiency

Efficiency measures the cost effectiveness of a project, or the developmental value-for-money resulting from the project's financing, and is one of the determinants of a project's overall outcome rating. Of the population of 25 closed projects, 10 had a positive efficiency rating compared to 15 that did not (Table 5.3). Again, considerable divergence exists between the pre- and post-1996 groups. In the earlier period, 9 projects were implemented relatively efficiently, consistent with the number of projects (also 9) that achieved their developmental objectives. In the later period, only one project had a positive efficiency rating from IEG. The majority of projects (10 of 11) received negative efficiency ratings—a fairly striking outcome.

Table 5.3 Project Efficiency

Category	High	Substantial	Modest	Negligible	Total
Pre-1996 projects	3	6	1	4	14
Post-1996 projects	0	1	8	2	11
Total	**3**	**7**	**9**	**6**	**25**

The large number of projects with negative efficiency ratings in the post-1996 period indicates a significant failure of SEZ-related projects to be executed cost effectively. The highly interesting large failure rate illuminates the difficulties of managing implementation effectively for projects that also had become significantly more complex over time. These projects often had large numbers of diverse components and were located for the most part in conflict-affected or post-conflict countries that had limited implementation capacity. These difficulties are captured in Table 5.4, which documents the effectiveness of implementation. Only 10 of 25 projects, or 40 percent, were implemented effectively. Of these, the smaller proportion (2 of 11) was in the post-1996 period.

Table 5.4 Were Projects Implemented Efficiently?

Category	Yes	No	Total
Pre-1996 projects	8	6	14
Post-1996 projects	2	9	11
Total	**10**	**15**	**25**

An important factor common to both groups of projects was the presence of weaknesses in project *preparation*, which in turn gave rise to delays in implementation. For example, in the Pulo Gadung Jakarta project, implementation problems related to land acquisition were seriously underestimated by the government and led to higher costs.

Other examples cite problems relating to inadequate preparation of zone infrastructure, arising in turn from the Bank's inadequate preparation at appraisal. In the pre-1996 group, the case of the Cartagena Industrial EPZ project can be cited. Its project cost estimates reportedly were based on an architectural study that lacked detailed engineering work. In addition, water supply, and road cost estimates were based on preliminary data developed only at the time of appraisal.[20]

In the post-1996 group, examples are abound. In the Bhutan PSD project, completion of the industrial park ran into delays due to the unanticipated need to lay HV (66kV) power lines underground, necessitating extending the closing date. The Uganda PSC II project was plagued with mismanagement of the construction of an office block in the industrial park. According to a "value-for-money audit," the office block ended up costing three-and-a-half times its original estimate, and 40 percent more than the square-meter cost in comparable projects.[21] Similarly, in the Afghanistan PSD Support project, the proposed industrial park was not completed by the time of project closure. According to the ICR, development of the park was "characterized by unpreparedness." of not only the site evaluation but also the critical technical aspects of power supply and the timely availability of technical design studies.[22] Although not for solely technical reasons, zone components were similarly delayed or even abandoned in several other post-1996 projects, including Ghana MSME, Madagascar Integrated Growth Poles, and Mali Growth Support.

In the majority of cases in this post-1996 group, economic rates of return (ERRs) estimated at the close of the project were found to be significantly lower than those estimated at appraisal, and notwithstanding generous

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[20] Project Completion Report, Colombia: Cartagena Industrial Export Processing Zone project, World Bank, Sept. 25, 1990.
[21] Implementation Completion and Results Report, Uganda: Second Private Sector Competitiveness project, World Bank, Aug 28, 2013.
[22] Implementation Completion and Results Report, Afghanistan: Private Sector Development Support project, World Bank, March 21, 2012, sec. 3.1.

extensions of project timeframes, disbursement of funds was relatively low. These outcomes were true even of projects that had received positive efficacy ratings, such as Bhutan PSD Madagascar Growth Poles and Mozambique PoDE. These low figures may have reflected a tendency to inflate rates of return in economic analysis conducted at appraisal—due either to a lack of attention paid by project task team leaders to this component of the appraisal document, or to pressures to make projects look more attractive than they were in reality.

In contrast, projects in the pre-1996 periods were relatively simpler and more focused in design. Thus, they proved easier to implement cost effectively and produced strong economic externalities. Their internal rates of return (IRRs)/ERRs estimated at closure were on par with, or greater than, the same rates estimated at appraisal. Even a relatively complex project such as the Jeonju Regional Development project in Korea was successful in completing most of its components within the originally scheduled 5-year period.

Summary of Lessons

The nature of the lessons learned differ between the two periods. For projects in the pre-1996 period, the following are the key lessons as drawn from the PCRs:

1. Most projects in this period were financed in the context of an *already established zone policy framework*. The policy decision was taken, and the WBG was financing the implementation. Fifty percent of the operations were funded as Financial Intermediary Loans. Therefore, these operations included access to finance as a component. All of the components focused primarily on the inputs (land infrastructure and buildings) needed to expand zones.
2. *Land acquisition* was an important issue for zones contained in urban projects. Governments found that that they needed to have paid greater attention to the modality and legalities of land acquisition. Failure to do so resulted in costly delays, as with the two Indonesia projects: Pulo Gadung and Nucleus Smallholder Estates. In contrast, the Jeonju Regional Development project in Korea demonstrated the benefits of being placed within the country's National Physical Land Development Plan, which provided an overall framework for dealing with such issues.

3. *Export Promotion (*or *Free Trade) Zones experienced limited spillovers*. Zones in isolation could demonstrate the potential for local and transitional benefits. However, to be an effective driver of private-sector-led investment and growth, improvements were needed in the overall regulatory and incentive framework, including rationalization of the trade regime to reduce effective rates of protection and in the overall business environment. In the absence of such wider reforms, any benefits arising from EPZ or other types of free trade zones would remain restricted to the zones themselves with little spillover to the wider economy, as resulted in the Cartagena and Dominican Republic projects.

For the post-1996 projects, the following are some of the key lessons:

1. The *implementation capacity for infrastructure components was inadequate* to meet the project targets within the project period. The limited design procurement and project management capability did not enable timely completion of the infrastructure services within a 4 to 6 year project period. In a number of cases, projects were found to have been under-prepared, especially the technical designs for the construction of their zones. This lack of preparation made it easy for unanticipated infrastructure-related problems to derail the implementation schedule. Project preparation or technical assistance aspects should be implemented prior to financing infrastructure components.

2. The *calculation of economic rates of return at appraisal needs greater focus and discipline by task team leaders*. The estimation of overly ambitious ERRs at entry—while enhancing the apparent viability of the project in the Board document—can undermine the assessment of project efficiency when this rate is re-estimated in the ICR and by IEG and found to be much lower in reality at project closure. It is likely that task team leaders (TTLs) need additional training in best practice in economic analysis. However, at a minimum, they may benefit from a standardized template on approach and methodology that they could use for this exercise.

3. Finally, as a more general lesson, *impact assessments are a useful tool to demonstrate the benefits* arising from a project, particularly for highlighting attribution to the project's activities. The use of impact assessments was not a common practice for the older projects. For

more recent World Bank projects, in general, assessments are more frequently used, even though for zone projects they were used very sparingly. As good practice, impact assessments should be built into project design. They could be financed out of project funds to ensure that resource availability is not a constraint in their being carried out.

Conclusions

Summary of Findings

As a consequence of the limited availability of cross-country data to measure SEZs' outcomes and characteristics, most of the literature that has delved into the analysis of the impact of SEZs has adopted a case study approach. Many of these cases represent solid analyses of the economic dynamism and influence of individual zones and provide interesting insights about their viability and the characteristics that make them successful. However the case study nature of the dominating analyses also is not without problems. Usually, research has focused on the most successful cases. Using only successes as examples raises questions about the accuracy of generalizing the factors behind the success of specific SEZs across economic social, political, and legal contexts that often diverge widely from those that have contributed to make a particular case successful.

The literature review suggests that SEZs have the power to bring FDI, bring new businesses to regions and developing economies, and boost exports; and that SEZ-based firms perform better than non-SEZ based firms. However, in terms of increasing employment and achieving spillovers in the larger region, the literature is inconclusive. The positive effects of SEZs are clearly connected to the context within which they are implemented, that is, to the capacity of non-SEZ-based firms and the supporting policies.

As detailed earlier (chapter 3, Conclusions), this report has relied on gathering an entirely new dataset of SEZ characteristics and programs as well as contextual factors across 553 zones in 51 countries. 346 zones in 22 countries were selected for the econometric estimation (chapter 4). To overcome the challenge of limited data availability for SEZ outcomes and characteristics, nightlights data have been used to proxy for SEZ performance.

The analysis is a first because it covers more SEZs in more countries than any previous study. Nevertheless, as is common in quantitative analyses relying on samples but not the entire population, this analyisis is not exempt from problems. Beyond the problems of traditional selection bias and measurement error linked to the samples approach, three specific caveats apply to this study.

1. First, the analysis measures economic growth based on nightlights data. In economics, nightlights are an increasingly common alternative for economic activity in areas of the world in which economic data either do not exist or are not reliable. However, as discussed at length in the report, using nightlights as a proxy is not exempt from controversy.
2. Second, the definition of SEZs—in part because nightlights are used as the proxy for economic growth—discards a large number of small SEZs. Also not included were the SEZs that, despite having planned to do so, did not launch or become operational until after 2007. A third factor limiting inclusion is that the sample remains highly dependent on data availability in only some countries in only some specific geofigureical areas of the world (for example, in East Asia but not in Africa).
3. Third, gathering data about the characteristics, programs, and incentives associated with the SEZs is limited to the types of information that can be readily quantified. This limitation implies a loss of information, particularly regarding "soft" aspects such as those relating to the quality of services provided at zone level; or the political will driving zone implementation at both the zone and the national levels.

To sum up, the approach represents a considerable step forward in understanding what makes SEZs across emerging economies function. Nevertheless, given these three caveats associated with the approach, the results must be considered with some caution.

The change in approach and method has delivered results that, to a certain extent confirm, but in other respects refute, parts of the dominating knowledge about the viability, success, and influence of SEZs on economic development in emerging economies.

Despite considerable variation in their performances across and within countries, SEZs' overall economic dynamism does not exceed that of the countries in which they are located. Moreover the results of the zone-specific econometric analysis point to some crucial structural features behind SEZs' economic success—or lack of it. Key results include that (1) zone growth is difficult to sustain over time; (2) trying to upgrade the technological component or value-added of SEZs is challenging because zones focused on high-tech sectors have performed worse than those in low-cost, labor-intensive sectors; and (3) size matters: larger zones seem to have an advantage in growth potential.

Moreover, the results of the zone-specific econometric analysis point to crucial structural factors behind the economic success—or lack of it—of SEZs. Key results include that (1) zone growth is difficult to sustain over time; (2) trying to upgrade the technological component or value-added of SEZs is challenging because zones focused on high-tech sectors have performed worse than those in low-cost, labor-intensive sectors; and (3) size matters: larger zones seem to have the advantage in growth potential.

Country- and regional-specific context further determine SEZ performance. Large zones in relatively poor areas but not too far from the largest city in the country, and in countries with relatively easy access to the main developed markets of the world, have displayed the greatest economic dynamism. Zones in countries with a history of pre-existing industrialization also have prospered.

In contrast, incentive packages to attract firms to SEZs and ownership and management schemes have had limited influence in the success of the zones. Factors such as the type of operator of the zone—private, public, or public-private partnership (PPP); corporate tax exemptions; or sundry subsidized utilities do not seem to have greatly affected the success of zones across emerging economies. The backbone of most SEZ policies' corporate tax breaks also seem to have played relatively minor roles in zone dynamism, which has been limited to the more developed countries in the sample. Hence, the role of factors such as tax breaks, the presence of an independent zone regulator, or nonfiscal benefits such as the availability of a national one-stop-shop seems to be much more context dependent than hitherto believed. There is no guarantee that providing such support incentives and/or subsidies bears fruit in zone dynamism.

The second research question is the impact of SEZ on growth in surrounding areas. SEZs can contribute to the growth of surrounding areas, but this effect erodes with distance. The immediate-vicinity benefits and the influence of zones still are felt within a 50 km radius, but at that distance, their effect weakens until it is insignificant. The problems linked to generating new knowledge in zones that often are not much more dynamic—if at all—than the rest of the country combined with the inability to absorb knowledge spillovers outside it limit the capacity of SEZs in most emerging economies to dynamize their environment beyond areas in close proximity to them. This weak or lack of effect holds true regardless of zone characteristics and after controlling for SEZ performance.

As as early as the 1970s, the World Bank funded a series of projects focused on limited-enclave export processing zones (EPZs). Using the IEG approach (effectiveness, efficiency, sustainability), the current review focused on the lending operations. The review relied on the main operational project documents. Project Appraisal Documents, Implementation Completion Reports, and Implementation Support Reports were used for this part of the review. Most pre-1995 projects were financed in the context of an already established zone policy framework. Fifty percent of the operations were funded as Financial Intermediary Loans so include access to finance as a component. Moreover, the components all focused primarily on the inputs (land infrastructure and buildings) needed to expand the zones.

Land acquisition was an important issue for zones contained in urban projects. Governments found that that they should have paid greater attention to the modality and legalities of land acquisition. In the absence of wider reforms, any benefits arising from EPZ or other types of free trade zones would remain restricted to the zones themselves, with little spillover to the wider economy.

For the post-1996 projects, to meet the project targets within the project period, *the implementation capacity for infrastructure components was critical*. The limited design procurement and project management capability did not enable timely completion of the infrastructure services within a 4–6 year project period. A number of projects were found to have been under-prepared, especially regarding technical designs for the construction of their zones, thus making it easy for unanticipated infrastructure-related problems to derail the implementation schedule.

Efficient and effective speed of implementation is critical for success. Furthermore, crowding out private investments, that is, building of constructing factory sheds, should be avoided.

Finally, as a more general lesson, impact assessments are a useful tool to demonstrate the benefits arising from a project, particularly to highlight attribution to the project's activities. The use of impact assessments was not a common practice for the older projects. As a matter of good practice, impact assessments should be built into project design. To ensure that resource availability is not a constraint in their being carried out, they could be financed out of project funds.

Policy Recommendations

The findings of the analysis have important policy implications. They point to the fact that SEZ policies in emerging economies do not take place in a vacuum, and that success depends on policy context. SEZ policies cannot substitute for wider structural reforms that would enhance the potential to develop both economic activities and the absorptive capacity in the country/region. SEZ policy formulation also should consider the supporting policies beyond the SEZ policy framework.

Proximity to attractive markets is essential as is the predisposition of the economy. A market and investor analysis prior to policy formulation is important to understand which categories of investors potentially would locate to the zone and which markets they would aim to serve. As the basis for policy formulation, it is important to assess whether the location could be used to penetrate local, regional, or international markets.

A cost advantage through a low-cost labor base likely would remain an attractive feature for firms and would continue to stimulate the dynamism of zones and their surrounding areas. Policy-makers therefore need to undertake a cost comparative assessment to fully understand whether an SEZ program would provide a cost advantage to investors. Most important, policy-makers should assess whether an SEZ program can be sustained; in other words, if the return on equity is competitive due to the SEZ program, whether the special incentives can be sustained.

SEZ policies are highly context dependent. Whether a country requires an independent zone regulator, a private or a public operator, or whether certain services are needed more or less in a specific zone depends

essentially on the precise context in which the zone operates. Different combinations may be effective in different contexts.

The location of zones is a major factor of success. More flexibility in choosing the location of an SEZ, that is, by a location analysis, the higher the probability of success. Locations that can exploit cost advantages in factor-input markets that are not negatively affected by distance have higher success rates.

Strong evidence suggests that positive spillovers from SEZ programs are possible. Supporting programs should be implemented as part of the SEZ program to ensure that positive spillovers are increased. These could range from increasing the absorptive capacity of non-SEZ-based firms to participate in supply chains or increased capacity of factor input markets.

Satellite imagery (nightlights and other images) can be used as a proxy to assess the impacts of SEZ programs. However, assessment through satellite imagery is not a substitute for proper impact assessments of SEZ programs. As mentioned repeatedly in this report, numerous compromises must be made, for example, the SEZ must be a minimum size or the location cannot be within a city for the satellite imagery approach to be applied. If satellite imagery is to be used, before construction of the zone, the SEZ program should request satellite imagery providers to collect images across a wide spectrum of light, including daylight. In addition, the area for economic spillover should be defined and included in the data collection.

Appendix A. Variable Descriptions

Variable	Description	Source
SEZ performance		
Absolute SEZ performance	$(Yi_1 - Yi_0)/Yi_0$: Growth rate of the sum of nightlights of the cells that compose the SEZ surface (chapter 4) over period of analysis	WB calculations based on NOAA's National Centers for Environmental Information (NCEI) https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html
Relative SEZ performance	Ratio of change in SEZ light intensity (Yi_1/Yi_0) over change of country light intensity $(Y_{country\ 1}/Y_{country0})$	WB calculations based on NOAA/NCEI
SEZ-related variables		
Years in operation	Number of years zone has been operating in 2007	Competitive Industries and Innovative Program (CIIP) dataset
Size	SEZ size in hectares (ha)	CIIP dataset
High-tech focus	Dummy = 1 if zone either "self-proclaims" on its advertising material that it specifically targets high-tech sectors or if companies established are within high-tech sectors as defined by OECD	CIIP dataset
Operator	Nature of zone operator: 0 = public, 1 = PPP, 3 = private Variable takes into account whether public sector is involved in zone development and/or provides land	CIIP dataset
Customs-office onsite	Dummy = 1 if SEZ provides customs office onsite	CIIP dataset
Electricity sub-power station	Dummy = 1 if SEZ has own subpower station onsite	CIIP dataset

Variable	Description	Source
One-stop shop onsite	Dummy = 1 if SEZ provides one-stop-shop services onsite	CIIP dataset
Distance largest city	Road distance in km to largest city in country	CIIP dataset
Distance closest major port	Road distance in km to closest major port	CIIP dataset
Distance closest city with min. 500k inhabitants	Road distance in km to closest city with min. 500,000 inhabitants	CIIP dataset
Distance closest city with min. 300k inhabitants	Road distance in km to closest city with min. 300,000 inhabitants	CIIP dataset
Regulatory variables		
Corporate tax exemption	Index based on level of tax exemption and number of years granted over 20-year horizon. Index can take values from 20— reflecting a company that is 100% exempt from paying corporate income tax over entire 20 years—to 0—indicating 0% exemption in any year.	CIIP dataset
Subsidized utilities	Dummy = 1 if firms within SEZ benefit from subsidized utilities	CIIP dataset
Exemption from labor regulations	Dummy = 1 if labor regulations applicable to firms within SEZ are less stringent than in rest of country	CIIP dataset
National one-stop-shop	Dummy = 1 if one-stop-shop services from a national authority are available to companies within SEZ	CIIP dataset
Foreign ownership requirement	% of firm ownership required to be held by foreign company for firm to locate within SEZ	CIIP dataset
Investment requirement	Dummy = 1 if firms are required to make a minimum investment to benefit from SEZ policies	CIIP dataset
Independence of zone regulator	Dummy = 1 if zone regulator is an independent entity	CIIP dataset
Free trade domestic market	Dummy = 1 if firms within SEZ can trade with local market without paying import and export duties or other restrictions	CIIP dataset

Variable	Description	Source
Export requirement	% of firm production required to be exported	CIIP dataset
Contextual factors		
Ratio regional/ national GDPpc	Natural logarithms of regional GDP per capita/country GDP per capita	Regional dataset sourced from Gennaioli and others 2014
Proximity to large markets	Sum of inverse distances from each country to US and EU	WB calculations based on distances from www.distance-fromto.ne
Industry (% of GDP)	Industry value added (% of GDP) in beginning of period of analysis	WDI
Rule of law	Rule of Law indicator in beginning of period of analysis. Values range from -2.5 to 2.5.	Kaufmann and others 2010
Political stability	Political Stability indicator in beginning of period of analysis. Values range from -2.5 to 2.5.	Kaufmann and others 2010
GDPpc	Natural logarithm of GDP per capita in beginning of period of analysis (constant 2010 US$)	WDI
Country nightlights growth	Growth rate of sum of lights within country in period of analysis	WB calculations based on NCEI https://ngdc.noaa.gov/eog/dmsp/downloadV4composites.html
Regional years of schooling	Years of schooling in country/region in which SEZ is located	Regional dataset sourced from Gennaioli and others 2014
Structural nightlights controls		
Population density around SEZ	Population density in immediate vicinity of zone: 1 = isolated, that is, almost no buildings around zone; 2 = sparsely populated; 3 = densely populated	Based on visual inspection of SEZ sites in googlemaps satellite view
Waterbody	Dummy = 1 if zone is located directly next to a waterbody	Based on visual inspection of SEZ sites in googlemaps satellite view
Highway	Dummy = 1 if zone is located directly next to a highway	Based on visual inspection of SEZ sites in googlemaps satellite view

Appendix B. SEZ Growth, 2007-12

Summary Statistics for Absolute SEZ Nightlights Growth, 2007–12

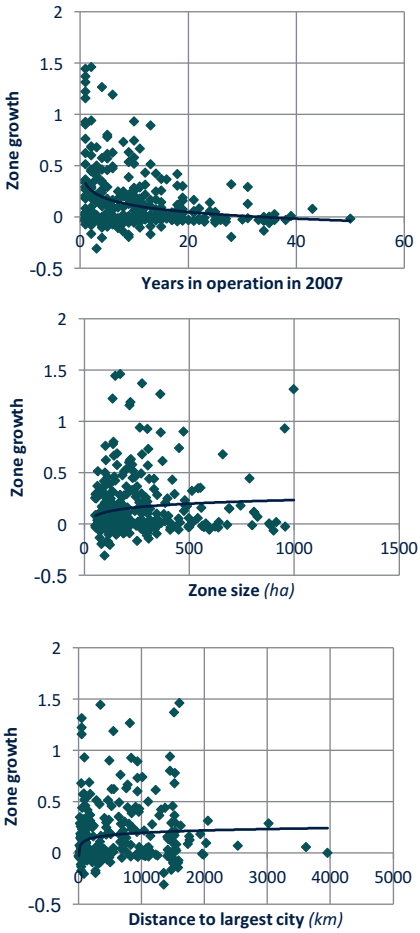
Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.123127	0.079646	0.2160494	0.063017898
Bangladesh	8	0.086411614	-0.17241379	0.25	0.128250978
Chile	3	0.244405533	0.127572	0.3157895	0.102008353
China	33	0.081519892	-0.11031175	0.9285714	0.256483049
Colombia	6	0.08383643	-0.04761905	0.2972973	0.150838106
Dominican Republic	10	0.119304864	-0.03225806	0.3714286	0.142807016
Ghana	1	0.1787709	0.1787709	0.1787709	#DIV/0!
Honduras	3	0.036355767	0.0204082	0.0535714	0.016617926
India	8	0.132515369	-0.03174603	0.4213836	0.177547738
Jordan	1	0.0173913	0.0173913	0.0173913	#DIV/0!
Kenya	1	0.2564103	0.2564103	0.2564103	#DIV/0!
Korea, Dem. Rep.	64	0.000157947	-0.09128631	0.5128205	0.095994402
Lesotho	1	0.0147059	0.0147059	0.0147059	#DIV/0!
Malaysia	6	0.01654229	-0.02564103	0.111399	0.04894747
Nigeria	1	0.6321839	0.6321839	0.6321839	#DIV/0!
Pakistan	3	-0.18533668	-0.31034483	-0.04958678	0.130710478
Philippines	29	0.0682588	-0.19565217	0.4615385	0.144810764
Russia	4	0.163269225	0.0086207	0.3064516	0.151793801
South Africa	1	0.0140845	0.0140845	0.0140845	#DIV/0!
Thailand	20	0.125659473	-0.03174603	0.8915663	0.23944778
Turkey	36	0.229802393	-0.0625	1.1904762	0.291811076
Vietnam	103	0.284063211	-0.20454545	1.4615385	0.377889949
Total	**346**	**0.146868494**	**-0.31034483**	**1.4615385**	**0.282058067**

Summary Statistics for Relative SEZ Nightlights Growth, 2007–12

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.90429435	0.8692853	0.9791115	0.05073932
Bangladesh	8	0.997298475	0.7597033	1.147469	0.117731233
Chile	3	1.0263724	0.9300092	1.085249	0.084135502
China	33	0.914741112	0.7524914	1.631171	0.216931408
Colombia	6	0.915561033	0.8045153	1.09588	0.127418987
Dominican Republic	10	1.01467387	0.8772789	1.24323	0.129457635
Ghana	1	0.7246067	0.7246067	0.7246067	-
Honduras	3	0.993996233	0.9787006	1.010508	0.015938535
India	8	1.003846625	0.8582475	1.259896	0.157376007
Jordan	1	0.8321588	0.8321588	0.8321588	-
Kenya	1	0.7757092	0.7757092	0.7757092	-
Korea, Dem. Rep.	64	0.978339575	0.8888901	1.479818	0.093900244
Lesotho	1	0.80386	0.80386	0.80386	-
Malaysia	6	0.811284067	0.7776183	0.8869875	0.0390641
Nigeria	1	1.424929	1.424929	1.424929	-
Pakistan	3	0.975099367	0.8254728	1.137583	0.156451821
Philippines	29	1.027987041	0.7740251	1.406441	0.139351601
Russia	4	1.06371485	0.9223014	1.194643	0.138802985
South Africa	1	0.9246849	0.9246849	0.9246849	-
Thailand	20	0.86354643	0.7427932	1.45111	0.183691788
Turkey	36	0.911232989	0.6946489	1.623053	0.216220009
Vietnam	103	1.059035955	0.6560541	2.030163	0.311666184
Total*	**346**	**0.984477436**	**0.6560541**	**2.030163**	**0.224244824**

Appendix C. SEZ Growth and Maturity, Size and Location, 2007-2012

(logarithmic function)



Appendix D. Zone Characteristics, Regulatory Variables, and SEZ Performance

Dependent Variable: Absolute SEZ Nightlights Growth, 2007-2012

	(1)	(2)	(3)	(4)	(5)	(6)
SEZ specific variables						
Initial lights in zone	-0.00111***	-0.00108***	-0.000990***	-0.000278***	-0.000277***	-0.000992***
	(0.000158)	(0.000192)	(0.000166)	(5.21e-05)	(5.21e-05)	(0.000164)
Years in operation	-0.00487***	-0.00339**	-0.00330***			-0.00439***
	(0.00136)	(0.00149)	(0.00125)			(0.00141)
Size	0.00112***	0.00101***	0.000943***			0.000937***
	(0.000168)	(0.000201)	(0.000186)			(0.000182)
High-tech focus	-0.0321	-0.0375	-0.0485**			-0.0372*
	(0.0227)	(0.0245)	(0.0214)			(0.0222)
Operator						
PPP	-0.0287	-0.0204	-0.0190			-0.00288
	(0.0334)	(0.0356)	(0.0330)			(0.0329)
Private	-0.0256	-0.000892	-0.0158			-0.0283
	(0.0334)	(0.0453)	(0.0329)			(0.0384)
Distance largest city	-6.01e-06	-3.72e-05	-4.56e-05*			-5.56e-05**
	(2.55e-05)	(3.15e-05)	(2.62e-05)			(2.53e-05)
SEZ program variables						
Corporate tax exemption				-0.00183	-0.0253	-0.0787**
				(0.00337)	(0.0312)	(0.0311)
*GDPpc 2007					0.00264	0.00918**
					(0.00360)	(0.00357)
Subsidized utilities				-0.0689*	-0.0586	-0.0240
				(0.0410)	(0.0417)	(0.0447)

	(1)	(2)	(3)	(4)	(5)	(6)
National one-stop-shop				0.0706*	0.0874**	0.0295
				(0.0381)	(0.0397)	(0.0370)
Foreign ownership requirement				-0.496***	-0.502***	-0.438**
				(0.165)	(0.164)	(0.188)
Independent zone regulator				-0.0366	-0.0337	-0.0116
				(0.0312)	(0.0308)	(0.0265)
Contextual factors						
Ratio regional/national GDPpc			-0.0848***	-0.115***	-0.115***	-0.0926***
			(0.0313)	(0.0376)	(0.0375)	(0.0328)
Proximity to large markets			0.375**	0.689***	0.702***	0.374**
			(0.158)	(0.180)	(0.173)	(0.157)
Industry (% of GDP)			0.0104***	0.00981***	0.00919**	0.00939***
			(0.00327)	(0.00343)	(0.00374)	(0.00350)
Rule of Law			0.0145	-0.0200	-0.0257	-0.0474
			(0.0392)	(0.0365)	(0.0365)	(0.0367)
GDPpc 2007			-0.0268	-0.0566**	-0.0769**	-0.0711*
			(0.0243)	(0.0275)	(0.0339)	(0.0380)
Country nightlights growth			0.301***	0.560***	0.499***	0.101
			(0.113)	(0.156)	(0.140)	(0.140)
Constant	0.229***	0.285***	0.0105	0.281	0.481	0.501
	(0.0700)	(0.0727)	(0.210)	(0.214)	(0.341)	(0.371)
Country dummies	-	Yes	-	-	-	-
Structural nightlights controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	343	343	343	345	345	343
R-squared	0.348	0.405	0.388	0.294	0.294	0.408

Note: Robust standard errors in parentheses clustered at the within country regional level. *** p<0.01 ** p<0.05 * p<0.1.

Appendix E. Alternative Regression with Ease of Doing Business

	(1)	(2)	(3)	(4)	(5)	(6)
	Zone growth	Zone growth	Zone growth	Zone/ national growth	Zone/ national growth	Zone/ national growth
SEZ specific variables						
Initial lights in zone	-0.000993***	-0.000992***	-0.000999***	-0.000807***	-0.000805***	-0.000810***
	(0.000165)	(0.000167)	(0.000165)	(0.000138)	(0.000140)	(0.000139)
Years in operation	-0.00333***	-0.00382***	-0.00428***	-0.00279***	-0.00321***	-0.00355***
	(0.00126)	(0.00137)	(0.00140)	(0.00105)	(0.00116)	(0.00119)
Size	0.000951***	0.000930***	0.000943***	0.000771***	0.000752***	0.000762***
	(0.000185)	(0.000184)	(0.000181)	(0.000154)	(0.000154)	(0.000151)
High-tech focus	-0.0514**	-0.0345	-0.0399*	-0.0405**	-0.0267	-0.0307
	(0.0212)	(0.0222)	(0.0224)	(0.0178)	(0.0185)	(0.0186)
Operator						
PPP	-0.0184	-0.00703	-0.00562	-0.0163	-0.00782	-0.00680
	(0.0329)	(0.0328)	(0.0326)	(0.0272)	(0.0272)	(0.0271)
Private	-0.0176	-0.0273	-0.0330	-0.0132	-0.0225	-0.0267
	(0.0348)	(0.0382)	(0.0389)	(0.0286)	(0.0318)	(0.0323)
Distance largest city	-4.55e-05*	-4.91e-05**	-5.75e-05**	-3.76e-05*	-3.95e-05*	-4.57e-05**
	(2.64e-05)	(2.44e-05)	(2.50e-05)	(2.17e-05)	(2.02e-05)	(2.06e-05)
SEZ program variables						
Corporate tax exemption		0.00219	-0.0786**		0.00203	-0.0569**
		(0.00352)	(0.0316)		(0.00278)	(0.0265)
*GDPpc 2007			0.00912**			0.00665**
			(0.00361)			(0.00300)
Subsidized utilities		-0.0703*	-0.0346		-0.0591*	-0.0331
		(0.0420)	(0.0434)		(0.0353)	(0.0371)

	(1)	(2)	(3)	(4)	(5)	(6)
National one-stop-shop		-0.0141	0.0342		-0.00611	0.0291
		(0.0385)	(0.0354)		(0.0319)	(0.0296)
Foreign ownership requirement		-0.429**	-0.455**		-0.353**	-0.372**
		(0.187)	(0.189)		(0.162)	(0.163)
Independent zone regulator		-0.0176	-0.00146		-0.00948	0.00232
		(0.0274)	(0.0253)		(0.0219)	(0.0204)
Contextual factors						
Ratio regional/ national GDPpc	-0.0844**	-0.0860**	-0.0869***	-0.0649**	-0.0667**	-0.0673**
	(0.0330)	(0.0329)	(0.0321)	(0.0269)	(0.0269)	(0.0264)
Proximity to large markets	0.314**	0.347**	0.399***	0.208	0.241*	0.279**
	(0.154)	(0.170)	(0.152)	(0.126)	(0.140)	(0.131)
Industry (% of GDP)	0.0100***	0.0116***	0.0105***	0.00724**	0.00850***	0.00769***
	(0.00332)	(0.00333)	(0.00331)	(0.00277)	(0.00274)	(0.00281)
Ease of Doing Business rank	0.000137	0.000738	0.000917*	0.000194	0.000687	0.000817*
	(0.000591)	(0.000535)	(0.000537)	(0.000489)	(0.000471)	(0.000477)
GDPpc 2007	-0.0146	0.00726	-0.0662*	-0.00745	0.0117	-0.0418
	(0.0236)	(0.0248)	(0.0339)	(0.0200)	(0.0212)	(0.0293)
Country nightlights growth	0.316***	0.375**	0.169	-0.497***	-0.441***	-0.591***
	(0.107)	(0.146)	(0.132)	(0.0906)	(0.117)	(0.118)
Constant	-0.0782	-0.337	0.339	0.929***	0.699***	1.191***
	(0.251)	(0.248)	(0.370)	(0.217)	(0.221)	(0.316)
Structural nightlights controls	Yes	Yes	Yes	Yes	Yes	Yes
Observations	343	343	343	343	343	343
R-squared	0.388	0.403	0.409	0.336	0.351	0.356

Note: Robust standard errors in parentheses clustered at the within country regional level.
*** p<0.01 ** p<0.05 * p<0.1.

Appendix F. Alternative Regressions with Logarithmic Transformations of the Explanatory Variables

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	**Zone growth**	**Zone/ national growth**	**Zone growth**	**Zone/ national growth**	**Zone growth**	**Zone/ national growth**	**Zone growth**	**Zone/ national growth**
LN (initial lights in zone)	-0.173***	-0.113***	-0.166***	-0.136***	-0.166***	-0.137***	-0.161***	-0.132***
	(0.0267)	(0.0211)	(0.0324)	(0.0263)	(0.0290)	(0.0235)	(0.0291)	(0.0236)
High-tech focus	-0.0497*	-0.0323*	-0.0540**	-0.0429**	-0.0656***	-0.0509***	-0.0532**	-0.0408**
	(0.0252)	(0.0195)	(0.0238)	(0.0196)	(0.0229)	(0.0190)	(0.0234)	(0.0195)
LN (size)	0.207***	0.102***	0.170***	0.138***	0.180***	0.147***	0.171***	0.139***
	(0.0306)	(0.0265)	(0.0353)	(0.0287)	(0.0339)	(0.0275)	(0.0332)	(0.0268)
LN (years in operation)	-0.0533**	-0.0333*	-0.0394*	-0.0329*	-0.0434**	-0.0358**	-0.0481**	-0.0399**
	(0.0211)	(0.0170)	(0.0229)	(0.0188)	(0.0204)	(0.0168)	(0.0217)	(0.0180)
Operator								
PPP	-0.0303	-0.0457	-0.0261	-0.0216	-0.0242	-0.0207	-0.0149	-0.0141
	(0.0344)	(0.0289)	(0.0368)	(0.0305)	(0.0332)	(0.0274)	(0.0340)	(0.0282)
Private	-0.0203	-0.0206	0.000545	0.00150	-0.00819	-0.00483	-0.0199	-0.0158
	(0.0329)	(0.0255)	(0.0433)	(0.0353)	(0.0341)	(0.0280)	(0.0375)	(0.0312)
LN (distance to the largest city)	-0.00889	-0.0201**	-0.0224*	-0.0181*	-0.0190*	-0.0158*	-0.0180	-0.0146
	(0.0128)	(0.00887)	(0.0125)	(0.0104)	(0.0114)	(0.00940)	(0.0115)	(0.00955)
Nightlights controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Contextual factors	-	-	-	-	Yes	Yes	Yes	Yes
Regulatory factors	-	-	-	-	-	-	Yes	Yes
Country dummies	-	-	Yes	Yes	-	-	-	-
Constant	0.123	1.272***	0.374***	1.175***	-0.120	0.914***	-0.263	0.787***

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	(0.127)	(0.102)	(0.125)	(0.104)	(0.250)	(0.209)	(0.284)	(0.239)
Observations	343	343	343	343	343	343	343	343
R-squared	0.362	0.302	0.423	0.376	0.398	0.349	0.407	0.358

Note: Robust standard errors in parentheses clustered at the within country regional level.
*** p<0.01 ** p<0.05 * p<0.1.
LN = natural log

Appendix G. SEZ Five-Year Growth Rate

Summary Statistics for Absolute SEZ Five-Year Nightlights Growth

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	-0.07602095	-0.3050848	0.16	0.194771585
Bangladesh	7	-0.035036886	-0.375	0.75	0.39563221
Chile	0				
China	32	0.158902197	-0.1988304	0.928571	0.293642116
Colombia	3	0.241249667	0	0.511628	0.257054784
Dominican Republic	2	0.4151585	0.176471	0.653846	0.3375551
Ghana	1	0.036585	0.036585	0.036585	-
Honduras	2	-0.0161118	-0.0526316	0.020408	0.051646796
India	3	0.344177	0.083333	0.676471	0.30295544
Jordan	1	0.084112	0.084112	0.084112	-
Kenya	1	0.580645	0.580645	0.580645	-
Korea, Dem. Rep.	45	0.143176873	-0.1884058	1.023256	0.254785274
Lesotho	1	0.021739	0.021739	0.021739	-
Malaysia	2	0.984837	0.318584	1.65109	0.942224029
Nigeria	1	-0.1518987	-0.1518987	-0.1518987	-!
Pakistan	2	-0.1760606	-0.2121212	-0.14	0.05099739
Philippines	19	0.344530279	-0.475	1.318182	0.546229908
Russia	3	0.072497567	-0.1256983	0.270777	0.198237663
South Africa	1	0.358108	0.358108	0.358108	-
Thailand	6	0.191734317	-0.0666667	0.578125	0.252919611
Turkey	31	0.155172355	-0.4133334	0.925	0.285877618
Vietnam	85	0.597637024	-0.2441314	1.571429	0.476264011
Total	**252**	**0.315885587**	**-0.475**	**1.65109**	**0.440788337**

Summary Statistics for Relative SEZ Five-Year Nightlighths Growth

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.876521975	0.6581042	1.077775	0.174224155
Bangladesh	7	0.987825186	0.5963211	1.83394	0.415574403
Chile	0				
China	32	0.92287325	0.6922644	1.631171	0.241013158
Colombia	3	1.222506	1.092802	1.410803	0.16690121
Dominican Republic	2	1.5301508	0.9581916	2.10211	0.808872458
Ghana	1	1.131593	1.131593	1.131593	-
Honduras	2	0.90150405	0.8243075	0.9787006	0.109172408
India	3	1.0433606	0.9444895	1.22534	0.157795732
Jordan	1	0.8414701	0.8414701	0.8414701	-
Kenya	1	1.218322	1.218322	1.218322	-
Korea, Dem. Rep.	45	1.070589516	0.7813815	1.650469	0.175391175
Lesotho	1	1.027075	1.027075	1.027075	#DIV/0!
Malaysia	2	1.6027185	1.068876	2.136561	0.754967304
Nigeria	1	0.7914019	0.7914019	0.7914019	-
Pakistan	2	0.81882245	0.674718	0.9629269	0.203794468
Philippines	19	1.156766153	0.5583654	2.122151	0.466711879
Russia	3	0.7674731	0.6256452	0.909361	0.14185791
South Africa	1	1.368062	1.368062	1.368062	-
Thailand	6	0.94279455	0.5595368	1.162033	0.222323678
Turkey	31	0.979659939	0.6013014	1.409558	0.21887086
Vietnam	85	1.225770053	0.5948063	2.233004	0.42690143
Total	**252**	**1.093289317**	**0.5583654**	**2.233004**	**0.355346135**

Appendix H. Growth in Neighboring Regions

Summary Statistics By Country For Nightlights Growth In Surrounding 10 Km Area, 2007-12

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.094776	0.001926	0.153406	0.072748397
Bangladesh	8	0.125226	-0.122099	0.280108	0.140416855
Chile	3	0.167389	0.131757	0.234744	0.058363605
China	33	0.10288	-0.079562	0.3948	0.124327957
Colombia	6	0.08017	-0.032474	0.158201	0.080578237
Dominican Republic	10	0.120855	0.000186	0.320201	0.098071669
Ghana	1	0.356223	0.356223	0.356223	-
Honduras	3	0.107135	-0.005939	0.175311	0.098613758
India	8	0.180807	0.102057	0.247837	0.056393396
Jordan	1	-0.0151	-0.015098	-0.015098	-
Kenya	1	0.504324	0.504324	0.504324	-
Korea, Dem. Rep.	64	0.036229	-0.158646	0.284392	0.070938222
Lesotho	1	0.033695	0.033695	0.033695	-
Malaysia	6	0.073275	0.00292	0.141558	0.062453501
Nigeria	1	0.362258	0.362258	0.362258	-
Pakistan	3	-0.12729	-0.188793	-0.059632	0.064799686
Philippines	29	0.111776	-0.061006	0.437648	0.09904308
Russia	4	0.344466	0.164438	0.742163	0.267288087
South Africa	1	0.009382	0.009382	0.009382	-
Thailand	20	0.169529	-0.024169	0.421587	0.120446
Turkey	36	0.309306	0.045833	1.314494	0.257539769
Vietnam	103	0.239456	-0.155541	1.031426	0.241693968
Total	**346**	**0.162346**	**-0.188793**	**1.314494**	**0.198560964**

Summary Statistics By Country For Nightlights Growth In Surrounding 20 Km Area, 2007-12

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.1571035	0.113833	0.228892	0.052425225
Bangladesh	8	0.1063568	-0.190548	0.280947	0.187842348
Chile	3	0.086689	0.007223	0.148215	0.072187732
China	33	0.1205244	-0.075677	0.444935	0.11905526
Colombia	6	0.1059573	0.032048	0.208544	0.063856136
Dominican Republic	10	0.0743502	-0.029088	0.165444	0.053780986
Ghana	1	0.345702	0.345702	0.345702	-
Honduras	3	0.08811	0.021706	0.123428	0.057546467
India	8	0.1766411	0.041314	0.276275	0.081146725
Jordan	1	-0.075871	-0.075871	-0.075871	-
Kenya	1	0.657551	0.657551	0.657551	-
Korea, Dem. Rep.	64	0.0329322	-0.233645	0.158173	0.057794213
Lesotho	1	0.083444	0.083444	0.083444	-
Malaysia	6	0.1330772	0.026539	0.257292	0.088884044
Nigeria	1	0.551242	0.551242	0.551242	-
Pakistan	3	-0.166026	-0.270608	-0.040967	0.116181689
Philippines	29	0.0908518	-0.162892	0.429612	0.09326759
Russia	4	0.2898493	0.149082	0.474317	0.138798163
South Africa	1	0.052706	0.052706	0.052706	-
Thailand	20	0.1779133	0.017663	0.278671	0.075835014
Turkey	36	0.2960674	0.050592	1.19921	0.239430741
Vietnam	103	0.238997	-0.31736	2.060268	0.318815788
Total	**346**	**0.160184**	**-0.31736**	**2.060268**	**0.225000674**

Summary Statistics By Country For Nightlights Growth In Surrounding 50 Km Area, 2007-12

Country	# SEZs	Mean	Min	Max	StdDev
Argentina	4	0.1966238	0.155762	0.295271	0.066127911
Bangladesh	8	0.1191586	-0.058128	0.24728	0.113893565
Chile	3	0.1100123	0.004148	0.164791	0.091699795
China	33	0.1395223	-0.021812	0.675816	0.139703489
Colombia	6	0.1448948	0.081983	0.196941	0.038515595
Dominican Republic	10	0.0542081	-0.024436	0.098194	0.035537124
Ghana	1	0.323864	0.323864	0.323864	-
Honduras	3	0.1061393	0.10295	0.112006	0.005087128
India	8	0.1421288	-0.023143	0.288788	0.094146487
Jordan	1	-0.016212	-0.016212	-0.016212	-
Kenya	1	0.347531	0.347531	0.347531	-
Korea, Dem. Rep.	64	0.0371137	-0.151023	0.11404	0.042444861
Lesotho	1	0.129062	0.129062	0.129062	-
Malaysia	6	0.1947407	0.137806	0.351126	0.078030637
Nigeria	1	0.628013	0.628013	0.628013	-
Pakistan	3	-0.173648	-0.243227	-0.040867	0.11503521
Philippines	29	0.0805821	-0.081869	0.182786	0.047499668
Russia	4	0.2452298	0.123137	0.342932	0.104394883
South Africa	1	0.024483	0.024483	0.024483	-
Thailand	20	0.1829521	0.077432	0.311688	0.071121692
Turkey	36	0.2883029	0.004247	0.869664	0.216465859
Vietnam	103	0.227671	-0.373149	1.174803	0.285355153
Total	**346**	**0.1583997**	**-0.373149**	**1.174803**	**0.203047578**

Appendix I. Effect on Neighboring Regions

Dependent Variable: Growth In Nightlights In Surrounding Areas

	2007—2012			5 years' growth performance					
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Variables	**10km radius**	**20km radius**	**50km radius**	**10km radius**	**10km radius**	**20km radius**	**20km radius**	**50km radius**	**50km radius**
SEZ performance	0.344***	0.277***	0.158*	0.361***	0.251***	0.279***	0.159*	0.185***	0.0891*
	(0.0689)	(0.0970)	(0.0863)	(0.0538)	(0.0772)	(0.0644)	(0.0814)	(0.0629)	(0.0526)
SEZ size	8.01e-05*	-7.59e-05	(0.0863)	4.11e-05	-2.66e-05	-0.000142	-0.000151	-0.000130	-7.89e-05
	(4.75e-05)	(5.65e-05)	-7.83e-05	(9.21e-05)	(0.000123)	(0.000109)	(0.000106)	(9.81e-05)	(0.000123)
SEZ high-tech	-0.00940	-0.0011	-0.0145	0.0894*	0.0838	0.121**	0.127	0.0539	0.0339
	(0.0183)	(0.0184)	(0.0198)	(0.0474)	(0.0691)	(0.0499)	(0.0785)	(0.0388)	(0.0434)
SEZ years operating	-0.000169	0.000133	0.00136	-	-	-	-	-	-
	(0.000807)	(0.000827)	(0.00102)						
Initial lights in surrounding area	-4.90e-06***	-1.70e-06**	-4.97e-07**	-1.01e-05***	-1.58e-05***	-4.65e-06***	-6.80e-06***	-1.02e-06***	-1.25e-06***
	(1.56e-06)	(7.26e-07)	(2.08e-07)	(3.54e-06)	(5.70e-06)	(1.66e-06)	(2.43e-06)	(3.43e-07)	(3.59e-07)
Constant	0.152***	0.196***	0.215***	0.633***	0.759**	0.812***	0.924***	0.657***	0.726***
	(0.0257)	(0.0394)	(0.0384)	(0.215)	(0.335)	(0.217)	(0.275)	(0.0970)	(0.151)
Time fixed	-	-	-	Yes	Yes	Yes	Yes	Yes	Yes
Country fixed	Yes	Yes	Yes	Yes	-	Yes	-	Yes	-
Regional fixed	-	-	-	-	Yes	-	Yes	-	Yes
Observations	346	346	346	255	255	255	255	255	255

R-squared	0.519	0.352	0.312	0.576	0.807	0.477	0.806	0.474	0.806

Note: Robust standard errors in parentheses clustered at the within country regional level.
*** p<0.01 ** p<0.05 * p<0.1.

Appendix J. Definition of Evaluation Concepts

The following definitions of evaluation concepts used in the text are drawn from IEG's Guidelines (2013):

Relevance of Design

The relevance of project design is defined as the extent to which the project's design (its planned activities or policy areas) is consistent with the stated objectives, including an assessment of the Results Framework. The relevance of design is assessed with respect to two elements: (1) the relevance of project design (activities, components, policy areas) to the objectives; and (2) the quality of the results framework.

Poor relevance of design may reflect a project design in terms of project components or policy areas that is not consistent with the project's stated objectives. An example would be the absence of key activities or policy areas necessary to achieve the objectives or inclusion of irrelevant or extraneous activities or policy areas.

Efficacy

Efficacy is defined as the extent to which the project's objectives (1) are achieved or are expected to be achieved taking into account their relative importance and (2) are attributable to the activities or actions supported by the operation. Objectives refer to each of the key *outcomes* indicated in the statement of Project Development Objectives (PDOs) from the Legal Agreement in the case of investment projects; or the Program Document in the case of Development Policy Operations (DPOs).

The achievement of objectives is based on the concept of "plausible causality," that is, the PDO is meant to focus on outcomes for which the project reasonably can be held accountable. Plausible attribution usually is determined based on the project's results chain and assessment of non-project factors in leading to the outcomes achieved.

Efficiency

Efficiency is a measure of how economically resources and inputs are converted to results. Efficacy asks whether the costs involved in achieving project objectives were reasonable in comparison with both the benefits and recognized norms ("value for money"). Was the project implemented at least cost? Efficiency is assessed only for investment-type operations including technical assistance loans, but not for development policy operations.

Efficiency usually can be established through either traditional measures such as net present value (NPV), economic rate of return (ERR), cost effectiveness, unit rate norms, service standards, least cost analysis and comparisons, and financial rate of return applied ex-ante and ex-post; or aspects of design and implementation that contribute to or impact efficiency.

Note:Efficiency refers to the cost effectiveness of *project* resources, not the use of World Bank budgetary resources.

Appendix K. Nightlights and Employment

Regressing Nightlights On SEZ Firms And Employment

	(1)	(2)
Variables	SEZ employment	Number of Firms
Nightlights within zone	177.3***	0.363***
	(23.77)	(0.0567)
Country dummies	Yes	Yes
Constant	-7859***	9.740
	(1909)	(9.635)
Observations	104	135
R-squared	0.556	0.524

Note: Robust standard errors in parentheses clustered at the regional level.
*** p<0.01 ** p<0.05 * p<0.1.

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The aim of this report is to analyze both the factors driving SEZ performance in emerging market economies, and the extent to which SEZ performance drives economic growth in surrounding areas. Lack of comparable cross-country data on the performance of SEZs has been a fundamental barrier to this type of study. To conduct broader empirical analysis, this study relied on the increasingly widespread use of nightlights data in economics to overcome the lack of reliable information on the performance of individual SEZs.

Comparable information also is missing about the characteristics of the zones and about the zone-specific and regional and/or national policy programs from which zones originate. The authors created a bespoke dataset from scratch. It encompasses: i) SEZ program factors including the incentives package, tenant requirements, and program characteristics that underlie setting up and operating a zone; ii) SEZ-specific factors including the size of the zone, the type of operator of the zone, years in operation, and distance to major cities and infrastructure; and iii) indicators about the zones' regional and national contexts including proximity to large markets, GDP per capita, years of schooling,

This report also reviews World Bank-financed SEZ projects to assess how they have performed, drawing on World Bank project documentation current at the time of each project. The review assesses the development objectives of individual projects; the extent to which these objectives were achieved; the challenges faced; and the lessons learned that could inform the scope and design of subsequent projects.

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