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PANACEA OR PLACEBO:
SUCCESS AND SPECIAL ECONOMIC ZONES IN THE DEVELOPING WORLD

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ABSTRACT

Within the last 30 years, the number of Special Economic Zones (SEZs) has grown exponentially from 147 Zones in 1987 to an estimated 4,000 in 2017. For developing countries in particular, SEZs have become a symbol of potential hope for rapid development and economic transformation. However, the actual efficacy of SEZs in promoting economic growth has yet to be determined. While abundant literature exists regarding the theoretical economic contributions of Zones, literature measuring actual SEZ outcomes is comparatively lacking. In fact, cursory inspection appears to indicate a discrepancy between theoretical predictions of Zone effectiveness and actual performance. This thesis examines the ongoing debate over the usefulness of SEZs from a theoretical and experiential perspective. An overview of Zone characteristics and historical experiences is first presented. Then, a synthesis and analysis of theoretical perspectives is conducted. Finally, a definition and possible measures of SEZ success are proposed as a foundation for potential future research into the actual efficacy of Zones.

TABLE OF CONTENTS

LIST OF TABLES	iv
ACKNOWLEDGEMENTS	v
Chapter 1 Introduction	1
Chapter 2 Characterizing Special Economic Zones.....	4
2.1 Defining Special Economic Zone	4
2.2 Types of Economic Zones	4
2.3 Purposes of Economic Zones.....	6
Attracting Foreign Direct Investment.....	6
Serving as “Pressure Valves” to Alleviate Large-Scale Unemployment	7
Supporting Wider Economic Reform Strategy.....	7
As Experimental Laboratories for the Application of New Policies and Approaches	8
2.4 Select Historical Experiences of SEZs in the Developing World.....	9
Chinese Experience	9
Mauritian Experience.....	10
Russian Experience.....	12
Indian Experience	14
Chapter 3 Theoretical Effectiveness of SEZs	15
Chapter 4 Defining and Measuring Success	24
4.1 Defining Success.....	24
Static Outcomes	25
Dynamic Outcomes	26
Internal and External Success.....	27
4.2 Methods for Measuring Success	29
Static Outcomes.....	29
Dynamic Outcomes	35
4.3 Takeaways.....	37
Chapter 5 Conclusion.....	40
BIBLIOGRAPHY.....	42

LIST OF TABLES

Table 1. Overview of Common Types of Economic Zones	5
Table 2. Summary of Theoretical Perspectives	23
Table 3. Summary of Possible Measures of Zone Successfulness	39

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Chapter 1

Introduction

Special Economic Zones (SEZs) are geographically delineated areas in which economic benefits and incentives are provided to investors contingent upon location within the specified area. While the concept of economic enclaves of trade and manufacturing has long existed in the form of port cities, it has been during the last 30 years that SEZs have experienced the most rapid growth. In 1986 there were 176 Zones in 47 countries. By 2006, that number had grown almost 20-fold to 3,500 Zones. Today, there are an estimated 4,000 Zones in over 140 countries, with numbers expected to continue rising (Boyenge, 2007). Part of this growth in SEZs can be attributed to developing countries' adoption of SEZ policy. In fact, SEZs have become a key component of many proposals for facilitating trade, foreign direct investment, and global economic growth in less developed countries. While Zones have attracted support over the past three decades as possible solutions for developing countries' woes, evidence related to Zone's long-term success is not conclusive (Farole, 2011). In fact, there is widespread debate over the "successfulness" of Zones in promoting development and structural change in developing countries.

Theoretical models describing the effectiveness and efficiency of SEZs as tools in the development process present a number of findings. While some economic perspectives view Zones as welfare reducing, others see a potential for Zones to overcome market inefficiencies and contribute to development. Despite these differences, a common theme among theoretical literature emerges: SEZs *might* be a viable tool for encouraging economic growth, but they are

only a second-best alternative to full market liberalization. Some economists go as far as to argue that SEZs promote a continuation of existing domestic protectionist policy, acting only as a distraction from the failure of the economy to fully liberalize.

Interestingly, however, the growth in the number of Zones and their productivity in recent years seems to exceed theoretical expectations. In countries like China, SEZs are considered to be a welfare increasing, key player in economic development. If certain global economic experiences are to be believed, it appears that SEZs may be a much more viable option for development than has been theorized. This potential discrepancy between theoretical and actual Zone effects is troubling. It could be indicative of either a failure of theoretical models to accurately predict the benefit of SEZs, or an inaccurate attribution of economic growth to SEZ policy.

As underdeveloped countries continue to look for growth opportunities, having an understanding of the nature, uses and potential effectiveness of SEZs as drivers of economic transformation is important. This paper looks to build such an understanding. First, an overview of the characteristics of SEZs is presented. Then, the paper synthesizes research on the theoretical effectiveness of SEZs as development policy, posing the question: “How effective are SEZs at promoting growth?” Finally, the paper discusses Zone outcomes and potential measures of actual Zone performance and success. Acknowledging the lack of research measuring the overall success of established Zones, I consider the question “How can actual Zone performance and successfulness be defined and measured?” In exploring this question, I hope to present a foundation for future research regarding the actual, experienced usefulness of Zones.

This paper, rather than arguing for either side of the SEZ debate, aims to support the need for further research into the actual successfulness and performance of SEZs. By filling the gap

between theory and practice, economists stand a better chance of understanding the complex relationship between SEZs and economic growth. For developing countries searching for answers to economic woes, this understanding is all the more vital.

Chapter 2

Characterizing Special Economic Zones

2.1 Defining Special Economic Zone

A “Special Economic Zone” can be defined in a number of ways. However, for the purpose of this paper, and as a general definition, Special Economic Zones can be understood using the criteria established by the World Bank’s Facility for Investment Climate Advisory Service (FIAS) which states that an SEZ is a geographically delineated area, usually physically secured, that has a single management or administration, offers benefits for investors located within the Zone, and has a separate customs area and streamlined procedures (FIAS, 2008). Zones are considered “Special” in that they provide a number of perks such as a separate regulatory regime that is typically more liberal economically than the surrounding environment, public services like efficient customs and licensing arrangements, reliable infrastructure that is often more advanced and higher quality than typical domestic infrastructure, and fiscal incentives such as tax exemptions and subsidies (Zeng, 2016).

2.2 Types of Economic Zones

While SEZs share the aforementioned core characteristics, every Zone is unique. As such, it is beneficial to further classify Zones based on specific, qualifying features. While this classification is subjective and not exhaustive, with Zeng (2016) defining seven Zones,

Pakdeenurit (2014) six, and Farole and Akinici (2011) five given the same ILO data, commonality exists between each of them. Zeng's (2016) discussion of the most common Zones, summarized in Table 1, defines all of the Zones described by Pakdeenurt (2014) and Farole (2011) with greater specificity, leading to more categories of Zones, but a more comprehensive definition of Zone types. Here, Zeng's (2016) categorization of common types of SEZs is used.

Table 1. Overview of Common Types of Economic Zones

Name	Definition
Free Trade Zones	FTZs (also known as commercial-free zones) are fenced-in, duty-free areas, offering warehousing, storage, and distribution facilities for trade, transshipment, and re-export operations.
Export Processing Zones	EPZs are industrial estates aimed primarily at foreign markets. They offer firms free-trade conditions and a liberal regulatory environment. There are in general two types of EPZs: one is a comprehensive type, open to all industries; another is a specialized type, only open for certain specialized sectors/products.
Comprehensive Special Economic Zones	Comprehensive SEZs are zones of a large size that have with a mix of different, industrial, service and urban-amenity operations. In some cases, these zones can encompass a whole city or jurisdiction, such as Shenzhen (city) and Hainan (province) in China.
Industrial Parks	Industrial Parks (also called "Industrial Zones") are largely manufacturing-based sites. Some multi-functional ones similar to "Comprehensive Special Economic Zones" (listed above) exist, but usually operate at a smaller scale. The parks normally offer a broad set of incentives and benefits.
Bonded Area	Bonded Areas (also known as "Bonded Warehouses") are specific buildings or other secured areas in which goods may be stored, be manipulated, or may undergo manufacturing operations without payment of duties that would ordinarily be imposed. A "bonded area" is subject to customs laws and regulations, while a "free trade zone" is exempt.
Specialized Zones	Specialized Zones include science/technology parks, petrochemical zones, logistics parks and airport-based zones.
Eco-Industrial Zones	Eco-industrial zones or parks focus on ecological improvements in terms of reducing waste and improving the environmental performance of firms.

Table from (Zeng, 2016)

2.3 Purposes of Economic Zones

Just as there are a number of types of Special Economic Zones, there are also various reasons for their establishment. There are four primary goals/reasons for establishing SEZs in developing countries (Madani, 1999; Cling & Letilly, 2001; FIAS, 2008; Zeng, 2010; Farole & Akinci, 2011; Fuller & Romer, 2012):

1. To attract Foreign Direct Investment (FDI)
2. To serves as “pressure valves” to alleviate large-scale unemployment
3. To support wider economic reform strategy
4. To act as experimental laboratories for the application of new policies/ approaches

Attracting Foreign Direct Investment

Most SEZs are established with the attraction of Foreign Direct Investment in mind. While there is ongoing debate over the true benefits and costs of FDI in terms of promoting economic development in the developing world, it remains that countries in all stages of development seek out FDI in an attempt to grow their economies. In the case of underdeveloped economies, the establishment of Special Economic Zones and their incentive structures can be used to promote FDI. These incentives range from financial to non-financial in nature. Tax breaks, tariff reductions, and subsidies are perhaps the first incentives that come to mind when evaluating how SEZs attract FDI, but countries can use a number of other non-financial incentives to draw investment as well. For example, a large, cheap workforce and access to

infrastructure can draw FDI, as can the promise of a geographically appealing location, and insulation from the otherwise stifling bribery, corruption, bureaucracy, or economic regulation that may be characteristic of the region.

Serving as “Pressure Valves” to Alleviate Large-Scale Unemployment

In some cases, Special Economic Zones are established with a singular goal in mind: combating large-scale unemployment. Such is the case in Tunisia and the Dominican Republic where it has been found that SEZs serve little role in development beyond acting as a “pressure valve” that alleviates regional poverty by providing large numbers of jobs to the surrounding population (Farole & Akinci, 2011). In these cases, the Zone is an enclave with very few linkages to the surrounding domestic economy (World Bank, 1992).

Supporting Wider Economic Reform Strategy

Special Economic Zones can also be used as one of a number of tools in a larger economic reform strategy. For example, the reform strategy for a developing country might broadly include diversification of exports as a means of driving economic growth. A country looking to diversify exports might undertake a number of economic policies to do so. Research by Papageorgiou, Kolovich, and Nolan (2017) on policies that encourage diversification shows that increasing stability through the reduction of inflation, elimination of direct barriers to entry such as state distribution systems, and reform of the agricultural and banking sectors all can aid in promotion of diversification. Special Economic Zones can be added to this list of policies as an additional tool in support of the diversification process. For example, in cases where

implementation of sweeping, immediate reform of the entire economy may be difficult due to factors like the political entrenchment of economic elite who benefit from protectionism, SEZs can be used to support reform by eliminating direct barriers to entry (one of the policies that encourages diversification) and reducing anti-export bias for certain industries while allowing for the continued existence of overarching protective barriers (World Bank, 1992). In this way, SEZs act supportively as a means by which barriers to entry may be reduced. When combined with other policies that increase stability and reform the agricultural and banking sector, wider goals of diversification and development may be accomplished.

SEZs can be utilized in a similar manner to aid in other reform goals like movement away from a government-spending based economy toward one based in private investment. By offering incentives for both FDI and private domestic investment, SEZs can play an important role in supporting the pursuit of increased private-sector investment. These are only two of the many goals of reform. However, they illustrate the supportive role that SEZs can have working as one of many tools in creation of a better functioning economy.

As Experimental Laboratories for the Application of New Policies and Approaches

Zones can also be implemented as a sort of experimental laboratory in which the government can test new policies and approaches. This purpose of a Zone is highly related to the aforementioned use of Zones as support in the economic reform strategy. Indeed, Zones can offer smaller areas where reform can be enacted without shocking the system. However, the “experimental laboratory” purpose of SEZs goes beyond this. Unlike the previously discussed use as support for wider reform, these labs are not enacted to immediately support any one

specific goal. Rather they are meant as a testing-ground for future policies. In this case, SEZs are established with the express purpose of testing new policy on a small, yet scalable size, before implementation in the wider economy beyond the “walls” of the Zone. This use of SEZs allows policy makers and the government to gain a greater understanding of how certain policies will function in practice within the country. Ultimately, success within the “labs” of the SEZ can be extended to the rest of the economy, theoretically initiating gradual economic transition and development (World Bank, 1992).

2.4 Select Historical Experiences of SEZs in the Developing World

Of the four reasons for Special Economic Zone establishment presented in Section 2.2, the final two (supporting wider economic reform strategy and experimental laboratories for the application of new policies and approaches) are especially critical in the developing world. The idea that SEZs may act as primary drivers of economic reform and development is what makes them highly attractive to developing countries. In fact, a number of large developing countries have undertaken SEZ programs in the hopes of spurring economic growth and development. Individual country experiences have ranged everywhere from “miracles” to failures. The cases of China, Mauritius, Russia, and India are now presented in order to demonstrate this wide distribution.

Chinese Experience

China implemented its first SEZs in 1980 in four small fishing villages along its southeastern coast. The Zones were intended to function as areas of rapid economic growth

largely free from the administration of the central government in Beijing. Local governments were authorized to offer tax incentives and build the infrastructure necessary to attract foreign investment. One of these small fishing villages, Shenzhen, became so successful that it has been deemed the “Shenzhen Miracle.” The region grew from a population 30,000 in 1979 to more than 12 million today. GDP for the Zone was recorded at \$338 billion in 2017, nearly double what it was in 2011 (Huifeng, 2018). Similar growth occurred in the other 3 SEZs, and as a result China expanded SEZ policy to include 14 larger, older cities (The Editors of the Encyclopædia Britannica 2018). Within the last 3 decades, SEZs have become a defining feature in Chinese economic development, making China the poster child and model for SEZ use in other developing countries.

It is important to note, however, that China didn’t rely strictly on SEZs to create economic reform. Rather, SEZs were part of a larger reform policy sometimes known as the Four Modernizations movement which aimed to make China an industrialized nation by 2000 (McKenney, 1993). The reform included decollectivization of agriculture, reduction in state imposed production quotas, and the introduction of “Sino-Foreign Equity Joint Ventures Law.” The law allowed for foreign investment through joint ventures, and by 1982 offered constitutional protection for foreign direct investment (Potter, 1993). All of these reforms have undoubtedly had some hand in the widely hailed “success” of Chinese economic reform. However, while Chinese growth has indeed been unprecedented, China is not the only “success” story.

Mauritian Experience

Mauritius' experience with SEZs dates to 1970 when the Mauritian government passed the Export Processing Zone Act which established incentives for manufacturers that catered to foreign markets. Incentives included protective import duties and quotas for infant industries, suspension of import duties on materials and equipment for industrial use that were not locally available, rebates of import duties on other raw materials and components for specified industries, duty draw-back schemes, and favorable long-term loans. (Zafar, 2011). What makes Mauritius' experience so unique is that the size of the island nation, 720 square miles (just over half the size of Long Island), led the government to make the entire island an SEZ rather than any particular area (The World Factbook: MAURITIUS, 2018). Essentially, the government individually selected those industries and firms which would be included within the Zone, and did not restrict them to one geographical location. Instead, the government invested heavily in infrastructure needed to support the SEZ in locations where authorized firms chose to locate.

By the 1980's the SEZ program accounted for more than 60% of gross export earnings and 1/3 of employment on the island (Zafar, 2011). Between 1980 and 1988 SEZ goods' share of GDP increased from 4% to over 14%, and the annual growth rate for value-added by the SEZ was nearly 30% (Zafar, 2011). Recently, Mauritius has begun to once again shift its economy. Initially, SEZs were implemented to move the island nation from reliance on sugar production to manufacturing exports like textiles. In light of recent downturns in the sugar and textile market in the region, the government is turning toward tourism and service industries like Business Process Outsourcing (BPO), financial services, IT services, and offshore banking (Zafar, 2011). Past experience with SEZs has laid the foundation for a positive business climate, which has eased this transition. In the 1990's the Mauritian government began business facilitation reforms to

bring domestic, non-SEZ firms in line with SEZ firms by removing obstacles like high interest rates, bureaucratic red-tape in obtaining foreign investment approvals, and difficulties securing loans from the Development Bank of Mauritius. As a result of the reforms, the divide between SEZ and non-SEZ closed, and the economy moved toward greater liberalization (Zafar, 2011).

Today, Mauritius is ranked by the World Bank as the 17th best country in which to do business, and the top country within which to do business in Africa. (Zafar, 2011). Within 40 years, the economy has developed from agrarian, to manufacturing, to services-based and has made great strides towards diversification and integration. As such, the Mauritian case, like that of China, is often referenced in economic literature as an example of the successfulness of SEZs in promoting structural change and development. However, China and Mauritius appear to be exceptions rather than the rule. Other developing countries like Russia and India have attempted to implement similar SEZ programs with much less impressive results.

Russian Experience

Russia's initial attempts at SEZ implementation arguably began in 1988 when financier, investor, and philanthropist George Soros and his team engaged in several talks with Russian bureaucrats that became known as the "Soros Initiative." The initiative proposed the establishment of economic reform through "Open Sectors," SEZs that would function under capitalistic rules separate from central planning intervention and FDI restriction. A new currency was proposed that, though tied to the ruble, would incentivize firms outside of the Zones to produce output marketable to firms inside Zones, eventually leading to movement into the Zones and liberalization of the economy. Unfortunately, this plan was perhaps too unrealistic for the

Russian economic system. The self-serving nature of the Communist Bureaucracy did not allow for the political self-denial needed to fully back away from central planning. Instead, the USSR implemented a number of industrial clusters which fell prey to a “jurisdictional battle” between Russia and the USSR and had limited success (Hanson, 1998). A few Zones, namely Kaliningrad and Magadan SEZ survived beyond the USSR, becoming the foundation for 21st century SEZ establishment.

In 2005, Russian President Vladimir Putin signed decree No. 116- Federal Law “Establishment of special economic zones in the Russian Federation” which granted the right to establish manufacturing SEZs in the Tartarstan Republic and the Lipetsk region. Legislation in 2005-2007 further opened the opportunity for SEZ development, establishing 6 types of SEZs: innovation zones, manufacturing zones, tourism zones, port zones, “old zones”, and gambling zones. However, post-USSR SEZs in Russia have not been nearly as successful as their Chinese counterparts. These SEZs are wholly owned by the State through a joint-stock company, and managed by regional governments. As a result, SEZs have developed at drastically different rates depending on regional management. Zones which established infrastructure first in order to attract investors have been semi-successful in attracting investment. The vast majority of SEZs, however, have waited for contractual obligations from potential investors before establishing fundamental infrastructure. This “wait to build until they come” system is suggested to be a large factor in the slow growth of some Russian SEZs (Sosnovskikh, 2017).

The outlook for Russian SEZs ten years beyond their establishment is mixed. In June 2016, Russian President Vladimir Putin instructed the stoppage of infrastructure work in 10 existing SEZs and suspended the creation of any new Zones within the near future. The orders came after an audit by the Federal Accounts Chamber found that SEZs were not significant

contributors to economic development, but rather havens for corruption and tax avoidance (Kremlin stops, 2016). Rather than facilitating widespread economic reform and development, it appears that the Russian SEZs have achieved at best limited success, and at worst complete stagnation.

Indian Experience

India's history with economic zones dates to 1965 when it began using Export Processing Zones (EPZs) with the objective of manufacturing exports in order to earn foreign exchange. In 2000, Indian Commerce Minister Murasoli Maran decided to implement the Chinese model of SEZs in India. The existing EPZs were converted into SEZs and placed under the governance of comprehensive legislation. The performance of the Zones since their establishment has been mixed. In 2014, of the 564 approved SEZs, only 192 were operational, and total Zone employment, expected to be nearly 1.7 million by 2009, had yet to reach 1.3 million (Bakshi, 2014). Furthermore, while the SEZ share of exports grew from 6% in 2006 to 28% in 2010, the classification of SEZs as "foreign states" means that SEZ products sold to the domestic economy are considered exports. As a result, export figures are misleading. In addition, SEZs in India are not quite the vehicles for growth through foreign investment that was once hoped. In fact, 90% of the operating Indian SEZs have been established by domestic investors, meaning that the majority of investment is domestic rather than in the form of FDI (Bakshi, 2014). What is more, the 2012 levying of the Minimum Alternative Tax (MAT) and Dividend Distribution Tax (DDT) on SEZ developers and firms has decreased the attractiveness of Indian SEZs to foreign and domestic investors alike ("Special Economic Zones," 2016).

As is the case in Russia, Indian SEZs lackluster performance has led to skepticism as to the future of the SEZ program. In fact, all SEZs operationalized after March 31, 2020 will lose the direct benefits established for SEZs in the 2005 SEZ Act, and while an extension to the SEZ sunset clause has been sought, it is unclear what the future of SEZs in India will look like.

The early success of Chinese programs was a driving force behind other developing countries' adoption of SEZ policy. However, as demonstrated through the cases of Russia and India, the Chinese case is not necessarily the norm. These mixed experiences over the past two decades have led many to question the true effectiveness of SEZs in promoting growth. In fact, the debate over the usefulness of SEZs as drivers of economic development has raged since the mid-20th century. An abundance of literature studying the effectiveness of SEZs exists, and is now synthesized and analyzed to answer the question: How effective are SEZs as tools for promoting development?

Chapter 3

Theoretical Effectiveness of SEZs

Generally, the debate over the effectiveness of SEZs as tools for economic growth and development has been split into two sides: those who see SEZs as an inefficient, second or third best alternative to wider economic reform, and those who view SEZs as having the unique ability to overcome market failures and act as catalysts for development.

One of the first theoretical studies of the efficacy of SEZs was conducted by Hamada in 1974. Hamada (1974) utilizes a two-factor, two-commodity trade Heckscher-Ohlin model in which one industry is more capital-intensive than the other. The country is assumed to be developing, and therefore is scarce in capital. As a result, the capital-intensive product is imported while the less capital-intensive product is exported. Hamada (1974) then considers the effects of establishing an SEZ in the absence of foreign investment and in the presence of foreign investments. He proposes that in the absence of foreign investment when the capital-intensive product is protected, the SEZ will not have an impact on production as there is no incentive to produce the capital-intensive product in the Zone rather than domestically. In the presence of foreign investments, Hamada (1974) theorizes that SEZs are inefficient, asserting that the country's labor resources are directed into the capital-intensive industry in which it lacks comparative advantage, thereby creating a scarcity of labor and ultimately "deteriorating national income at international prices" (Hamada, 1974).

While Hamada's application of the Heckscher-Ohlin model has become one of the cornerstones of neoclassical theory related to SEZs, it leaves several areas for criticism. Most glaringly, his Heckscher-Ohlin model considers capital to be domestically mobile but not internationally mobile. As was discussed previously, one of the central functions of an SEZ is the attraction of capital through international investment. Warr (1989) argues that by treating capital as internationally immobile the findings of the model become irrelevant to SEZs stating:

"Insofar as the model treats capital as being internationally immobile, it fails to capture the international mobility of capital goods - which is central to the functioning of EPZs.

The main conclusion of most of this literature - that EPZs necessarily reduce the welfare

of the countries - is thus largely irrelevant for EPZs as they actually operate” (Warr, 1989).

Additionally, Hamada (1975) and the Heckscher-Ohlin model make the assumption of full employment in the economy, despite the fact that in developing countries particularly high rates of unemployment are often one of the primary factors in Zone establishment. Since Zones are in many cases established for the purposes of increasing employment, making the assumption that the market has already achieved full employment eliminates the ability of the model to measure welfare effects that result from increases in employment. Making the assumption of full employment may thereby lead to underestimation of positive welfare effects.

Ultimately, the aforementioned perceived deficiencies of Hamada’s (1974) work led Warr to develop his own approach for measuring the efficacy of SEZs using cost-benefit analysis. Cost-benefit analysis involves discounting the calculation of net present values of streams of revenue and actual and opportunity costs and comparing them to find the net effect of the SEZ for the government, workers, and the wider economy (Warr, 1989). Warr’s (1989) model focuses heavily on the interactions and linkages between the SEZ and the domestic economy. However, these are the only linkages that are considered. Interactions between the SEZ and the international economy that don’t involve the domestic economy are deemed irrelevant in measuring benefits and costs to stakeholders. In reality, these interactions lead to a number of indirect effects like FDI spillover and technology transfer that impact the domestic economy and stakeholders alike (Johansson, 1994). As a result, the benefits of SEZs are understated by the cost-benefit analysis method, resulting in lower net benefits than may actually be the case (Baissac, 2010).

Despite the potential understatement of Zone benefits, the described cost-benefit analysis approach when applied by Warr (1989) to the cases of Indonesia, South Korea, Malaysia, and the Philippines returned positive total net present value and internal rate of return for Indonesia, South Korea, and Malaysia. The results indicated that in some cases SEZs were able to provide benefits that outweighed costs of implementation. Despite these findings, Warr (1989) indicates that Zones, while perhaps not as welfare reducing as Hamada proposed, cannot act as a replacement for economy wide reform, stating: “they are definitely not engines of development.” Rather, he asserts, they are one of a number of valuable tools for early-stage developing economies looking to increase employment and benefit from exposure to international competition.

Both Hamada (1974) and Warr (1989) discount SEZs use as drivers of development, favoring full economic liberalization instead. This opinion is widely held across neo-classical economics, and by the World Bank which views SEZs as a third-best alternative after economy-wide liberalization and country-wide duty free import system (Baissac, 2003). However, neoclassical models, while identifying SEZs as a less desirable, ineffective tool, often either fail to consider, or assume away, the potential costs and capabilities required to achieve liberalization and market development. Counterarguments to the neoclassical approach, hold that these “prerequisites” for liberalization are critical and cannot be assumed to exist in developing countries.

The counterargument to neoclassical support of SEZs as only a second or third best alternative to liberalization is based on the idea that achieving liberalization can be particularly difficult within developing countries due to socio-economic conditions and “structural bottlenecks” that exist within developing countries. For example, Wen (2015) argues that

historical experience shows socio-political stability to be one of the cornerstones of an efficiently operating free market. However, he asserts that this foundation is seriously lacking in many developing nations, pointing out that in countries like Afghanistan, Egypt, Iraq and Ukraine imposed or prematurely adopted democratization and capitalism led to socio-political instability, and ultimately hindrance rather than the expected promotion of liberalization efforts (Wen, 2015). Essentially, while full economic liberalization would have been nice in theory, it was nearly impossible to achieve in practice because the proper conditions did not exist.

Following this premise, additional counterarguments to neo-classical approaches assert that other common socio-political features of developing countries like lack of infrastructure, unwieldy and corrupt bureaucracy, and unattractive monetary and taxation policies act as “structural bottlenecks,” undermining even the best attempts at liberalization. The argument here is that the general view of full-liberalization as the best option for economic development is not applicable to developing countries since bottlenecks would prevent proper implementation. By functioning as areas within which infrastructure is better, interaction with corrupt bureaucracy and red tape is limited, and taxation policies are favorable, SEZs, it is argued, are a potential means by which these bottlenecks can be circumvented. In this case, SEZs are seen not as an alternative to economy-wide liberalization, but as a crucial means toward full-liberalization.

As opposed to slightly pessimistic neo-classical view of SEZ effectiveness, this body of theory, views SEZs as effective, and occasionally necessary tools in liberalization and economic development. Additionally, it takes a more optimistic stance on the effectiveness of SEZs in promoting development, arguing that the demonstration effects created by SEZs promote development. It is this assumption that demonstration effects both exist and are drivers of development that leaves significant room for questioning when analyzing the validity of the

argument. If it is found that either of the assumptions about demonstration effects are unsupported, then the argument for SEZs as an effective solution to achieve long-run liberalization is substantially weakened.

Thus, the impact of demonstration effects is a key sticking point in the debate over SEZ effectiveness in general. As such, Schrank (2001) tests whether SEZs “engender broader market reform by way of the demonstration effect” in order to determine which “side” of the debate is correct. At the center of his analysis is the life-cycle model of SEZs first presented by Basile and Germidis (1984) which claims that SEZs attract foreign investors, who in turn demonstrate the utility of competitive behavior to domestic firms, thus driving the behavior into the domestic market. The SEZ is proposed to act not as an economic enclave but as the foundation for the creation of a “neoliberal coalition” that will act to promote liberalization (Schrank, 2001). He first conducts a comparative analysis of Zone outcomes like employment, value of exports, vertical integration, and domestic economy linkages across South Korea, Mexico, and the Dominican Republic. Through his comparison he hypothesizes that market size and state capacity are key determinants of Zone’s ability to follow the life-cycle model of demonstration effects. He then quantitatively tests the life-cycle model hypothesis using a quadratic regression model with the age of the SEZ and the age of the SEZ squared. He notes that while the quadratic regression does not yield interpretable individual coefficients or t-statistics, if the life-cycle model is being followed, one would expect to see a positive coefficient on the age term, and a negative coefficient on the age squared term. He finds this to be the case when the regression is run for countries with large domestic markets, concluding that countries with large domestic markets follow the life-cycle model while countries with small domestic markets do not (Schrank, 2001).

These findings make sense intuitively. In economies with large markets, large manufacturers are more likely to exist and offer more attractive joint-venture partners. Their size and maturity increase their ability to compete in the global economy, where interactions with other firms lead to the benefits of demonstration effects. Here, SEZs act as catalysts for economic transformation. However, in the case of small domestic markets, domestic firms are unlikely to be of a size large enough to provide significant export contributions and compete in the global market. As a result, they do not benefit from demonstration effects and would prefer the existing regime to liberalization. Here, there is no incentive for a neo-liberal coalition, and the SEZ reverts to serving as only a pressure valve.

That being said, there is room for questioning. While it may be the case that the correlations between market size and ability of Zones to promote development exists, there is no indication of causation between the two. The comparison between South Korea and the Dominican Republic offers a perfect example of the various possible explanations for the differences between Zone performance aside from size. The countries, though similar in timing of Zone establishment and per capita GDP at establishment have vastly different political, economic, and social institutions. South Korea and the Dominican Republic can't be used as "control" and "treatment" groups in a study of the impact of economy size, because they are not identical. Studying the causal relationship between size and economic development would require controlling for all potential differences between countries through fixed effects or some other means.

While initial theoretical models predicted SEZs to be generally welfare reducing, most conclusions related to the effectiveness of SEZs have moved nearer to the center of debate. Economists acknowledge that Zone have the *potential* to spur economic development in certain,

highly specific cases, but remain skeptical of their actual ability to do so. Despite the movement away from a completely negative view of SEZs, SEZs are still considered limited tools or “second-best” options in the search for economic development.

Why, then, do developing countries continue to implement SEZs? There are a number of possible reasons. For one, the recent extraordinary performance of certain SEZ programs like China and the corresponding rapid economic growth outlined in Chapter 2 has inspired other developing countries, like India, to implement similar programs. It’s important to keep in mind, however, that SEZs are at their core a governmental policy, and as such, their establishment is often politically motivated. While politicians might claim to implement SEZs as a way of driving economic growth, they also stand to make gains of their own. For example, politicians may favor SEZs because of the possibility of extracting bribes based on the different prices inside and outside of the Zone; bribes that would otherwise not exist if full-liberalization were adopted. With this in mind, studying the actual effectiveness of existing Zones is all the more imperative. If Zones are as limited in effectiveness as theory implies, then implementing them in developing countries already plagued by issues of corruption under the guise of driving growth could be detrimental. Therefore, we must evaluate the actual effectiveness of SEZs.

Table 2. Summary of Selected Theoretical Perspectives

Author	Method	Proposed Effectiveness	Analysis
Hamada (1974)	Heckscher-Ohlin Model	Either have no impact (if foreign investment is absent) or are inefficient and welfare reducing (if foreign investment is present)	Treats capital as internationally immobile thereby failing to capture the international mobility of capital goods which is central to the functioning of SEZs
Warr (1989)	Cost-Benefit Analysis	Zones are perhaps not welfare reducing, but are only second-best to liberalization	Does not consider interactions between the SEZ and international economy
Basile and Germidis (1984)	Developed Life-Cycle Model	SEZs attract foreign investors, who in turn demonstrate the utility of competitive behavior to domestic firms, thus driving the behavior into the domestic market	Assumes that demonstration effects actually exist between SEZ firms and the domestic economy
Schrank (2001)	Comparative Analysis and Life-Cycle Model	State capacity and market size are key determinants of success; SEZs are only effective in engendering broader economic reform in countries with large domestic markets; state capacity and market size are key determinants of success	Analysis relates only correlation between size and ability of Zone to act at catalyst for economic transformation rather than a causal relationship between SEZs and demonstration effects
Wen (2015)	Historical qualitative analysis	SEZs may act as means of overcoming structural bottlenecks suffered by developing countries that prohibit full liberalization	Conclusions as to the theoretical effectiveness are based in historical, anecdotal evidence of “structural bottlenecks” and successfulness of liberalization

Chapter 4

Defining and Measuring Success

The theoretical models presented in Chapter 3 focus on the overarching nature of all SEZs. They only occasionally allude to actual individual experiences. Thus, the conclusions drawn regarding SEZs apply across the board, no matter the individual Zone feature or circumstances. However, in the study of actual Zone performance, the complex nature and wide variety of SEZs and SEZ policy has led to a lack of literature regarding the overall successfulness of currently functioning Zones. Due to the unique nature of each SEZ, Zone performance has been studied on a case by case basis for individual countries. Therefore, unlike in theoretical analysis, there is limited conclusive evidence as to the overall successfulness of SEZs in practice. In fact, the piece meal nature of the study of actual performance of SEZs results in varying definitions of success itself. Here, we look to begin to process of filling the gap between theory and practice by first proposing our own definition of success, and then analyzing existing and potential measures of this success. The question now becomes: How can existing-SEZ success be defined and measured?

4.1 Defining Success

Defining “success” is highly subjective. In the study of SEZs, success is currently defined by the individual researcher. This makes comparing the findings of studies difficult and further complicates the ability to draw general conclusions about SEZs. Additionally, there are a number of outcomes on which an SEZ may be judged depending on the aim of the study. In many cases, research focuses on an individual aspect of Zone performance, such as attraction of FDI, and

defines success narrowly in terms of that aspect. Generally, these aspects fall into two outcome categories defined by Farole (2011) and the World Bank: static and dynamic.

Static Outcomes

While in economics static is usually used in reference to a “timeless” economy or data from a single point in time, here static takes on a different meaning. In this case, static outcomes refer to those outcomes that occur as the result of the usage of SEZs as instruments of trade and investment policy (Farole, 2011). Jayanthakumaran (2003) more clearly describes static outcomes as those occurring “via increases in the supply of foreign exchange, remuneration of factors of production and supplier of intermediate and other inputs, as well as the achievement of economies of scale in developing land, infrastructure, and government services.” Essentially, static outcomes are those derived from the direct functioning of firms within the Zone as they participate in primary business activities like attracting capital investment and production. Static outcomes include increases in employment through job creation, growth and diversification of exports, sustained level of exports, and amount of FDI attracted (World Bank, 2008).

One of the most commonly cited static outcome goals is an increase in total capital investment which can drive subsequent increases in employment, export growth, and diversification through the growth and establishment of domestic and foreign firms alike. In developing countries where domestic investment can be limited, foreign direct investment plays a crucial role in the creation and growth of Special Economic Zones. FDI is therefore a key metric by which studies measure the static outcomes of Zones.

Employment is also considered a static outcome, and is in some cases the sole goal of establishing a Special Economic Zone. However, in developing countries seeking economic reform, achieving higher employment is not enough to induce this reform (Farole & Akinci, 2011). Additionally, while SEZs have been shown to be major contributors to FDI and exports, they have a comparatively smaller effect on employment, especially in countries with large populations like China (Farole, 2011). Therefore, employment outcomes must be considered in concert with other short-term outcomes like investment.

Export growth and diversification offer yet another example of a static outcome at the center of analysis for SEZs. Since most developing countries rely heavily on exporting commodities, they are highly vulnerable to shocks. Through diversification, countries hope, among other things, to stabilize export revenues. Additionally, the monetary and intellectual gains from increased trade and export growth are key to economic development and further structural change. Developing countries hope that SEZ can aid in promoting and increasing exports and diversification. Because of this, export behavior is considered a key static outcome by which Zone successfulness can be measured.

Dynamic Outcomes

Dynamic outcomes differ from static outcomes in a couple of ways. For one, they typically materialize more slowly over a number of periods, and are thus less related to the short-term success of the Zone. However, the key difference between the two is the mechanism used to create the outcomes. While static outcomes are created through the SEZ firms' undertaking of primary business functions, dynamic outcomes occur as the result of the Zone "promoting

essential conditions for the industrialization of the host country in the form of linkage effects, such as demonstration effects, skills, and technology” (Jayanthakumaran, 2003). Dynamic outcomes include technology transfers, integration with the domestic economy, and eventual structural change like economic diversification and openness (Farole, 2011).

Technology transfers involve the transfer of technology, and knowledge of it, from, for example, a developed country to a less developed country, or from one company to another. In the case of developing countries, SEZs are important in bringing foreign investment and technology into the country and creating a proximity between domestic and foreign companies which aids in this transfer. In a well-functioning SEZ, domestic producers benefit from the advancements and technology gained from interactions with other actors within the SEZ. This transfer can lead to better functioning, more productive domestic firms, which in turn drive change within the broader domestic economy through interactions and competition with other domestic firms. This technology transfer can occur in a number of ways, but it perhaps most easily achieved through another important outcome: integration.

Integration occurs when foreign and domestic producers inside and outside of the SEZ interact with one another such that the “walls” around the SEZ, whether physical or not, are broken down. In this case, companies do not strictly operate only with other companies within the Zone, and the Zone is less of an exclusive enclave.

Ultimately, however, the goal of SEZ implementation in most developing countries is to achieve the dynamic outcome of structural change. Essentially, structural change involves a change to the very core of how an economy operates. For example, many developing economies are agrarian in nature. Here, structural change involves moving toward a manufacturing based economy and is indicated by a change in sectoral composition within the economy as a whole. In

cases where countries operate through a regulated economy, structural change would involve liberalization of the economy which may be indicated by changes to governmental policy, laws, regulations, etc. Structural change, therefore, looks different depending on the current and desired structure.

Internal and Extended Success

Additionally, “success” can be further broken into internal and extended success. Internal success is the success of the physical Zone itself and the firms within it, such as the amount of FDI attracted to the Zone, how many jobs are created, or the exporting behavior of firms within the Zone etc. While these internal success measures address the first two goals of SEZs, they do not indicate how well the Zone is performing when it comes to impacting the wider economy. For developing countries seeking to use SEZs to change the economy, Zones should have an impact beyond their own walls. The ability of a Zone to drive investment, employment, exporting behavior, etc., in the wider economy can be labeled extended success.

The majority of previous literature related to measuring the success of SEZs focuses on only one or two of the previously discussed outcomes. But labeling an SEZ a success simply because it has increased FDI, for example, paints too limited a picture of the actual effect of the Zone. In fact, a truly successful Zone is one that is able to achieve all of the aforementioned static and dynamic outcomes on the internal level, while also driving extended success and economic growth. In the next section, we identify and analyze means by which we can measure the successfulness of Zones, once more entering the debate over causal relationship between

SEZs, structural change, and economic growth outlined in Chapter 3. This time, however, we approach from a quantitative rather than theoretical angle.

4.2 Methods for Measuring Success

In order to test how successful SEZs are, one must measure the various short and long term outcomes discussed in Section 4.1. There are a number of methods by which outcomes can be measured to identify internal and extended success levels alike. Through review of literature related to SEZ performance, one can better understand the methods for measuring outcomes, their applications, and their deficiencies. The aim in analyzing such methods is to present potential measures of internal and extended success that could be used in evaluating SEZs. Here, a number of historically used measures of Zone performance outcomes are presented alongside their findings related to Zone successfulness. First, measures of static outcomes are presented, followed by measures of dynamic outcomes.

Static Outcomes

One of the most commonly used tools for evaluating the performance of Zones is descriptive statistics and analytics. These statistics come in a variety of forms across all Zone outcomes, and, although only summaries of Zone performance, are often cited as indicators of Zone success. Farole (2011), for example, uses descriptive statistics in analyzing the successfulness of African SEZs in attracting investment. In particular, Farole (2011) estimates FDI flow by either taking the difference in the cumulative value of FDI or FDI stocks from one year to the next. These estimates are able to provide some picture of the flow of FDI, SEZ FDI

per capita, and the percent of a country's FDI for which SEZs account. These statistics are then used to track and compare the performance of Zones with one another over time. In some cases, this comparison has led to certain Zones being labeled a "success" while others are pegged as underachieving. It is important to note that descriptive statistics are widely used across all of the aforementioned outcomes, not just FDI. In fact, descriptive statistics related to the level of exports are some of the most used and cited in the discussion of Zone performance. Exports per capita, SEZ share of national exports, and average growth in exports are all seen as important indicators of the successful performance of an SEZ.

However, these measures, while showing the successful performance of an SEZ, do not necessarily prove that this performance is caused by the nature of the SEZ itself. A firm within a Zone having increasing levels of investment may not result from location within the Zone or Zone attributes, but from other economy-wide economic conditions which drive foreign investment, such as interest rates. Analysis of the relationship between SEZs and export behavior in African and Asian countries has shown that "differences in the probability of a firm exporting are driven not by a firm being in an SEZ, but by the characteristics of firms in SEZs" (Davies and Mazhikeyev, 2015). Firms within studied SEZs tended to be naturally more export-oriented, with characteristics that predispose them to exporting like large size, higher productivity, foreign-ownership, and roles as importer intermediaries (Davies and Mazhikeyev, 2015). While the SEZs concentrate exporting activities and decrease costs for existing exporters, the SEZ itself is not found to be the driver of the higher likelihood of exporting within the Zone as compared to outside. As is demonstrated, indicating that an SEZ is a success based strictly on descriptive statistics is futile. A more convincing measure is needed if one would like to attribute the internal success of an SEZ to its own nature.

A Difference-in-Difference (DID) technique offers one solution. The technique uses “longitudinal data from treatment and control groups to obtain an appropriate counterfactual to estimate a causal effect” (“Difference-in-Difference,” n.d.). DID takes the mean difference in outcomes before and after a specific intervention in a treatment group and compares it to the mean difference in outcomes before and after the intervention within a control group. By taking a weighted average of the DID estimator for each treated group and then averaging the individual estimates, one can estimate the causal relationship (Wang, 2013). This estimation, however, relies on several key assumptions, one being the parallel trend assumption which requires that “in the absence of treatment, the difference between the ‘treatment’ and ‘control’ group is constant over time,” a study of SEZs needs to meet this assumption despite the obvious lack of a natural control group (“Difference-in-Difference,” n.d.).

Wang (2013), in her study of Chinese SEZs and investment effectively implements DID technique to analyze the impact of SEZs on FDI. The study provides a highly relevant model that can be applied to other SEZ data. In the case of SEZs, a non-SEZ region acts as the counterfactual, indicating what would have happened within a region had the Zone not been implemented. In order to ensure the validity of results, it is necessary to first match SEZ regions with their closest non-SEZ counterparts. Additionally, regional fixed effects and flexible regional-year fixed effects must be allowed in order to account for inherent differences between the pairs and region-specific effects. These adjustments allow for the counterfactual to be as accurate as possible. The Difference-in-Difference strategy is then used to analyze the relationship. In this case, Wang (2013) found that SEZ policy increased FDI by 58% over the predicted level without SEZ policy, implying that the SEZs studied were, in fact, internally successful at attracting FDI. This DID strategy is promising, but requires a data set that allows

for accurate matching and a degree of subjectivity when determining comparable pairings.

Additionally, while the method aids in determining the causal relationship between existence of an SEZ and internal Zone success, it does not address extended effects or success of the Zone.

In order to test these extended effects, a model is needed that evaluates the relationship between the existence of an SEZ and investment in the surrounding economy. In a study of Polish SEZs' impact on investment and employment, Ciżkowicz, Ciżkowicz-Pękała, Pękała, and Rzońca (2015) present one such model. They evaluate the impact of SEZs on total capital investment within the SEZ-host county through the regression:

$$cap_{it} = \alpha_i^{cap} + \beta^{cap} cap_{sseit} + Z_{it}\gamma^{cap} + v_{it}$$

Here, cap_{it} is the total (including both SEZ and non-SEZ firms) capital investment within the SEZ host-county, i , in a given year, t , while cap_{sseit} is the total investment activity of SEZ firms. Z_{it} is a vector of a set of controls that characterize the county's economy and determine the investment in the i -th county in the year t , but that are not directly related to the SEZ functioning. The variables in vectors Z_{it} are either standard determinants of regional investment or indicators capturing differences between hosting and non-hosting counties. For example, Vector Z_{it} contains variables characterizing the county's economy, corporate sector, and labor market like the share of population living in rural area in total population, the manufacturing production per inhabitant, the number of registered companies, and employment outside of the SEZ. β^{cap} and γ^{cap} are structural parameters, and α_i^{cap} are fixed effects that capture unique characteristics of the area in which the SEZ is located. v_{it} is an independent and identically distributed (IID) error term (Ciżkowicz et. al., 2015).

This measure presents a clearer indication of the impact of an SEZ on investment totals in the host-county economy with β^{cap} indicating the effect. Importantly, the model differentiates

between investment that does and does not relate to the actual functioning of the SEZ, and takes into account the differences between host and non-host counties, as well as the unique characteristics of the area in which the SEZ is located. The inclusion of these variables increases the reliability of the results, bridging the gap between correlation and causation. In the case of this model, “success” would be defined by $\beta^{cap} > 1$, which, according to the model, indicates that the SEZ is exerting a positive impact on investment located outside of the SEZ.

That being said, the above presented regression does not take into account the spatial/secondary effects of a Zone, that is, the impact of a Zone on performance of neighboring areas. The best example of the importance of including spatial effects is demonstrated in the measurement of the extended success of Zones in driving employment. While the previously described regression can be helpful in measuring local success, it makes the assumption that SEZs have affects only on their host-region, an assumption that, especially in the case of employment, can be misguided. In developing countries with limited employment opportunity, SEZs are particularly likely to attract employees from areas surrounding the host-region (Liang, 1999).

Spatial Durbin Models, offer a means by which these spatial effects (“secondary effects”) can be measured (Mur & Angulo, 2005). Spatial effects are based on the notion that what happens in one area, relates to what happens in neighboring regions. A matrix is established showing which regions are neighbors to one another with 1 representing that the regions are neighbors and 0 representing that they are not. For example, if 4 regions were related like so:

Region	Neighbors
1	3,4

2	3,4
3	1,2,4
4	1,2,3

The matrix would take the form:

$$W = \begin{pmatrix} 0 & 0 & 1 & 1 \\ 0 & 0 & 1 & 1 \\ 1 & 1 & 0 & 1 \\ 1 & 1 & 1 & 0 \end{pmatrix}$$

The matrix is then transformed into a row-standardized weight matrix based on the number of neighboring regions each region has, becoming:

$$W = \begin{pmatrix} 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ 0 & 0 & \frac{1}{2} & \frac{1}{2} \\ \frac{1}{3} & \frac{1}{3} & 0 & \frac{1}{3} \\ \frac{1}{3} & \frac{1}{3} & \frac{1}{3} & 0 \end{pmatrix}$$

Using the matrix, a vector of the average of x over the neighbors of each region can be determined:

$$Wx = \begin{pmatrix} \frac{1}{2}(x_3 + x_4) \\ \frac{1}{2}(x_3 + x_4) \\ \frac{1}{3}(x_1 + x_2 + x_4) \\ \frac{1}{3}(x_1 + x_2 + x_3) \end{pmatrix}$$

The model then weights the independent variables of the regression with average-neighbor values. The cross-sectional model $y = X\beta + \mu$ becomes $y = X\beta + WX\theta + \mu$. From here,

the correlation can be tested (Viton, 2010). This model is an especially useful tool in the study of SEZs and their impact on surrounding regions' economies.

Cizkowicz et. al (2015) use the “direct effect” regression presented earlier as a foundation for a Spatial Durbin Model from which they are able to estimate the impact of an SEZ on employment beyond the confines of the host-region, thus enabling them to study the wider effect of the SEZ on employment. They find that development of the studied SEZs correlated positively with the employment of the host-region as well as counties surrounding the host-region. However, they acknowledge their results are more “optimistic” than most other estimates, perhaps owing to their unique inclusion of spatial effects.

While the aforementioned measures include some outside effects such as the unique characteristics of each host-region within their error terms, they often relate correlation rather than causation. Government policies and the national and global economy can have large impacts on employment in a region. What is more, in the use of regressions, one must be wary of omitted variable bias and multicollinearity, especially in the case of Spatial Durbin Models (Viton, 2010). Thus, it is difficult to definitively attribute an increase in employment to a “successful” SEZ.

Dynamic Outcomes

Dynamic outcomes are even more difficult to measure than static outcomes because they involve a number of variables that are not necessarily quantitative. For example, key components of technology transfer (such as knowledge surrounding management and organization) that go beyond specific techniques and mechanics are difficult to measure. As a result, technology

transfer does not currently have a unified measurement or indexing process (Roszkowska, 2013). Rather than a single indicator of technology transfer, several of the aforementioned short-term outcome measures are used in combination with one another in attempts to quantify the level of technology transfer from the global economy to individual national economies.

Maskus (2004) analyzes value of incoming FDI, value of technologically advanced imported goods, and intellectual property rights payments to understand the level of technology transfer using data available from UN Comtrade, IMF, and UNCTAD World Investment Reports. Dahlman (2010) compares the value of FDI and technology licensing with the value of GDP of a country in order to compare the technology transfer and knowledge acquired from abroad with the size of the economy. Additionally, the OECD's technology balance of payments (TBP) which registers the transactions related to international technology and knowledge transfers through measuring money paid or received for the use of intellectual property and research and development in a given country has been used as a partial indicator of the level of technology transfer (OECD, 2006). These measurement methods have typically been applied to measuring technology transfer within an entire economy, rather than to the specific case of SEZs. However, their methodology could be applied on a smaller scale to SEZs.

Aggarwal (2007) undertook one of the first attempts to measure technology transfer within SEZs specifically. She proposes comparing the "vintage" of technology used by domestic arms of multi-national enterprises (MNEs) within SEZs to that of technology used by domestic counterparts. The difference in "vintage" is indicative of the difference in the nature of technology used by the firms, and the level of opportunity for technology transfer between MNEs and domestic firms within the zone. She finds, however, that the technologies used by MNEs are not significantly better than their domestic counterparts'. This conclusion is supported

by other research which shows that in many cases MNEs, often thought of as the drivers of technology transfer, do not bring new products or equipment with them, are locked in low value-added productions, and provide little R&D or training within their SEZ segments.

Integration and structural change offer similar challenges in measurement, especially when it comes to isolating the effects of an SEZ on the economy. Currently, a Structural Change Index (SCI) exists which can be used to measure the change in sectoral composition within the economy as a whole. While no such study currently exists, finding the correlation between SEZ activity and changes in the SCI might shed some light on the relationship between SEZs and structural change in terms of sectoral competition. It is important to note, however, that structural change does not necessarily imply successful development, and running a regression would only determine correlation between the two, rather than proving that SEZ policy drove sectoral change. As far as measuring other aspects of structural change such as changes in policy, governance, etc., there are very few quantitative methods, and even fewer studies, regarding the relationship between the two. In general, research in the area of actual dynamic outcomes is particularly lacking, and as a result methods to measure these outcomes are lacking as well.

4.3 Takeaways

The goal of section 4.2 was to indicate a number of means by which Zone outcomes can be measured. Ideally, the most effective measurement of the overall successfulness of SEZs would indicate the success of the Zone in achieving all of the desired static and dynamic outcomes simultaneously. However, as was demonstrated, proving that an SEZ has had a direct, significant, positive impact on development is difficult. The need to take into consideration other

factors such as simultaneous market reforms, evolving government policy, regional differences among SEZs, the global economic environment, etc., further complicate such a model.

Additionally, current, limited uses of the presented methods find mixed results as to the successfulness of SEZs. While Cizkiewicz et. al (2015) found that SEZs promoted employment in the SEZ and the surrounding region, the results of their similar study on investment found that SEZs appeared to have neither a crowding-in, nor crowding out effect on. As for internal success, Wang (2013) found that SEZ policy did appear to be the primary cause of FDI growth. Meanwhile, Davies and Mazhikeyev (2015) assert that despite appearances, it is not in fact Zone policy that drives high levels of exporting behavior within Zones, but rather the self-selection of already predisposed firms.

This points to the utility of measuring each of the static and dynamic outcomes individually, and then analyzing the results in order to see the extent to which the SEZ was successful; treating them as individual components of overall success. Undertaking a study in which each individual outcome was measured for a country's SEZ program and the results were then analyzed to determine overall successfulness is obviously beyond the scope of this paper. However, the concept offers an intriguing avenue for future research. If the same study were to be conducted upon a range of SEZ programs, there would be a much stronger foundation for the comparison of programs, identification of contributing factors of SEZ success, and determination of the true effectiveness of Zones versus theoretical estimates.

Table 3. Summary of Possible Measures of Zone Successfulness

Performance Measurement Method	Function	Weaknesses
Descriptive Statistics	<p>Measures the direct contributions of the Zone to total economic activity</p> <p>Can track changes in Zone output/ contributions over time</p>	<p>Unable to show that changes in the contributions of an SEZ over time are the result of the functioning of the SEZ itself rather than other factors</p> <p>Does not indicate the Zones indirect contribution to total economic activity</p>
Spatial Durbin Models	<p>Measures the indirect impact of a Zone on the surrounding economy</p>	<p>Relates correlation rather than causation</p> <p>Issues with multicollinearity</p>
Regression Analysis with investment/employment/etc. of firms in SEZ used as explanatory variable in area's economic activity	<p>Measures the correlation between Zone performance and the performance of the wider economy</p> <p>Can measure induced effects</p>	<p>Does not relate causation, and thereby is not a reliable indicator of the impact of the SEZ on economic growth</p> <p>Does not take into account spatial effects</p>
Regression Analysis with dummy variable indicating zone existence in particular region and time	<p>Evaluates the differences between SEZ and non-SEZ regions to understand impact of SEZs on performance</p>	<p>Often does not factor in spatial effects</p> <p>Does not indicate external success</p>
Difference-In-Difference	<p>Creates a treatment and control group in order to study causal effects of Zone implementation on the region</p> <p>Can indicate internal success</p>	<p>Requires the manufacturing of a control group through subjective matching.</p> <p>Does not take into account spatial effects</p> <p>Does not indicate external success</p>

Chapter 5

Conclusion

In Chapter 2, the cases of China, Mauritius, Russia, and India were presented as examples of perceived experiences of SEZ success and failure. China and Mauritius are presented here, and in wider economic literature, as success stories while Russia and India are presented as near or total failures. Based on these and several other anecdotal stories, a growing body of literature has begun to emerge related to key determinants of Zone success. For example, scholars point to things like the strategic location of Chinese SEZs near ports, their access to a large local and regional market, the availability of new infrastructure, the accessibility of abundant cheap labor, and the stability and strength of the government as determinants of Zone success that then drives development. Analysis of other historical experiences has aided in the development of a seemingly endless do's and don'ts list for achieving "successful" SEZs. However, all of this discussion of "success" stories and their lessons is based on the notion that these are, in fact, stories of success.

But this assumption is perhaps ill-founded. As presented in Chapter 3, economic theory appears to be converging towards an opinion of SEZs as second-best alternatives to liberalization, with little to no significant impact on widespread economic development. Theoretically, there is little evidence that SEZs are, by nature, successful drivers of economic development. Of course, theory may differ from practice. Therefore, in Chapter 4 literature related to the measurement of actual Zone success was analyzed. Here, it was found that methodologies used to measure Zone outcomes did little in the way of measuring the causal

relationship between SEZs and internal and extended success. What is more, it was found that most studies claiming to support the successfulness of Zones relied only on the measurement of one outcome, such as investment, while disregarding other key components of overall success. Due to these difficulties in measurement, it is difficult to deem any Zone, Chinese or otherwise, a success when it comes to promoting development. It is as of yet unclear how much success, internal or extended, can be attributed to SEZ policy rather than other factors.

Before we can start recommending specific policies, or identifying countries where SEZ policy may work, we first have to determine how effective SEZs actually are. Moving forward, studies should focus on measuring the causal relationship between SEZ policy and each of the internal and external Zone outcomes on a country by country basis. Models like the DID used by Wen (2015) will aid in supporting convincing conclusions about the relationship between Zones and economic growth and development.

Simply seeing a correlation between the establishment of Zones and economic growth and jumping to the conclusion of causality and success is faulty thinking. For developing countries seeking any opportunity for growth, it is just this jump that can lead to hugely detrimental investments in fruitless policy. Researchers, economists, politicians, and the like need to be clear that the findings on SEZs as successful policy tools are currently mixed, that there are no clear indications of causality, and that implementation of Zones is far riskier than the media might suggest.

BIBLIOGRAPHY

- Aggarwal, A. (2006). "Special Economic Zones: Revisiting the Policy Debate" *Economic and Political Weekly*, 41(43/44), 4533-4536.
- Aggarwal, A. (2007). Impact of special economic zones on employment, poverty and human development, Working Paper No. 194, Indian Council for Research on International Economic Relations
- Baissac, C. (2003). "Maximizing the Developmental Impact of EPZs A Comparative Perspective in the AFRICAN Context of Needed Accelerated Growth ,*A Presentation at the Johannesburg EPZ Symposium*, Oct15-16, 2003.
- Baissac, C. (2010). Planned Obsolescence: Export Processing Zones and Structural Reform in Mauritius. Mimeo. World Bank. September, 2010.
- Bakshi, I. (2014, December 04). Why SEZs in India have failed. Business Standard News. Retrieved February 25, 2018, from http://www.business-standard.com/article/economy-policy/sezs-hobbled-by-taxes-infrastructure-114120300440_1.html
- Basile, A., & Germidis, D. (1984). *Investing in Free Export Processing Zones*. Paris: OECD.
- Boyenge, J. P. S. (2007). *ILO Database on Export Processing Zones, Revised*. Geneva: International Labour Organization.

- Ciżkowicz, P., Ciżkowicz-Pękała, M., Pękała, P., & Rzońca, A. (2015). The effects of special economic zones on employment and investment: spatial panel modelling perspective (Working Paper No. 28). Retrieved from Narodowy Bank Polski website: https://www.nbp.pl/publikacje/materialy_i_studia/208_en.pdf
- Cling, J.P. & G. Letilly. (2001, November). "Export Processing Zones: A Threatened Instrument for Global Economy Insertion?" *DIAL/Unite de Recherche CIPRE Document de Travail* DT/2001/17.
- Dahlman C. J. (2010). *Innovation Strategies in Brazil, China and India: From Imitation to Deepening Technological Capability in the South*, [in:] *The Rise of Technological Power in the South*, X. Fu, L. Soete (eds.), Palgrave MacMillan, London–New York.
- Davies, R. B. & Mazhikeyev, A. (2015): "The Impact of Special Economic Zones on Exporting Behavior," University College Dublin Working Paper 15/28.
- Difference-in-Difference Estimation. (n.d.). Retrieved January 25, 2018, from <https://www.mailman.columbia.edu/research/population-health-methods/difference-difference-estimation>
- Farole, T., & Akinci, G. (2011). "Special Economic Zones: Progress, Emerging Challenges, and Future Directions" Washington, DC: World Bank.
- Farole, T. (2011, September). "Special Economic Zones: What Have We Learned?," The World Bank Economic Premise, Washington DC, Number 64.

- Farole, T. (2011). "Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience." Washington, DC: World Bank.
- Farole, T. (2011, September) "Special Economic Zones: Performance, policy, and practice- with a focus on Sub-Saharan Africa." International Trade Department, World Bank.
- Felah, F. (1994). "The Role and Activities of Offshore Companies in the Tunisian Economy." Mimeo.
- FIAS (Foreign Investment Advisory Service). (2008). *Special Economic Zones. Performance, Lessons Learned, and Implications for Zone Development*. Washington, DC: World Bank
- Fiorini, M., Jansen, M., Kummritz., & Xie, W. (2013). "Trade and the Extent of Structural Change: Retrieve January 2, 2017 from <http://www.etsg.org/ETSG2013/Papers/221.pdf>
- Fuller, B., & Romer., P. (2012). "Success and the City: How Chartered Cities Could Transform the Developing World?" Ottawa, Ontario, Canada: MacDonald-Laurier Institute.
- Hamada K. (1974), 'An Economic Analysis of Duty-free Zone', *Journal of International Economics*, **4** (3): 225–241
- Hanson, P. (1998) Foreign advice. In Ellman, M. & Kontrovish, V. (Eds), *The destruction of the Soviet economic system an insiders' history* (pp. 238-254). Armonk, NY: M. E. Sharpe, Inc.
- Huifeng, H. (2018, January 16). Shenzhen economic expansion dwarfs growth in Hong Kong and Singapore. Retrieved February 25, 2018, from

<http://www.scmp.com/news/china/economy/article/2128310/shenzhen-88-cent-hi-tech-growth-roll-hit-y2tr-2017>

Jayanthakumaran, K. (2003). Benefit–cost appraisals of export processing zones: A survey of the literature. *Development Policy Review*, 21 (1), 51-65

Johansson, H. (1994). “The Economics of Export Processing Zones Revisited.” *Development Policy Review* 12(4): 387–402

Kremlin stops developing special economic zones in Russia. (2016, June 9). In bne IntelliNews Retrieved March 1, 2018, from <http://www.intellinews.com/kremlin-stops-developing-special-economic-zones-in-russia-99471/>

Liang, Z. (1999). Foreign investment, economic growth, and temporary migration: The case of shenzhen special economic zone, china. *Development and Society*, 28(1), 115-137.

Lin, J.Y., & Monga, C. (2010). “Growth Identification and Facilitation: The Role of the State in the Dynamics of Structural Change”. World Bank Policy Research Working Paper 5313.

Lu, Y., Wang, J., & Zhu, J. (2016). “Place-Based Policies, Creation, and Displacement: Evidence from China’s Economic Zone Program”

Madani, D., (1999). “A Review of the Role and Impact of Export Processing Zones.” World Bank Policy Research Working Paper 2238. World Bank, Washington, DC.

Maskus, K. E., (2004). *Encouraging International Technology Transfer*, UNCTAD-ICTSD

- McKenney, K. I. (1993). "An assessment of China's special economic zones", The Industrial College of the Armed Forces, National Defence University, Washington, DC
- Mur, J. & Angulo, A. (2005), 'A closer look at the Spatial Durbin Model,' 45th Congress of European Regional Science Association, Amsterdam. Projecton IPRs and Sustainable Development, "Intellectual Property Rights and Sustainable Development", no. 7, May.
- OECD. (2006, January 04). Technology Balance of Payments.
- Pakdeenurit, N. Suthnikarnnarunai, N., & Rattanawong, W. (2014, March). "Special Economic Zone: Facts, Roles and Opportunities of Investment." Proceedings of the International MultiConference of Engineers and Computer Scientists Hong Kong, China
- Papageorgiou, C., Kolovich, L., & Nolan, S. (2017, April 14). How Low-Income Countries Can Diversify and Grow. Retrieved March 1, 2018, from <https://blogs.imf.org/2014/05/28/how-low-income-countries-can-diversify-and-grow/>
- Potter, B. (1993) "China's Equity Joint Venture Law: A Standing Invitation to the West for Foreign Investment?" University of Pennsylvania Journal of International Business Law, V. 14 n.1, 1993, pp. 1-36; p. 4-6.
- Roszkowska, D. (2013). Approaches to International Technology Transfer Measurement – An Overview. Optimum. Studia Ekonomiczne, 51-63.
- Schrank, A. (2001). "Export Processing Zones: Free Market Islands or Bridges to Structural Transformation." *Development Policy Review* 19(2): 223–242.

- Sosnovskikh, Sergey. (2017). Industrial clusters in Russia: The development of special economic zones and industrial parks. *Russian Journal of Economics*. 3. 174–199.
- Special Economic Zones set to lose direct tax benefits post March 2020. (2016, February 29). Retrieved January 25, 2018, from <https://www.thehindubusinessline.com/economy/budget/special-economic-zones-set-to-lose-direct-tax-benefits-post-march-2020/article8296759.ece>
- Sukhankin, S. (2016, March 31). Kaliningrad: Russia's stagnant enclave. Retrieved February 25, 2018, from http://www.ecfr.eu/article/commentary_kaliningrad_russias_stagnant_enclave_6052
- The Editors of Encyclopædia Britannica. (2018, January 09). Special economic zone. Retrieved February 25, 2018, from <https://www.britannica.com/topic/special-economic-zone>
- The World Factbook: MAURITIUS. (2018, March 16). Retrieved March 25, 2018, from <https://www.cia.gov/library/publications/the-world-factbook/geos/mp.html>
- Viton, P.A. (2010). Notes on spatial econometric models. *City Reg. Plan.* 870, 9–10.
- Wang J. (2013). The economic impact of Special Economic Zones: evidence from Chinese municipalities. *J. Dev. Econ.* 101:133–47
- Warr, P. (1989). “Export Processing Zones: The Economics of Enclave Manufacturing.” *The World Bank Research Observer* 9(1): 65–88

Wen, Yi. (2015). “The Making of an Economic Superpower—Unlocking China’s Secret of Rapid Industrialization.” Working Paper No. 2015-006B, Federal Reserve Bank of St. Louis.

World Bank. (1992). “Export Processing Zones.” Policy and Research Series No. 20. Washington, DC: World Bank.

Zafar, A. (2011). *Mauritius: An Economic Success Story*. Washington D.C: World Bank.

Zeng, D. Z., ed. (2010). *Building Engines for Growth and Competitiveness in China: Experience with Special Economic Zones & Industrial Clusters*. Washington, DC: World Bank.

Zeng, D. Z. (2015a). “Global Experiences with Special Economic Zones: Focus on China and Africa.” World Bank Policy Research Working Paper 7240. Washington, DC: World Bank.

Zeng, D. Z. (2016). “Special Economic Zones: Lessons from the Global Experience.” PEDL Synthesis Paper Series.

ACADEMIC VITA

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EDUCATION: The Pennsylvania State University, University Park, PA

Schreyer Honors Scholar and Paterno Fellow

B.S Accounting

B.S Economics

Minor: Political Science

EXPERIENCE:

EY (Ernst and Young), Pittsburgh, PA

June 2017- August 2017

Financial Service Organization (FSO) Summer Assurance Intern

Full Time Hire: Fall 2018

- Collected and audited SOC1 evidence from client's internal auditors
- Prepared tie-out for end of quarter financial statement footnotes
- Completed test of controls walk-throughs
- Attended the International Intern Leadership Conference (IILC)

Penn State Learning Edge Academic Program (LEAP)

April 2016- August 2016

Mentor

- Mentored group of 22 incoming Penn State freshmen to become acclimated to campus and academia
- Worked as liaison between students, faculty, and library staff
- Planned and led educational, community development, and orientation events

Penn State College of the Liberal Arts, University Park, PA

August 2015-December 2016

Undergraduate Teaching Assistant, Microeconomics (Econ 102) and Econometrics (Econ 106)

- Assisted faculty in proctoring and grading assignments and exams
- Communicated with faculty effectively to ensure student success across diverse learning styles and levels of comprehension

LEADERSHIP:

Penn State Pan-Hellenic Dance Marathon (THON)

October 2015-February 2018

Donor and Alumni Relations: Development Committee Member

- Engaged with donors and alumni to increase financial support and awareness of THON, contributing to the \$10.1 million total

Penn State Lion Scouts

October 2016-May 2018

Penn State Office of Admissions Tour Guide

- Led weekly tours of Penn State's University Park Campus for prospective students and their families