Place-based Policies and Household Wealth in Africa*

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Abstract

This paper provides novel evidence on the impact of a prominent place-based policy - Special Economic Zones (SEZs) - on the economic well-being of African households. Exploiting time variation in SEZ establishment on a dataset of repeated cross-sections of households in 10 African countries during 1990-2020, we show that households living near SEZs become wealthier relative to the national average after SEZ establishment. The effect is not driven by residential sorting, accrues mostly within 10 km of SEZs, and is accompanied by increased access to household utilities, higher consumption of durable goods and a shift away from agricultural activities.

Keywords: special economic zone; place-based policy; household wealth; Africa

JEL Codes: F6, F21, O15, O25

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1 Introduction

Place-based programs - governmental policy tools used to promote local economic development and reduce regional disparities - have gained significant prominence in developing countries in recent decades. These policies aim primarily at attracting investments, creating jobs and increasing the welfare of local residents. Despite the growing popularity, there is limited empirical evidence evaluating the effectiveness of place-based policies in achieving their objectives in developing countries, particularly in Africa. Further, the main focus so far has been on traditional firm-level outcomes, such as productivity, wage, and employment (e.g., Kline and Moretti, 2014; Lu et al., 2019), with little attention paid to the welfare and distributional effects on households (Picarelli, 2016).

This paper provides novel evidence on the effects of Special Economic Zones (SEZs) - one of Africa's most widespread place-based programs - on household wealth. The term SEZ is used in this paper as an umbrella term that encompasses the different types of zones, which can be described as designated geographical areas that provide specific incentives and regulations to foster economic growth, innovation, and job creation in the target area. According to AEZO (2021), the number of SEZs in Africa has risen from 20 in the early 1990s to more than 200 in 2021. While SEZs have become an important development tool, the question of whether SEZs have contributed to improved welfare of households remains unclear.[1]

To estimate the local impact of SEZs on household wealth, we compile a novel dataset of repeated cross-sections of households residing in various distance bands around SEZs in 10 African countries over the period of 1990 to 2020 using the Demographic and Health Surveys (DHS) and georeferenced SEZs data. The 10 countries – Egypt, Ethiopia, Ghana, Kenya, Mali, Mozambique, Nigeria, Tanzania, Uganda, Zambia – are a fair reflection of the policy in the African continent. They are home to more than half of the SEZs and 45% of the population in Africa. In terms of economic development, they range from lower-middle-income countries to low-income economies, with some countries still heavily dependent on agriculture and mining (e.g. Mozambique, Zambia), while others are more economically diverse (e.g. Kenya).[2]

Exploiting time variation in the establishment of SEZs, we show that the asset wealth of households relative to the national average, as measured by the DHS wealth index, has increased significantly following SEZs establishment. The effect is

[1] Previous literature is predominantly descriptive in nature and focuses on case studies for a single SEZ. See for instance Farole and Kweka (2011); Farole and Sharp (2017); Phiri et al. (2020); Xu and Wang (2020).

[2] Information on population and income status are from the World Bank, World Development Indicators 2023.

most pronounced for households residing within 10 km of an SEZ and is comparable to owning a computer in Nigeria in 2008 in terms of the magnitude. The rise in wealth goes hand in hand with increased access to household utilities, higher consumption of durable goods, higher levels of education and a shift away from agricultural activities. These results are not driven by the in-migration of wealthier and more educated households to SEZ locations. Native households, identified as households whose female members report having always lived in their current place of residence, experience a wealth increase at least equivalent to households with migration history. We interpret these findings as an indication of an urbanization trend as locals transition to non-agricultural activities and improve their overall well-being.

Methodologically, we identify the effect of SEZs on household wealth using a Difference-in-Differences (DiD) approach with staggard treatment timing. A household receives treatment in the year of establishment of the nearby SEZ. Our estimator only considers ultimately treated locations and compares earlier versus later treated households living in the same distance band around an SEZ. In our baseline estimation, we distinguish between three non-overlapping distance bands – within 10 km, 10-20 km, and 20-30 km of an SEZ – where the distance bands are generated by drawing circles around the centroid of SEZs.

Estimating the effect of SEZs on household wealth is not trivial due to the non-random assignment of SEZs in space. If, for example, governments use SEZs to attract foreign investors, then it is more likely that relatively developed areas get treated, which may lead to an upward bias in the estimates. We addressed this issue in our baseline estimation in two ways. First, our empirical approach compares earlier versus later treated households, all of which live at the same distance from locations that have been assigned an SEZ. Further, SEZ fixed effects absorb any time-invariant differences between the location of earlier and later SEZs, such as differences in their initial conditions.

However, our estimates may still be biased if, in the absence of SEZ, household wealth is trending differently in early than in late-treated locations. In other words, a common trend assumption may be violated. We provide robustness checks to show that our result is robust when the estimation allows for differential trends specific to the SEZ location. In addition, we run placebo tests by moving the treatment dates 5 or 10 years back in time. Obtaining statistically zero estimates in these placebo regressions further reinforces the robustness of our results.

Further, recent literature has put the conventional DiD estimation methods under scrutiny in the presence of staggered treatment rollout and treatment effect heterogeneity and proposes alternative estimation methods.[3] We implement the es-

[3]For further discussion see Goodman-Bacon (2021), de Chaisemartin and D'Haultfœuille (2020),

timator of Callaway and Sant'Anna (2021) and the Extended Two-Way Fixed-Effects method proposed by Wooldridge (2021) and document that our baseline result of a positive and significant treatment effect also holds under these alternative methods.

Our baseline estimate suggests that households residing within 10 km of an SEZ experienced an increase of 0.25 standard deviation of the wealth index relative to the country average after the establishment of the SEZ. The effect diminishes rapidly with distance, both in terms of magnitude and statistical significance, and disappears beyond 20 km. Moving beyond the average effect, we also look at the distributional impact by implementing Quantile Treatment Effect (QTE) estimation at the deciles of the wealth index distribution (Firpo, 2007; Firpo and Pinto, 2016). We find the largest effects close to the middle of the distribution, in particular between the third and sixth deciles. In contrast, the estimates are smaller and turn statistically zero for the lowest wealth deciles, suggesting that SEZ policies have contributed to strengthening Africa's middle class.

To better understand what drives the aggregate wealth increase, we decompose the aggregate wealth measure and look at the components of the wealth index separately. We find that the establishment of SEZs increases the access to utilities such as electricity and improved sanitation facilities which comes from the improvements in infrastructure that accompany the SEZs development. Further, we find that following an SEZ establishment, the consumption of durable goods increases and households improve their housing quality. Looking at educational outcomes, we show that household members are more likely to have at least secondary education and tend to stay longer in education.

The DHS data offer limited opportunities to study the employment channel. Nevertheless, we observe employment outcomes for some household members (all females in reproductive age with children and their male partners) and find that SEZ establishment raises the probability of employment in the last 12 months among males. We also document that working mothers are significantly less likely to work in agriculture.[4] The transition away from agriculture is also present among husbands/partners even though it is not significant at conventional levels. Looking at heterogeneous effects by educational attainment, we observe that the increase in the employment likelihood occurred among males without secondary education. This implies that the type of jobs created by SEZs are predominantly for low-skilled workers. Taken together, these results suggest that SEZs stimulate local economic activity and contribute to a sustainable urbanization trend for nearby households.

Three papers are most closely related to our work. The first is the paper by

Callaway and Sant'Anna (2021), and Wooldridge (2021).

[4]A recent study by Zhao and Qu (2024) also documents a sectoral shift among women to non-agricultural activity following an economic zones establishment in China.

Picarelli (2016), which examines the effect of Export Processing Zones (EPZs) on the level of per capita expenditure in Nicaraguan municipalities. She finds that, on average, the consumption level increased by 12% in the treated municipalities. Second, using household surveys from Cambodia, Brussevich (2024) finds that SEZs increase employment and decrease income inequality at the district level. In contrast to these studies, which use administrative areas as the unit of analysis, we use geolocated household information and assign treatment to DHS clusters, which correspond to a village or urban neighbourhood and are thus more granular than districts or municipalities. This leads to more precise estimates and reduces concerns about measurement error while at the same time allows us to look at households as the unit of analysis. The third closely related work is by Shenoy (2018), who finds that infrastructure and investment subsidies increased the availability of public goods and improved household welfare. In contrast to Shenoy (2018), who looks at one state and a single tax transfer program in India, we examine 10 African countries and all SEZs incentives, which allows us to provide evidence-based policy advice at the aggregate level.

Previous studies on SEZs have primarily used firm-level data to analyze the effects of the policy. Wang (2013) and Lu et al. (2019), for instance, show that the establishment of SEZs in China increases foreign direct investments, productivity, employment and wages of manufacturing firms. The increase in wages is higher than the increase in the local cost of living, generating net benefits for workers. Schminke and Van Biesebroeck (2013) show that preferential regional policies promote exporting activity among manufacturing firms both in terms of volume and the number of destination countries. In India, Görg and Mulyukova (2022) show that the establishment of SEZs does not have any discernible effect on the productivity growth of firms, whereas Alkon (2018) documents that the program did not bring any local socio-economic development. Other related work evaluating place-based tax incentive programs is by Chaurey (2017), Hasan et al. (2021) and Blakeslee et al. (2022) who find that industrial policies significantly increase firm entry and employment.

The literature assessing the impact of SEZs in Africa is scarce and, if anything, predominantly descriptive in nature, using individual SEZs as case studies.[5] Moreover, these studies look at the employment generation or wage effects of SEZs (see, e.g. Glick and Roubaud (2006) for Madagascar and Obeng et al. (2015) for Ghana). On the contrary, we leverage detailed household-level data to explore the average effect of SEZs and how the policy effects vary along the wealth distribution. Our data, moreover, allow us to decompose the aggregate effect and look at the compo-

[5]See, for instance, Farole and Kweka (2011) for a general overview, Farole and Sharp (2017); Thompson (2019); Phiri et al. (2020) for South Africa, Xu and Wang (2020) for Ethiopia and Zambia, Farole and Kweka (2011) for Tanzania, Adunbi (2019) for Nigeria.

nents of the wealth index separately. To the best of our knowledge, this is the first paper to examine the effects of African SEZs from these perspectives.

More broadly, our paper relates to the literature on the effects of place-based policies. Prior research has focused primarily on evaluating spatially targeted policies in developed countries, see, e.g. Glaeser and Gottlieb (2008); Busso et al. (2013); Kline (2010); Neumark and Simpson (2015). Kline and Moretti (2014) find that the Tennessee Valley Authority program increased manufacturing employment and generated agglomeration economies. Neumark and Kolko (2010), on the contrary, find no employment gains following California's enterprise zone program. Ham et al. (2011) show that State Enterprise Zones have a large positive impact on the local labor market. Blouri and Ehrlich (2020) document that regional policies have contributed to welfare gains. While these studies generally suggest that such policies yield improvements in the well-being of the intended beneficiaries, the results cannot be directly extended to developing countries due to the differences in the programs and institutions.

The rest of the paper is organized as follows. Section 2 provides an overview of SEZ policies in Africa, while Section 3 describes the data used in the empirical analysis. Section 4 outlines the estimation framework, and Section 5 presents and discusses the main results. In Section 6, we examine the role of individual wealth components and other potential mechanisms in explaining the wealth effect. Finally, Section 7 concludes.

2 Institutional Background

African countries are relative latecomers in applying SEZ policies. The establishment of SEZs has only spread across the continent in the last two decades. However, by 2022, most countries had adopted active SEZ programs, resulting in approximately 203 operational SEZs and nearly 100 more under construction (Rodríguez-Pose et al., 2022). This notable trend reflects the adoption of SEZs by policymakers to align with the goals of the African Union's Agenda 2063 and the UN Sustainable Development Goal 9, which underscores the role of industrialization in generating employment and elevating living standards.[6]

Two main patterns account for the recent increase in SEZs in Africa. Firstly, countries with established SEZ programs such as Ghana, Egypt, Nigeria and Kenya

[6]Agenda 2063 is a strategic framework that aims to achieve inclusive and sustainable growth, reflecting the Pan-African drive towards unity, self-determination, freedom, progress, and collective prosperity as expressed in the ideals of Pan-Africanism and the African Renaissance. Goals 1 and 4 of the agenda aim to improve the standards of living and promote well-being for all by creating employment opportunities and transforming economies through industrialization. For the UN Sustainable Development Goal 9, see https://sdgs.un.org/goals/goal9.

are actively expanding and diversifying their existing SEZ portfolios. Their goal is to drive structural transformation, enhance participation in Global Value Chains (GVC), and create employment opportunities through established production networks. Secondly, emerging players are establishing new SEZs to attract Foreign Direct Investment (FDI), boost exports, and generate employment, particularly for low-skill labourers (UNCTAD, 2021). These active initiatives highlight the evolving significance of SEZs in shaping the economic landscape of countries in the continent.

The placement of SEZs is a strategic decision. This multifaceted process is influenced by various factors such as the intended purpose, ownership structure, and the economic development level of the host country (UNECA, 2022). SEZs initiated by the state typically align with local development priorities and resource availability, often concentrating in less urban areas with thriving agriculture and natural resource extraction. On the other hand, private SEZs (often in service and manufacturing sectors), proposed by private investors subject to the approval of the state are strategically located in urban and semi-urban areas and near airports and seaports. The strategic positioning serves a dual purpose: to tap into transportation hubs and natural resources, enhancing the appeal to investors, and fostering the agglomeration of firms capable of providing employment opportunities for both urban and rural populations (UNCTAD, 2021). In cases where essential infrastructure is lacking, either the state or private developers take the lead in providing the necessary amenities such as roads, electricity, drainage, and residential accommodations before the construction and commissioning of the SEZ. Notable examples include the Kigali SEZ in Rwanda (studied in Steenbergen and Javorcik (2017)) and the Mombasa SEZ in Kenya.[7] While the location choices for SEZs in some sample countries are not explicitly stated, it is worth noting that political considerations may also influence certain location decisions, apart from economic factors.

While governments or private investors can initiate SEZs, a state entity tends to oversee their progress. This entity can be an independent SEZ authority, a relevant ministry like the Ministry of Industry, or a national Investment Promotion Agency (IPA).[8] These authorities have a range of functions, including approving applications to establish private SEZs and regulating private SEZs. The designated SEZ institutions also play a role in developing, authorising firm operations and managing state-owned SEZs (Farole and Moberg, 2017).

Aligned with the conventional SEZ incentive structure, African SEZs offer various forms of fiscal benefits such as reductions or exemptions from corporate and local taxes for a limited duration, alongside waivers of import duties on machinery and

[7]The information is from https://openjicareport.jica.go.jp/pdf/12338448.pdf. Accessed on: 22.01.2024.

[8]One example of an independent SEZ authority is the Ghanaian Free Zones Authority, while an example of an IPA is the Ethiopian Investment Commission.

production inputs and outputs (UNCTAD, 2019). In some countries, fiscal incentives have both temporal and spatial dimensions. They are linked to specific locations to encourage investments in less developed and rural regions (Ethiopian Investment Commission, 2017). Similarly, some countries also offer tax deductions for skill development programs sponsored by SEZ-based firms that target local workers, hire local workers, use local content or meet designated export targets. Additionally, few countries provide one-stop service centres within the SEZs to deliver government services to the SEZs firms (UNCTAD, 2021).

The majority of the SEZs in our study are oriented towards industrial activities, particularly manufacturing and assembling but also agro-processing and natural resource-intensive activities (Appendix Table A2). SEZs specialized solely in services constitute only slightly over 10% of our sample SEZs, while a significant number of SEZs are engaged in mixed (i.e. both industrial and service) activities. The service sector SEZs often function as logistics hubs providing commercial and warehousing services near transportation hubs. Overall, the sector distribution of the SEZs points to a lack of specialization in most African zones.

3 Data

One of the main challenges in evaluating the impact of SEZs on household wealth in developing countries, particularly in Africa, is the limited availability of data on households located near the zones. To overcome this limitation, we employ a novel approach by geocoding SEZ locations and spatially joining them with georeferenced household data, which to our knowledge has not been used in the literature on place-based policies before.

3.1 Households

We derive our household data from the Demographic and Health Surveys (DHS) Program administered by the United States Agency for International Development (USAID). The DHS is a comprehensive and nationally representative survey that collects data on various aspects of population, health, nutrition, demographics, and socioeconomic characteristics in developing countries. This survey is conducted periodically, typically every five years, and intends to provide standardized and comparable information across countries. The data is used widely by researchers, policymakers, and international organizations to inform policy decisions and guide intervention strategies.[9]

[9]For a detailed description of the data visit: https://dhsprogram.com/Methodology/Survey-Types/DHS.cfm

The selection of countries for our analysis is primarily guided by data availability. We begin by leveraging our SEZs data (discussed in the next section) to identify all African countries with at least one active SEZ. Subsequently, we narrow our focus to countries that have geocoded DHS with information on household asset wealth both before and after the establishment of at least one of their SEZs. We collect data from both standard DHS and Interim DHS (I-DHS) rounds. Additionally, we incorporate data from the Malaria Indicator Surveys (MIS) and the AIDS Indicator Surveys (AIS) of the DHS Program, provided they offer information on households' wealth and georeferenced location. Although the different survey types differ in their topical focus and sample size (with the Standard DHS being the largest), they are all based on a representative sample of a country's population.

Our final sample comprises 10 African countries, spanning a total of 57 DHS survey rounds. Table 1 provides a comprehensive list of the countries in our sample and the corresponding periods covered by our data. Except for Mozambique and Zambia, countries in our sample have more than five rounds of DHS, affording us extensive temporal coverage to analyze the impact of SEZs on household wealth.

Table 1: DHS Survey Rounds by Country.

Country	Survey rounds
Egypt	1995, 2000, 2003 (I-DHS), 2005, 2008, 2014
Ethiopia	2000, 2005, 2011, 2016, 2019 (I-DHS)
Ghana	1993, 1998, 2003, 2008, 2014, 2016 (MIS), 2019 (MIS)
Kenya	2003, 2008-09, 2014, 2015 (MIS), 2020 (MIS)
Mali	1995-96, 2001, 2006, 2012-13, 2015 (MIS), 2018
Mozambique	2009, 2011, 2015, 2018 (MIS)
Nigeria	1990, 2003, 2008, 2010 (MIS), 2013, 2015 (MIS), 2018
Tanzania	1999, 2003-04 (AIS), 2007-08 (AIS), 2010, 2011-2012 (AIS), 2015-16, 2017 (MIS)
Uganda	2000-01, 2006, 2009 (MIS), 2011, 2014-15 (MIS), 2016, 2018-19 (MIS)
Zambia	2007, 2013-14, 2018

Note: Standard DHS surveys unless otherwise noted. I-DHS: Interim DHS, MIS: Malaria Indicator Survey, AIS: AIDS Indicator Survey. If a survey was conducted in two consecutive years, we assign the data to the first year, unless more than two thirds of the interviews took place in the second year, in which case we assign the data to the second year.

Given the survey's primary focus on population, health and nutrition outcomes, there are limited socio-economic indicators at the household level, such as employment, wages, or consumption expenditure. Consequently, we rely primarily on the household asset wealth index (referred to as the wealth index) to gauge the economic status of households. The DHS wealth index has been used extensively to measure household economic well-being in the development economics literature (e.g., von der Goltz and Barnwal, 2019; Lowes and Montero, 2021) and is particularly valuable in countries with no reliable income or expenditure data. It serves as a composite measure depicting the cumulative living standards of a household, as it is constructed using Principal Component Analysis based on household responses on ownership of selected assets and access to services.[10] The DHS wealth index is standardized by design so that it has a mean value of zero and a standard deviation of one for each survey. It therefore shows the household's wealth position relative to the average of the respective country in the survey year.[11]

3.2 SEZs

In constructing our SEZs dataset, we draw information from two primary sources; the Open Zone Map and the Africa Economic Zones Organisation (AEZO), which we complement with our independent data collection.[12] Our list of SEZs covers a wide range of zone types, also including industrial parks, export processing zones, technology parks, etc., all of which are grouped under the umbrella term SEZ. Nevertheless, we exclude single-company zones from the analysis.[13]

We gather information on the location, management type, land size and operational status of SEZs from the Open Zone Map and the AEZO. Due to inconsistencies in data related to the establishment dates of some SEZs from these sources, we manually collect the date of establishment from various web-based sources, including the official websites of the SEZs and country-level institutions responsible for managing the SEZs. Similarly, we collect information on the sectoral specialization of individual SEZs and define four broad categories: Industry, Services, Mixed activities, and Not identified for those SEZs whose sectoral information is not available.[14]

The distribution of SEZs according to the type of management (private, public, private-public partnership), activity and land area size is shown in Appendix Table A2. The relative majority of SEZs are publicly managed, specialized in industrial activities and medium in land size, i.e., between 100 and 1000 hectares. The number

[10] These services and assets include the source of drinking water, the type and privacy level of toilet facilities, the material composition of the main floor, walls, and roof, and type of windows in the house. Additionally, it incorporates the type of cooking fuel, household services and possessions (such as electricity, TV, radio, watch, and vehicles), agricultural land size and type of ownership, the number of owned animals, and the presence of a bank account. For more on the details of the wealth index construction, see https://dhsprogram.com/topics/wealth-index/.

[11] For a visual representation of the wealth index score distribution among sample households in the first and last Demographic and Health Surveys (DHS) conducted in the sample countries, please refer to Appendix Figure A1.

[12] Open Zone Map provides a comprehensive mapping of SEZs worldwide. The Adrianople Group maintains it and can be accessed at: https://www.openzonemap.com/. The AEZO Atlas is available upon subscription at: https://www.africaeconomiczones.com/aezo-atlas/.

[13] Single-firm zones differ from the zones we cover as they do not refer to a specific geographical area. They also tend to be small and employ relatively few workers (UNCTAD, 2021).

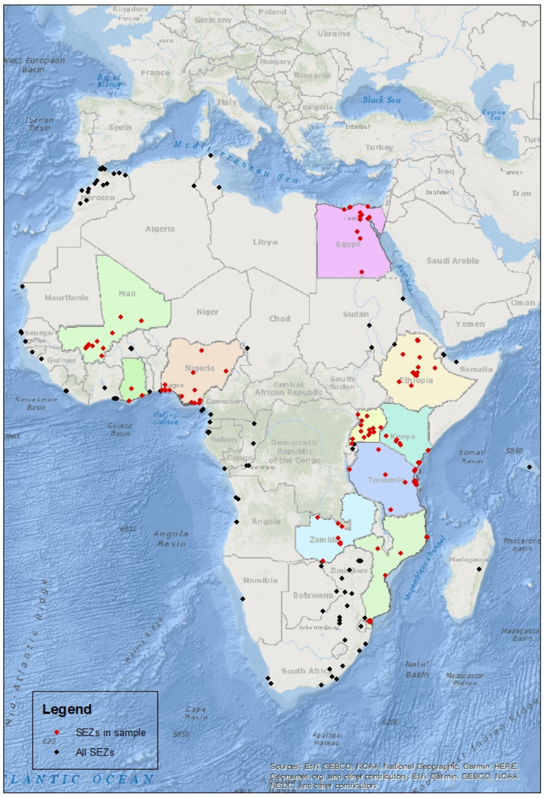
[14] Industry includes manufacturing, agro-processing and energy. Services include transport, logistics, R&D, ICT, medical and financial services.

of SEZs that are large in land size or specialized only in services is relatively low.

SEZs are important players in the local economies. Although comprehensive data on the economic importance of SEZs in Africa are not available, we have information on the number of firms and jobs for 15 of the 51 SEZs in our estimation sample. The 15 SEZs, which are all either small or medium-sized in terms of land area, host an average of 42 businesses and generate an average of 12,300 jobs.[15] This indicates that SEZs represent a considerable economic force.

Figure 1 illustrates the geographical distribution of all SEZs in Africa for which we have location information. Dark dots on the map represent SEZs in countries not included in our sample, while red dots indicate SEZs in our sample countries, which are included in the empirical analysis. The excluded SEZs are either non-operational, located in countries or regions without DHS or were established prior to the first DHS of its country of location. The number of SEZs in our sample countries is notably larger compared to the excluded ones, ensuring a comprehensive representation of SEZs across the continent. The substantial and relatively balanced sample sizes of SEZs enable our analysis to effectively capture the economic implications of SEZs on household asset wealth throughout Africa.

Figure 1: Map of all SEZs in Africa.

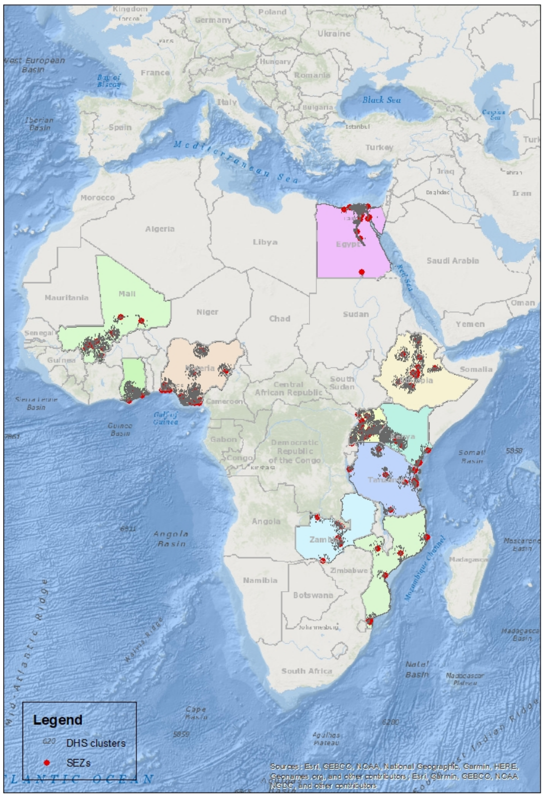


[15]The authors would like to thank the AEZO for providing access to this information.

3.3 Combining DHS and SEZ Data

We spatially join the household and SEZ data by utilizing the GPS coordinates of both the SEZs and DHS clusters. Figure 2 visually demonstrates that the DHS clusters in our sample countries align closely with the locations of SEZs. Since the DHS is a nationally representative survey, this spatial overlap indicates that the SEZs in our sample countries are situated in regions where most of the surveyed population live. As a result, a significant number of households are exposed to the potential impact of SEZs, enhancing the relevance of our analysis in examining the effects of SEZs on these households.

Figure 2: The Location of DHS Clusters and SEZs in our Sample Countries.



To construct our estimation sample, we adopt the following methodology. Initially, we define the inner area of each SEZ by drawing a circle around the centroid of the SEZ with a radius proportional to the SEZ official area size. Then, we create distance bands by incrementally extending the radius by 10 km.[16] By doing so, we establish non-overlapping distance bands around each SEZ and assign households to these bands based on the geographical coordinates of the survey clusters (villages or urban neighbourhoods) where the households are located.[17] In cases where a

[16]This method takes into account the differences in the size of the SEZ areas. SEZs with larger inner areas can reach greater distances.

[17]For confidentiality, the DHS project randomly displaces the geocoordinates of the survey clus-

household's neighbourhood is within the vicinity of multiple SEZs, the household is assigned to the SEZ that was established first. This ensures that the surrounding areas of different SEZs do not overlap and that households are treated as soon as the first SEZ is established in their neighbourhood.

In our baseline analysis, we include distance bands up to a maximum of 30 km and differentiate between households living inside or not farther than 10 km from the boundary of the SEZ inner area (within 10 km), households living 10 to 20 km and households living 20 to 30 km from the boundary of the SEZ inner area. The rationale for not going beyond 30 km is to approximate commuting zones within which households are likely to be affected by the presence of SEZs. This approach aligns with the existing literature demonstrating that the effect of place-based policies rapidly decays with distance (Frick et al., 2019). Further, in a robustness check where the maximum distance is extended to 100 km, we show that further distance bands are not relevant.

Our final sample comprises repeated cross-sections of households observed within the 30-km-radius circles surrounding each SEZ established from 1990 to 2020. SEZs established before the first wave of the country's DHS, i.e., outside the sample period, and households residing near them are completely excluded from the analysis. The estimation sample encompasses a total of approximately 90,000 household-year observations in three non-overlapping distance bands around 51 unique SEZs.[18]

3.4 Characteristics of SEZ Locations

SEZs are not randomly located in space, and therefore their locations have distinctive characteristics even before the establishment of the SEZs. Available information suggests that African SEZs tend to be located in populous, urbanized places. About 80% of the SEZs in our sample are no more than 10 km from a populous city and roughly a third of them are located near a major airport or seaport (Appendix Figure A2).

This section examines the characteristics of SEZ locations in terms of their pre-treatment level of development and urbanisation. Table 2 reports pre-treatment means and standard deviations of the household wealth index and three variables capturing urbanisation in DHS survey clusters falling into the various distance bands. Urban residence is a binary variable, which is 1 for urban and 0 for rural survey clusters. The built-up index quantifies the presence of built structures in a survey

ters by up to 2 km for urban clusters, up to 5 km for 99% of rural clusters and up to 10 km for a randomly-selected 1% of rural clusters (`https://dhsprogram.com/pubs/pdf/SAR7/SAR7.pdf`, accessed on 07.09.2023). This geographic masking introduces classical measurement error and should not bias our estimation results.

[18]None of the SEZ surrounding areas in our baseline sample happen to extend to neighbouring countries. This does not, however, apply to samples extending beyond 30 km.

cluster on a scale of 0 to 1 and refers to the year 1990. Population density is the number of persons per square kilometre in a survey cluster, referring to the year 2000.[19]

Table 2: Pre-treatment Location Characteristics of SEZs.

	(within 10 km)			(10-20 km)			(20-30 km)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
All SEZ Locations									
Wealth index	20706	0.78	1.09	10663	-0.05	0.91	12773	-0.14	0.83
Urban residence	20706	0.76	0.43	10663	0.29	0.45	12773	0.21	0.41
Built-up presence index	20441	0.21	0.24	10368	0.07	0.17	12447	0.09	0.25
Log population density	20531	7.05	1.66	10628	6.00	1.30	12738	5.69	1.43
Early SEZ Locations (Establishment before 2015)									
Wealth index	5113	1.10	1.28	1989	0.50	1.20	3421	0.34	1.08
Urban residence	5113	0.83	0.37	1989	0.54	0.50	3421	0.40	0.49
Built-up presence index	5113	0.42	0.33	1989	0.24	0.28	3421	0.28	0.40
Log population density	5113	7.25	1.83	1989	6.44	1.84	3421	6.02	2.01
Late SEZ Locations (Establishment in 2015 or later)									
Wealth index	15593	0.68	1.00	8674	-0.18	0.78	9352	-0.31	0.63
Urban residence	15593	0.74	0.44	8674	0.23	0.42	9352	0.14	0.35
Built-up presence index	15328	0.14	0.15	8379	0.03	0.09	9026	0.02	0.06
Log population density	15418	6.98	1.60	8639	5.90	1.12	9317	5.57	1.12

Note: Summary statistics for pre-treatment household-year observations. The wealth index is specific to households, the other three indicators are specific to DHS survey clusters. Urban residence is a binary variable taking value 1 for urban and 0 for rural locations. The built-up presence index ranges on a scale of 0 to 1, with a higher value indicating more built structures. Population density is expressed as log number of persons per square kilometres. The latter two variables refer to a single year, 1990 and 2000 respectively. 1990 is a pre-treatment year for all SEZs, 2000 for all but 5 SEZs in our sample. With a cut-off year of 2015, there are 22 early and 29 late SEZs in our estimation sample.

The upper panel of Table 2 shows that locations chosen to host SEZs and their 10 km immediate neighborhoods tend to be richer, more urbanised and more densely populated than the more distant neighborhood already before the establishment of the SEZs. The mean of the wealth index of households living within 10 km of SEZs is 0.78, indicating that their wealth is 0.78 standard deviation higher than the country average. In contrast, households in the 10-20 km band are about the same affluent (-0.05), while households in the 20-30 km band are poorer (-0.14) than the country average. Similar decreasing patterns are observed for the degree of urbanisation and population density. The SEZs are thus located close to urban centres.

The middle and lower panels of Table 2 illustrate how the aforementioned location patterns vary by the date of establishment. We distinguish between "early" SEZs, defined as SEZs established before 2015, and "late" SEZs established in 2015 or later. We observed that SEZs set up earlier are assigned to larger urban areas than SEZs established later. The neighborhoods of early SEZs exhibit a higher built-up presence and population density, which decline less sharply with distance from the SEZs. This aligns with the observation that early SEZs are, on average, closer to major airports than late SEZs (Appendix Table A3). The above charac-

[19]The urban residence variable is sourced from the DHS household surveys. The built-up index and population density are taken from the DHS Geospatial Covariate Dataset, https://spatialdata.dhsprogram.com/covariates/.

teristic is robust to using other cut-off years than 2015 to classify SEZs into early and late groups. Moreover, the pattern that later SEZs are systematically placed in less favourable locations is in line with the literature (e.g., Lu et al., 2019).

Guided by this descriptive evidence, we follow an identification strategy that compares households within the same distance bands of SEZs while taking into account differences in the initial characteristics of SEZ locations.

4 Empirical Framework

We define household exposure to SEZs based on the geographical proximity to an active SEZ. Since our sample consists only of SEZs and their surrounding areas, all locations (and their households) are eventually exposed to an SEZ, albeit at different points in time. We exploit this time variation in SEZ establishment to estimate the wealth effect of SEZs and follow a staggered treatment difference-in-differences approach.

Our empirical model describes the relationship between household wealth and SEZs as follows.

$$W_{hzct} = \beta \text{SEZ}_{zt} + \gamma X_{hzct} + \alpha_z + \alpha_{ct} + \varepsilon_{hzct} \quad (1)$$

The wealth index of household h living in the proximity of SEZ z in country c and observed in year t depends on whether the SEZ has already been established in t, which is captured by the time-varying binary treatment variable SEZ_{zt}. The treatment variable switches from 0 to 1 in the year when the SEZ starts to operate and remains 1 throughout the sample period.

In addition, Equation (1) controls for a set of household-specific variables, X_{hzct}, as well as SEZ-specific and country-year specific fixed effects, α_z and α_{ct}, respectively. The household-specific variables are indicators of basic characteristics of households that capture the changing composition of households between surveys and across distance bands. They include binary variables for above-median household size, above-median age of household head and female household head. Summary statistics of the household variables are reported in Appendix Table A4.

The SEZ-specific fixed effects absorb differences between SEZ locations in their initial characteristics. As shown in Section 3.4, SEZs established later are systematically placed in poorer locations than SEZs established earlier. Because our treatment variable varies by SEZ and year, the inclusion of SEZ fixed effect means that the treatment effect is identified from the time variation in the relative wealth position of households (relative to their respective country average). Specifically, our coefficient of interest, β, captures how the relative wealth position of households living close to SEZ changes after the SEZ opens, compared to similar households living close to SEZ that have not yet been opened.

Equation (1) also controls for country-year fixed effects, which partial out country-specific trends in the relative wealth positions of the sample households as well as any effects specific to the survey rounds. Although the wealth index as provided by the DHS program is purged of country trends due to standardization, the households included in our sample may exhibit trends in their relative wealth position independent of SEZ, justifying the inclusion of country-specific year effects. However, we find that our results are robust also when we control only for common year effects.[20]

We estimate Equation (1) separately for each distance band with Ordinary Least Squares (OLS) and cluster standard errors at the level of the SEZ.[21] We follow von der Goltz and Barnwal (2019) and estimate without DHS sampling weights, but we show that the results are robust when the weights are applied.

Our empirical approach addresses the challenge of endogenous treatment assignment in two ways. First, our estimation only considers locations that eventually become treated. Specifically, it compares the wealth trajectories of earlier versus later-treated households living in the same distance band (within 10 km, between 10-20 km or between 20-30 km) around their respective SEZ. Second, the potential systematic differences between earlier and later treated locations (and their households) are addressed by the inclusion of SEZ-specific fixed effects, which absorb any time-constant differences between SEZ locations.

However, our estimates may still be biased if, in the absence of SEZ, household wealth is trending differently in early than in late-treated locations.[22] SEZ locations with varying growth dynamics may also vary in their responsiveness to the policy. We provide three types of robustness checks to demonstrate that our finding is robust to the concern of such systematic trend differentials. First, we show that our baseline results are robust to the inclusion of SEZ-specific linear trends in the estimation. Second, we augment Equation (1) to allow for differential trends based on the initial level of development of the SEZ locations. Third, we run regressions with placebo treatment dates by moving the establishment dates of the SEZs in the sample back a specified number of years (5 or 10) to times when there were no active SEZs at the sites. Statistically zero β estimates with such placebo treatment dates would reinforce the robustness of our findings.

Our empirical model corresponds to a two-way fixed-effects (TWFE) model at

[20] These results are available upon request.

[21] To minimize the impact of measurement error, we exclude from the estimation sample survey clusters with less than 15 households. Further, we winsorize the lower and upper 1% of the wealth index distribution in every survey to eliminate potential outliers in our dependent variable.

[22] Differential trends that purely arise from diverging country-specific trends are absorbed by country-specific year effects.

the level of the SEZ, even though the analysis is conducted at the household level. An emerging literature subjects the TWFE model in staggered treatment settings under scrutiny and argues that, unless the treatment effect is homogeneous across time and units, the estimated average treatment effect is biased (Roth et al., 2023).[23] Several alternative estimation methods have been proposed to account for this problem, but only few can accommodate repeated cross-sectional data. A further challenge in applying some of these methods in our setting is the sparsity of the DHS data across countries and over time. We, therefore, opt to perform our baseline estimation with OLS, which we then complement with robustness checks using the estimation method of Callaway and Sant'Anna (2021) and the Extended TWFE estimation proposed by Wooldridge (2021).

Besides the average effect of the policy, we are also interested in the effects along the wealth distribution and examine how household wealth at different quantiles of the local wealth distribution changes following the establishment of an SEZ. Relying on empirical model (1), we perform the Quantile Treatment Effect (QTE) estimation method proposed by Firpo (2007) and Firpo and Pinto (2016) to estimate the treatment effect at each decile of the wealth distribution.[24] There are two caveats concerning QTE estimation in the current context. Firstly, it only allows us to measure changes in the wealth distribution at specific deciles but not changes in the wealth position of individual households at these deciles. Secondly, the results refer to the *local* distribution, i.e. the distribution of wealth in the specific distance band of the SEZs, and not to the wealth distribution of the country as a whole. Nevertheless, the analysis can be of policy significance because it provides insight into how broadly the benefits of SEZs are distributed across the local population and what types of households benefit the most.

5 Results

5.1 Main Results

Results from estimating Equation (1) for the mutually exclusive distance bands within 10 km, 10-20 km, and 20-30 km are presented in Table 3. The estimates suggest that the overall impact of SEZ policy on the relative wealth position of

[23]In a staggered treatment setting, the TWFE estimand is a weighted average of the different two-by-two difference-in-differences estimates comparing the individual groups treated at different times. The source of the identification issue is that some of these comparisons are incorrect, such as using an earlier-treated group as a control for a later-treated group. See, among others, Goodman-Bacon (2021), de Chaisemartin and D'Haultfœuille (2020), Callaway and Sant'Anna (2021), and Wooldridge (2021).

[24]We use the Stata function `rifhdreg`, which is a two-step estimation procedure relying on recentered influence functions and which allows for high-dimensional fixed effects (Rios-Avila, 2020).

households is positive. Following the establishment of an SEZ, the wealth of households living within 10 km of an SEZ rises by 0.25 standard deviation of the wealth index (significant at 1%) relative to the country's average. Converted into real terms, this increase in relative wealth is substantial. It is roughly equivalent, ceteris paribus, to owning a computer in Nigeria in 2008 or having a finished floor made of ceramic tiles in Kenya in 2014.[25] The wealth gain is also sizeable when expressed in monetary terms: in 2008, the average price of a personal computer was USD 692, which was about 60% of Nigeria's annual per-capita gross national income (GNI) in that year.[26]

The estimated effect decays as the household's distance to the SEZ increases, with the 10-20 km band estimate still positive (0.15 standard deviation) but only marginally significant, while the 20-30 km band estimate is statistically zero. The effect of SEZs on relative wealth is therefore limited to the immediate neighbourhood of the SEZ locations. We find no clear evidence of treatment effects, either positive or negative, at distances beyond 10 km, even when we extend our analysis to distances up to 120 km from the SEZ (Appendix Figure A3).

Table 3: Baseline Results for Three Distance Bands Around SEZs.

Depvar: Wealth index	(1) (within 10km)	(2) (10-20km)	(3) (20-30km)
SEZ	0.2493***	0.1464*	-0.1293
	(0.0753)	(0.0757)	(0.1190)
N	39,537	24,452	24,764
Number of clusters	51	47	49
R-squared	0.267	0.431	0.404

Note: Results from estimating Equation (1) with Ordinary Least Squares on the repeated cross-section of households in various distance bands around SEZs. All regressions include SEZ fixed-effect, country-year dummies and household-level control variables for the household size and the age and gender of the household head. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

The main results are qualitatively unchanged when we estimate with survey sampling weights (rescaled to account for the modified sample size), as presented in

[25]These comparisons are drawn from detailed information on the construction of the wealth index in each DHS survey, provided by the DHS project at https://dhsprogram.com/topics/wealth-index/Wealth-Index-Construction.cfm. Accessed on 24.08.2023

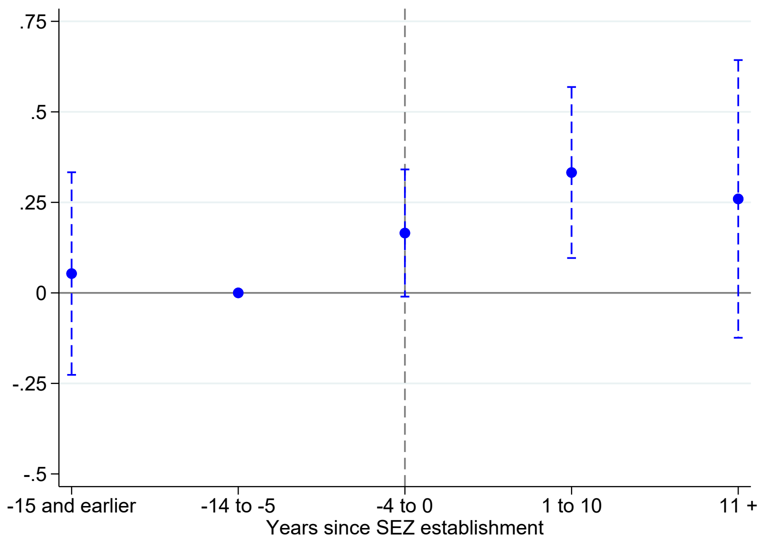
[26]Source of information on the average selling price of desktop personal computers worldwide is Statista, https://www.statista.com/statistics/203759/average-selling-price-of-desktop-pcs-worldwide/, accessed on 25.01.2024. The Nigerian GNI per capita was USD 1150 in 2008, as reported by the Africa Development Indicators of the World Bank (accessed on 25.01.2024).

Appendix Table A7. The estimate for the within 10 km band is very similar to the unweighted estimate (showing an increase of 0.26 standard deviation, significant at the 1% level). However, the distance decay is more pronounced, as the estimate falls to zero beyond 10 km.

These baseline results are consistent with the findings of von der Goltz and Barnwal (2019), who in a similar way estimate the local wealth effects of living near an operating mine using DHS household data in 44 developing countries. Their estimate for households living within 5 km of mines is 0.26 standard deviations of the wealth index (significant at the 1% level) and is also characterized by a sharp distance decay.

The broad time pattern of the treatment effect is depicted on the event study graphs in Figure 3 for the within 10 km distance band and in Appendix Figure A4 for further distance bands. Due to the sparse nature of our data, we do not estimate coefficients for single years, but for periods of multiple years preceding and following treatment. This ensures a reasonably large number of independent events behind each estimate. The treatment period is chosen to consist of the year of SEZ opening and the four preceding years, while the other event periods are 10 years long. We choose the period before the treatment period as the benchmark and set its coefficient to zero.

Figure 3: Event Study Graph for Households within 10 km



Note: The figure plots OLS estimates with 95% confidence intervals on the sample of households living within the 10 km distance band. The coefficient for the period preceding the period of SEZ establishment is set to zero. Estimation with binned endpoints.

Focusing on the within 10 km band, no statistically significant pre-treatment deviation in wealth can be observed at conventional significance levels, i.e., no pre-trends can be detected. Nevertheless, the relatively high estimate for the treatment period (-4 to 0 years) may suggest the presence of some early effects, probably due to construction works in the SEZs. After treatment, the wealth level of households increases significantly relative to the reference period, at a similar magnitude to the average estimate in Table 3. However, the estimate decreases slightly and loses statistical significance beyond a time horizon of 10 years, suggesting that the relative wealth gain of SEZ locations weakens in the longer horizon.

5.2 Robustness

In this section, we perform a series of robustness checks to demonstrate that our finding of a positive treatment effect within 10 km of the SEZs is robust to the identification issues discussed in Section 4.

Controlling for Differential Trends. We check whether our results are driven by differential trends that are specific to SEZ locations in two ways. Firstly, we introduce SEZ-specific linear trends in Equation (1). The trends control for the possibility that SEZ locations do not only differ in their initial level of development but also in their long-term growth paths. Secondly, we allow the treatment effect to vary with a location's initial level of development to allow for the likelihood that local economies may respond differently to the SEZ policy. We capture initial development using the built-up presence index from 1990, the first year of our sample. Since the index varies by survey cluster, we take its population-weighted average value in each SEZ-specific distance band. Then, we include it in interaction with the treatment variable in Equation (1) as an additional control variable. The estimated results in Columns (1) and (2) of Table 4 indicate that our baseline estimate remains robust to the alternative model specifications.

CS and ETWFE Estimations. To illustrate that our results are robust to recent criticism of the TWFE estimation with staggered treatment, we implement the Callaway-Sant'Anna (CS) and the Extended Two-Way Fixed-Effects (ETWFE) estimation methods. The two methods overcome the shortcomings of the TWFE estimation under effect heterogeneity in two very different ways. The CS method computes every valid two-by-two DiD estimate between cohort groups and then aggregates them to obtain a single estimate for the average treatment effect on the treated (ATT), using only comparison groups that are not yet treated and thus avoiding incorrect comparisons. In contrast, the ETWFE estimation method, proposed by Wooldridge (2021), is a regression-based method, which accounts for effect heterogeneities by cohort and time by including a full set of dummies for all possible

Table 4: Robustness Results for Within 10 km.

Depvar: Wealth index	SEZ-specific time trend (1)	Built index 1990 × SEZ (2)	Callaway-Sant'Anna (3)	Extended TWFE (4)	Placebo Treatment Date -5 years (5)	-10 years (6)
SEZ	0.2098**	0.3842***	0.8132**	0.1776**	0.2637	-0.1484
	(0.0874)	(0.0777)	(0.3186)	(0.0708)	(0.1586)	(0.1628)
N	39,537	39,537	21,944	39,537	19,908	16,294
Number of clusters	51	51	51	51	43	33
R-squared	0.277	0.267	.	0.221	0.307	0.294

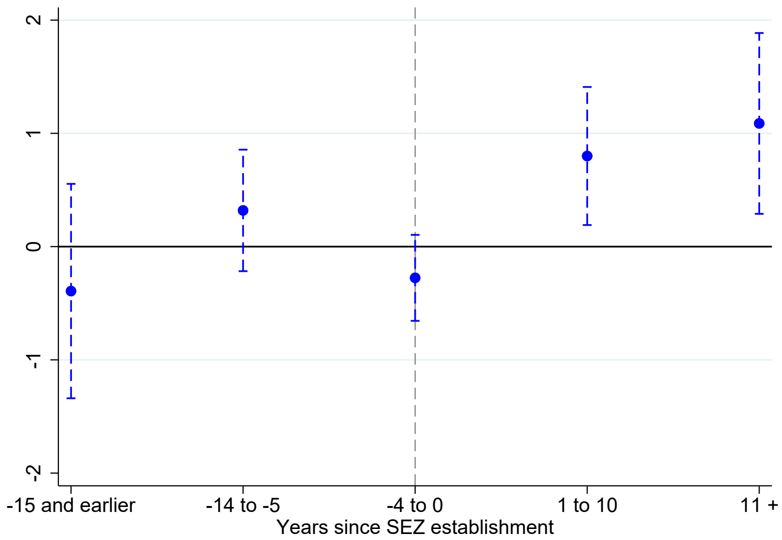
Note: Column (1): SEZ-specific linear time trend included in Eq. (1). Column (2): Interaction of treatment variable with the level of development of the distance band in 1990 included in Eq. (1). Column (3): Callaway and Sant'Anna estimation using the doubly robust DiD estimator based on stabilized inverse probability weighting (Sant'Anna and Zhao, 2020) and with short pre-treatment gaps. Column (4): Extended Two-Way Fixed-Effects (ETWFE) estimator proposed by Wooldridge (2021). Columns (5)-(6): Results from regression (1) with placebo treatment dates backdated by 5 or 10 years. The placebo estimation samples exclude observations following the true dates of establishment. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

interactions between cohort groups and post-treatment periods.[27] Columns (3) and (4) of Table 4 present the ATT estimates, while we display event study estimates with the CS method in Figure 4. Our baseline finding of a positive and statistically significant treatment effect within 10 km of SEZs remains robust to applying the alternative estimation methods. Both estimates are positive and significant at 5% level and, considering the estimated standard errors, do not differ statistically from the baseline estimate. The CS event study graph also shows similar temporal patterns as the baseline TWFE event study in Figure 3, albeit with no decrease in the treatment effect in the long run. Nevertheless, the generally very large CS standard error estimates (more than four times the regression-based estimates) warrant caution in the interpretation of the CS results.

Placebo Treatment Dates. In a further robustness exercise, we estimate the baseline model with placebo dates of SEZ establishment, pretending that all SEZs in our sample opened earlier than they did. The aim is to check whether there is a treatment effect in the years between the placebo and actual treatment dates, i.e. during a period when there are no active SEZs in the location in question. Observations after the true dates are excluded from the placebo estimation samples, which naturally leads to smaller sample sizes. The estimates are presented in Columns (5) and (6) of Table 4 for placebo dates that are 5 and 10 years ahead of the true dates, respectively. The placebo estimates are statistically zero in both cases, with relatively large standard errors. The point estimate is similar in magnitude to the

[27]We implement the above estimations with the user-written `csdid` and `jwdid` commands in Stata created by Fernando Rios-Avila, Pedro H. C. Sant'Anna and Brantly Callaway and Fernando Rios-Avila, respectively.

Figure 4: Event Study Graph for Households Within 10 km, Callaway and Sant'Anna Estimation.



Note: The figure plots Callaway and Sant'Anna (CS) DiD estimates with 95% confidence intervals on the sample of households living in the within 10 km distance band. The estimation applies the doubly robust DiD estimator based on stabilized inverse probability weighting (Sant'Anna and Zhao, 2020) and short pre-treatment gaps. Estimation with binned endpoints.

baseline estimate (although not significant) when the treatment dates are backdated by only 5 years and becomes negative and insignificant for a 10-year backdating. The estimate for the 5-year backdating could hint at the possibility of SEZs having some impact on the local economy already during the construction phase.

Overall, the placebo exercise suggests that our baseline result of a positive wealth effect is attributable to the establishment of SEZs and not due to systematic pre-treatment differences between earlier and later-treated households.

5.3 Heterogeneity

We explore possible effect heterogeneities with respect to household migration status and SEZ characteristics in this section. To achieve this, we estimate interacted versions of Equation (1), where the treatment indicator and the household-specific covariates are interacted with a heterogeneity variable of interest.

Migration Status of Households. The estimated wealth effect could be driven by population migration. Wealthier and better-educated households might be attracted to SEZ neighbourhoods after treatment, a phenomenon demonstrated in place-based policies by some studies (Reynolds and Rohlin, 2015; Chaurey et al., 2023). Such a compositional shift toward a more affluent population can result in positive treatment effect estimates on repeated cross-sectional data. Moreover, the new residents may fill the jobs created by the SEZs and thus limit the economic opportunities for natives – a possibility of potentially great policy importance.

To assess whether native households also benefit from the SEZs or if the positive baseline estimate is a product of a compositional change, we estimate heterogeneous treatment effects by the observed migration status of households. While the DHS database does not contain comprehensive information on migration flows, some of the individual surveys have a question about the previous migration experience of the household members. Specifically, interviewed females (aged 15-49) are asked how long they have lived continuously in their current place of residence. We define a household as "never-mover" if all its interviewed female members answered "always" to the above question.[28] Further, among households with some migration background, we identify households with recent migration history if all female members reported to have lived in their current place of residence for less than 5 years.

The sub-sample in which migration information is observed is considerably smaller in size than the baseline sample, but it covers most of the SEZs (46 out of 51) and is roughly similar to the baseline sample in terms of key household characteristics (Table A4). Of the households whose migration status is observed, close to 40% are never-movers and a further 20% are recent immigrants. Households within 10 km of SEZs differ in some key characteristics depending on their migration status (Appendix Table A5). Households that have moved there only recently are on average smaller and have younger and more educated household heads than households that have lived there for longer. Recent immigrants have similar wealth levels as other households with a migration background, but tend to be wealthier than never-mover households.

We categorize households into four groups in our estimation sample – never-movers, recent migrants, other migrants, and households whose migration status is unknown – and estimate an interacted model, with other migrants as the base category. Results in Table 5 suggest that never-mover households benefit in terms of wealth increase at least as much from the SEZs as households with migration background. The estimates for the interaction of the treatment variable with the never-mover status, capturing the differential impact on never-movers relative to (non-recent) migrants, are statistically zero in all three distance bands. The estimate for the differential impact on recent migrants compared to other migrants is also not significantly different from zero in any of the distance bands. At the same time, the relatively large negative point estimate within 10 km of SEZs suggests that the relative wealth position of this group improves the least with the establishment of

[28]This definition of never-mover is conservative, considering it is based on the entire migration history, not just post-SEZ establishment.

SEZs. Overall, these findings provide suggestive evidence against the possibility that our results are driven by the residential sorting of more educated and wealthier households in SEZ neighbourhoods.[29]

Table 5: Results by Households' Migration Status.

Depvar: Wealth index	(1) (within 10km)	(2) (10-20km)	(3) (20-30km)
By never-mover status (base: Other migrant)			
SEZ	0.3042***	0.0504	-0.1150
	(0.0980)	(0.0990)	(0.0975)
SEZ × Never-mover	0.0597	0.1416	-0.0189
	(0.0847)	(0.0853)	(0.0412)
SEZ × Recent migrant	-0.1299	0.0238	-0.0288
	(0.0954)	(0.1145)	(0.0867)
SEZ × Unknown	-0.0846	0.1217*	-0.0146
	(0.0854)	(0.0644)	(0.0605)
N	39,537	24,452	24,764
Number of clusters	51	47	49
R-squared	0.269	0.432	0.406

Note: Estimation results from a version of Equation (1), where the SEZ dummy and all household-level control variables are interacted with a categorical variable for the migration status of households. Recent migrants have lived in their current place of residence for less than 5 years as of the year of the DHS survey. All regressions include SEZ fixed-effects, country-year dummies and household-level control variables. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

SEZ Characteristics. A question of considerable policy interest is determining which types of zones generate the most significant household wealth growth. SEZs differ in various ways, including their size, age, type of activity, form of management, or locational features. We explore effect heterogeneities along these dimensions using the baseline sample and the interacted version of Equation (1).

We consider the following categorical heterogeneity variables: the level of development of the host country, management type of SEZ, activity of SEZ, land size, age of SEZ, and distance to major airports and seaports. Host countries are classified into low-income (Mozambique, Mali, Uganda, Ethiopia) or lower-middle-income groups (Egypt, Ghana, Kenya, Nigeria, Zambia, Tanzania) based on their level of development. Management type can be Private, Public or Public-private partnership. Activity is classified into Industry, Services, Mixed activity and Not identified, where the latter includes SEZs with no available information on activity. We dis-

[29] We acknowledge that our estimate may also be influenced by the out-migration of less affluent natives from the SEZ neighbourhood (caused, e.g., by increasing cost of living), which we are unable to capture with the data at hand.

tinguish between three categories of SEZ size: Small (up to 100 hectares), Medium (100 to 1000 hectares) and Large (more than 1000 hectares). In terms of age, we distinguish between SEZs below the median age (10 years) and SEZs older than that.[30] Finally, we split the sample by the distances to major airports and seaports at the respective sample medians (22 km and 41 km, respectively) and create two binary variables for below-median distances.

The results, which we present in Appendix Table A8 for households within the 10 km distance band, show no clear evidence for effect heterogeneities at conventional significance levels. The signs of the interaction coefficients in columns (1), (2) and (3) suggest that the treatment effect might be the largest for privately managed SEZs, SEZs specialized in industrial activities and SEZs located in low-income countries, but the differences are not significant statistically.[31] Estimates in column (4) show that the entire wealth gain is realised in the first nine years of the SEZ's operation, with no further positive effect thereafter, a pattern also apparent from the event study graph in Figure 3. Proximity to a major airport or seaport does not appear to contribute to greater household wealth gains, as shown in columns (5) and (6). In fact, the treatment effect is larger for SEZs that are relatively far (more than 22 km) from a major airport, while distances to a major seaport do not matter.

5.4 Distributional Impacts

This section explores the policy's distributional effects by estimating treatment effects for each decile of the wealth distribution with a quantile regression approach. Figure 5 illustrates the results for the within 10 km distance band.

The estimated treatment effects are positive at every decile of the distribution, suggesting that SEZs tend to improve the relative wealth position of all wealth classes in the local economy. However, the point estimates also reveal some variation in the magnitude of the effects at the different deciles, even if large standard errors render these differences statistically insignificant. The point estimates become larger, drawing closer to the middle of the distribution, particularly between the third and sixth deciles. In contrast, the estimates are relatively small towards the two tails and turn statistically zero for the lowest two wealth deciles.[32]

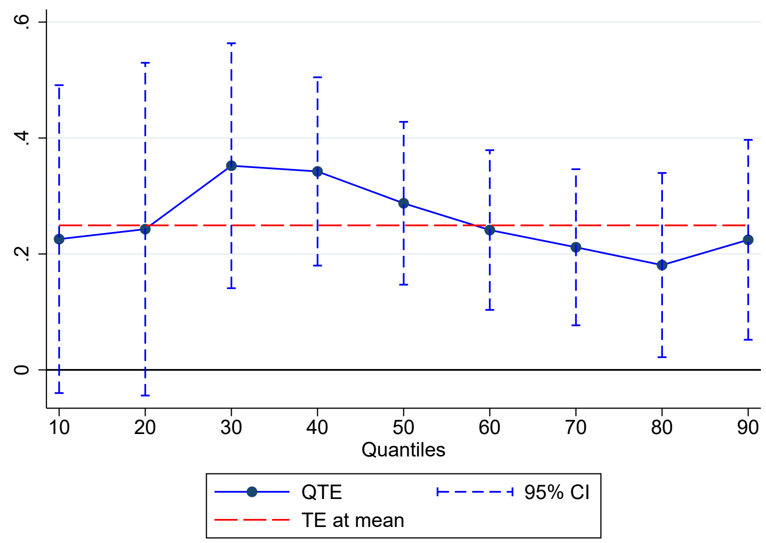
These results suggest that the benefits of SEZs regarding household wealth are

[30] The age of the SEZ is a time-varying variable, defined as the year of the DHS survey minus the year of SEZ establishment plus 1.

[31] Only SEZs with unknown type of activity have a significantly lower treatment effect than industrial SEZs (the base category), which is plausible if we assume that lack of information is related to poor SEZ performance.

[32] We consider the estimates for the upper deciles to be less reliable due to the peculiarities of the DHS wealth index. Since the wealthiest households may already own all the assets included in the index construction, further improvements in the economic situation of these households may not be captured by our outcome variable.

Figure 5: Treatment Effects Along the Wealth Distribution for Households within 10 km.



Note: The figure plots treatment effect estimates for each decile of the wealth distribution with 95% confidence intervals as well as the treatment effect estimate at the mean (horizontal line). Quantile Treatment Effect estimation method, based on Equation (1) and the sample of households in the 10 km distance band.

broadly distributed across the local societies. At the same time, the main beneficiaries of SEZ policies appear to be members of the local (lower) middle class. This aligns with recent evidence on the growing prosperity of the continent's middle class during the past decades (AfDB, 2011; Shimeles and Ncube, 2015). A potentially disturbing finding is the weak evidence for a positive wealth effect in the lowest deciles, suggesting that SEZ policy may not be an effective tool to benefit the poorest segment of the local society.

6 What Drives Increasing Household Wealth?

How can we explain the increasing wealth effect? In this section, we decompose the aggregate wealth measure and look separately at the components of the wealth index. We group survey variables into four categories, namely: (1) the accessibility to utilities, (2) the ownership of household durables and the quality of housing, (3) livestock, land-ownership and agricultural activity, and (4) education and employment of households. Summary statistics of the variables used in this section are reported in Appendix Tables A4 and A6. Given that the main effect occurred on households within 10 km of an SEZ, we focus only on this distance band and provide results for 10-20 km and 20-30 km in the Appendix.

6.1 Utility Accessibility

First, SEZs may improve infrastructure facilities, including transportation networks and utilities like electricity, water supply and telecommunications in order to attract firms. Zeng (2015) and Wang (2013) show that robust infrastructure may result in a better business environment inside the zone, attracting new enterprises and ultimately contributing to the development of the surrounding area. Particularly, electricity has been shown as an important determinant of productivity growth of manufacturing firms (Abeberese, 2017).

Indeed, the establishment of SEZs is typically accompanied by infrastructure projects around the area. Take as an example the Lusaka South Multi-Facility Economic Zone established in 2010 in Zambia. To attract both local and foreign firms, developers have invested in 19.5 km of all-weather gravel roads, a 20 km of bituminous road, along with water supply and 33 KV electricity infrastructure. The objective is to deliver fully serviced land to potential investors and provide 99% electricity uptime.[33] Another example is Mombasa SEZ in Kenya, where the government has signed a grant agreement with the Japan International Cooperation Agency. The grant of 6,000 million yen is designated for the development of water supply facilities and rainwater drainage channels in Dongo Kundu area, where the zone is located.[34] These benefits of improved infrastructure facilities may extend to households residing in the immediate vicinity of SEZs.

To investigate the potential factors contributing to the observed rise in household wealth subsequent to the establishment of SEZs, we look at whether households are more likely to have access to electricity, improved sanitation and drinking water following SEZ's establishment. We follow the guide to DHS[35] and define a household with improved sanitation if it has a flush toilet to a piped sewer system, a septic tank or to pit latrine, ventilated improved pit, pit latrine with slab, and composting toilet. Similarly, we create a binary variable for improved water if households have drinking water piped into dwelling/yard/plot, piped to a neighbour, public tap/standpipe, tube well or borehole, protected well/spring, rainwater, tanker truck, cart with a small tank and bottled water.[36]

Regression coefficients from estimating Equation (1) with various outcome variables are plotted in the first panel of Figure 6. We find that households residing within 10 km of an SEZ are significantly more likely to have electricity and im-

[33]The information is taken from the official website https://www.lsmfez.co.zm/infrastructure-developments/. Accessed on: 23.12.2023

[34]The information is from the official website https://www.jica.go.jp/Resource/english/news/press/2022/20220621_21_en.html. Accessed on: 23.12.2023

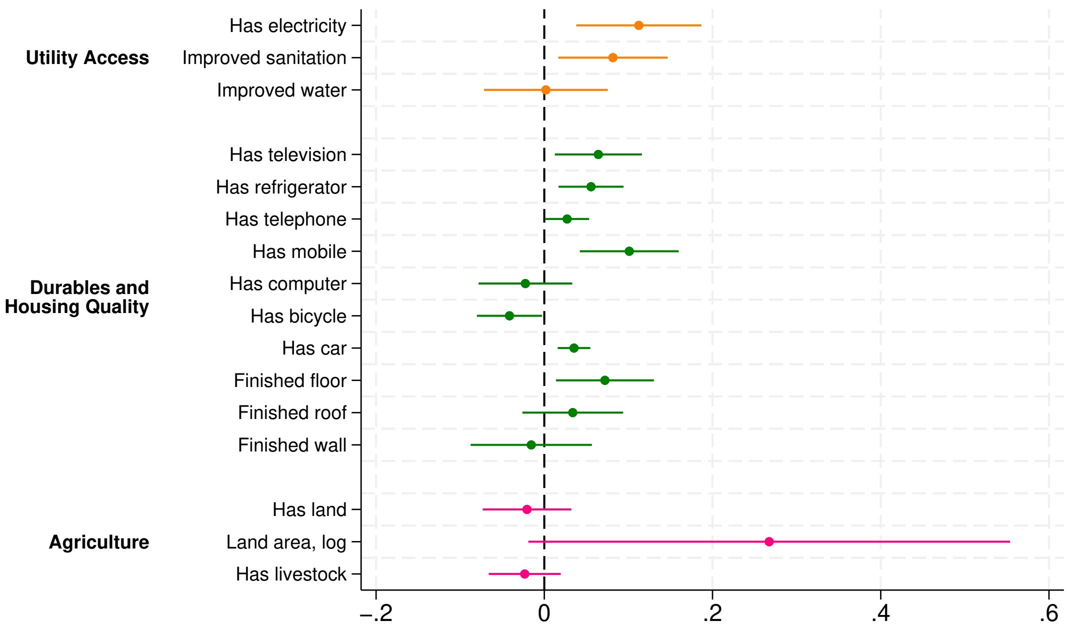
[35]Available at: https://dhsprogram.com/data/Guide-to-DHS-Statistics/Type_of_Sanitation_Facility.htm. Accessed on: 19.06.2023

[36]The classification of household drinking water is available at: https://dhsprogram.com/data/Guide-to-DHS-Statistics/Household_Drinking_Water.htm. Accessed on: 19.06.2023

proved sanitation as a result of an SEZ establishment. Households in the 10-20 km and 20-30 km distance bands are also more likely to have improved sanitation facilities which is shown in Figures A5 and A6 in the Appendix, however, the effect decays rapidly with distance. The establishment of SEZs had no significant impact on drinking water facilities.[37]

Consequently, the increased wealth observed among households within 10 km, following the establishment of the zone, can plausibly be explained by improved access to household utilities, particularly electricity and enhanced sanitation facilities.

Figure 6: Decomposition of Aggregate Wealth Index for Households within 10 km.



Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the sample of households living in the within 10 km distance band. Land area is winsorized at the top 95 percentile. All regressions include SEZ fixed-effect, country-year dummies and household-level control variables for the household size and the age and gender of the household head.

6.2 Household Durables and Housing Quality

Second, SEZs may affect the wealth of households through increased consumption of durable goods and improved housing quality. If household members find employment in SEZs, the additional income may be used to purchase durables. Further, as SEZs attract new enterprises, some durable goods may become available, facilitating household consumption decisions. Similarly, the extra income from SEZs may enable households to invest in high-quality materials for housing construction, further

[37]Our findings on no effect on improved drinking water are supported when looking at the time needed to get to the water source. There, we also do not find any statistically significant effect, even though all coefficients have a negative sign. Results are available upon request.

contributing to improving housing quality.

To investigate this aspect, we assess whether the establishment of SEZs has an impact on household ownership of durable goods, such as televisions, refrigerators, telephones, mobile, computers, bicycles and cars, and the materials used for floors, roofs and walls of the dwelling. In defining the housing quality, we follow Tusting et al. (2017). A finished floor is a binary indicator of whether a floor is made of parquet/polished wood, vinyl, asphalt strips, ceramic tiles, cement, and carpet. A finished roof is a dummy variable, taking one if a roof is made of metal, wood, calamine or cement fibre, ceramic tiles, cement, and roofing shingles. Lastly, a finished wall equals one if a wall is made of cement, stone with lime, bricks, cement blocks, covered adobe, and wood planks or shingles.

Estimated coefficients depicted in the second panel of Figure 6 indicate that households within 10 km of an SEZ are significantly more likely to possess a television, refrigerator, telephone, and mobile phone. However, we find no significant effect on owning a computer, suggesting that SEZs potentially create low-skilled manual jobs. Moreover, households are switching from owning a bicycle to owning a car, indicating growing urbanization. Whereas the main beneficiaries are households within 10 km of SEZs, households between 10 and 20 km also benefit in terms of television and mobile ownership. There is no effect beyond 20 km, as is shown in Figure A6 in the Appendix. Looking at the housing quality, households within 10 km are significantly more likely to have finished floors, whereas there is no effect on the roof or wall quality.

To sum up, as a result of SEZs establishment, households are consuming more durable goods such as televisions, refrigerators, telephones and mobile phones. Further, there is a shift from bicycles to car ownership, along with an improvement in housing quality. These patterns indicate an urbanization trend brought by the SEZs. The benefits spread largely to households within 10 km of SEZs and do not extend beyond that.

6.3 Livestock, Land-ownership and Agricultural Activity

A frequently discussed aspect of SEZ development in the literature pertains to land acquisition. SEZ developers require land for their projects, and taking farming land may displace households dependent on agriculture, potentially leading to unemployment and a reduction in the well-being of local farmers (Levien, 2013; Aggarwal and Kokko, 2022). On the other hand, SEZs may provide jobs that can potentially decrease household agricultural occupation. Further, SEZs development may increase housing and land prices, further exacerbating the income divide (Reynolds and Rohlin, 2015). To investigate these dynamics, we examine whether the establishment of SEZs has any effect on the probability of owning land, the land area, and the likelihood of having livestock.

The third panel of Figure 6 plots the regression coefficients with 95% confidence intervals. The establishment of SEZs had neither a statistically significant effect on land ownership nor on the probability of having livestock. Interestingly, the coefficient on land area is positive and statistically significant at 10% showing that households increase the owned land area, contrary to the arguments in the literature. This indicates that the land for SEZs development was not necessarily taken from those households and that households, on the contrary, were even able to increase the land area in their possession, which is in line with increased wealth effects.

6.4 Education and Employment of Households

One of the main goals of SEZs is to create employment opportunities for the region by attracting new firms. If better-paid jobs become available for skilled workers, the incentives to pursue further education may rise as people see improved employment prospects opening up for them. We check whether the increased wealth effect after the establishment of SEZs is accompanied by higher educational attainment and employment probability among household members residing in the vicinity.

The last panel of Figure 6 highlights that the establishment of SEZs significantly increases the likelihood of having at least secondary education as well as the years of education of household heads. The effect occurs on households within 10 km of an SEZ and does not extend beyond that. Looking at possible heterogeneous effects by migration status, we find no indication that the effect is driven by recently in-migrated households.[38] These results suggest that SEZs incentivize the heads of local households to continue their education and/or enable the better-educated household members to become household heads.

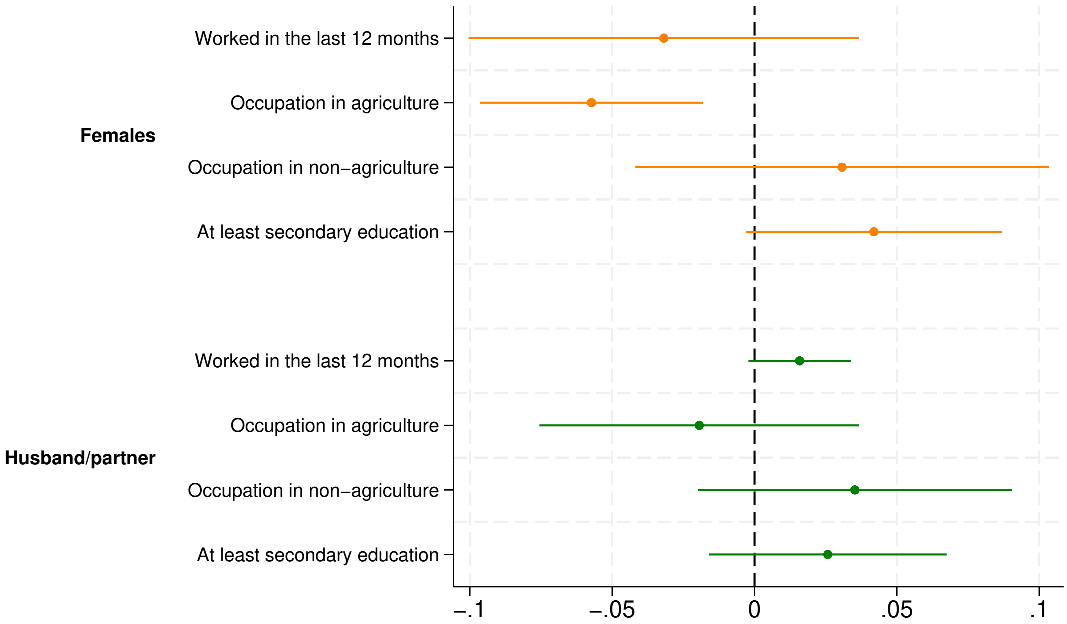
Next, we study educational and employment outcomes of household members at the individual level. We can derive the probability of working in the past 12 months, the employment sector and the probability of having at least secondary education when looking at the sub-sample of female household members aged 15-49 who have at least one child and their husbands/partners. We run the variation of Equation (1), where in addition to household level controls, we also control for female-specific characteristics, which include a female's age, age squared, an indicator variable for whether a woman is married, a dummy variable for whether a woman is pregnant and the number of children under 5 years of age alive.

The results are presented in Figure 7 for females and their husbands/partners separately for within 10 km distance band (Appendix Figures A7 and A8 plot the

[38] These estimation results are available upon request.

results for within 10-20 km and 20-30 km distance bands, respectively). We observe no significant effect on employment probability for females, which can be explained by the fact that all females in our sample have at least one child. However, we find that working mothers are significantly less likely to be employed in agriculture, indicating that the development of SEZs brings with it the switch away from agricultural activity.

Figure 7: Employment Outcomes by Gender for Households within 10 km.



Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the subsample of females of age 15-49 with at least one child living within 10 km distance band and their husbands/partners. All regressions include SEZ fixed-effect, country-year dummies, household-level control variables for the household size and the age and gender of the household head, and female-level controls such as age, age squared, indicators for whether a woman is married, pregnant and the number of children under 5 years of age alive.

Regarding the husbands/partners, we note a higher likelihood of employment in the last 12 months (significant at 10%). Similarly, we document that husbands/partners also transition away from agricultural activities, with an increasing probability of employment in the non-agricultural sector, even though the coefficients are not statistically significant at 5%. When looking at the employment effect by the educational attainment of the individual, we find that the increase in the employment probability of husbands/partners occurred among men without a secondary education (Appendix Table A9). Within this group, the shift away from agricultural work is also statistically significant at 5%. This implies that the SEZs predominantly create jobs for low-skilled workers.

In terms of educational attainment as an outcome, we find that females are more likely to have at least secondary education as a result of the policy, though the significance is only at 10%. In contrast, the estimate for men is statistically zero. However, looking at heterogeneous effects by age, we find significantly positive effects for both women and men in the youngest age group, 20 years and younger (Appendix Table A10). This indicates that, even though the jobs created are mostly low-skilled jobs, the policy positively affects the decision of young individuals to acquire secondary education. This could occur, for example, if SEZs lead to a higher wage premium for skilled workers in the local labor market.

Collectively, these findings demonstrate that the establishment of SEZs leads to enhanced utility access for households, greater consumption of durable goods, and an overall improvement in dwelling quality. The improved employment opportunities motivate household members to pursue further education and shift away from agricultural activity. These trends suggest that SEZs stimulate local economic activities and contribute to a sustained urbanization trend among nearby households.

7 Conclusion

Many countries across Africa have implemented varied SEZs over the last two decades to promote export diversification, GVC participation, and local economic development by using incentive packages to attract firms into the desired location. Despite the wide spread of SEZs in the continent, there is limited empirical evidence on the economic implications of the policy, particularly at the micro level, largely due to data unavailability.

Using geocoded DHS data, we demonstrate that the establishment of SEZs in Africa contributes to the growth of asset wealth of households living within 10 km of the SEZs relative to the national average. While the benefits of SEZs are broadly distributed across African households, the primary beneficiaries of policies appear to be members of the (lower) middle class. We further observed that the increase in household asset wealth corresponds to increased access to household utilities, greater consumption of durable goods, improved dwelling quality and higher educational levels of household members, suggesting that SEZ policy drives urbanization.

Additional findings indicate that both native and immigrant households experience a positive increase in asset wealth following the policy initiation, lending support against the concerns that place-based policies such as SEZs often do not benefit the locals. Looking at the gender aspect, we discover that the creation of SEZs leads to increased employment likelihood only among male household members. At the same time, there is no corresponding increase in the likelihood of mothers being employed.

Our findings present two limitations. The first limitation stems from the non-random location choice of SEZs. SEZs in Africa tend to be located near urban centers, and therefore the validity of our results may not necessarily extend to cases when SEZs are established in less developed rural areas. Similarly, our distributional results may not capture the poorest households in the countries, as these are likely to live in remote rural locations. Second, the employment data from DHS predominantly covers a specific demographic group, mainly females of reproductive age and male partners, potentially missing out on the broader employment effects. Such limitations highlight the need for cautious interpretation and suggest avenues for further research.

Our results highlight two important policy implications. First, the findings imply that SEZ policies can be an effective tool for policymakers in developing countries to stimulate urbanization trends and improve the welfare of residents in targeted locations. This is particularly relevant in Africa, where there are still significant regional disparities in terms of economic opportunities. Second, distributional effects suggest that the benefits of the policy mainly accrue to the local middle class, while the local poor may be left behind. In other words, SEZ policies alone might be insufficient measures to combat poverty and economic inequality among households. Policymakers should therefore consider supplementary policy options (e.g., minimum wage policies and vocational training programmes for the poor) for equity reasons.

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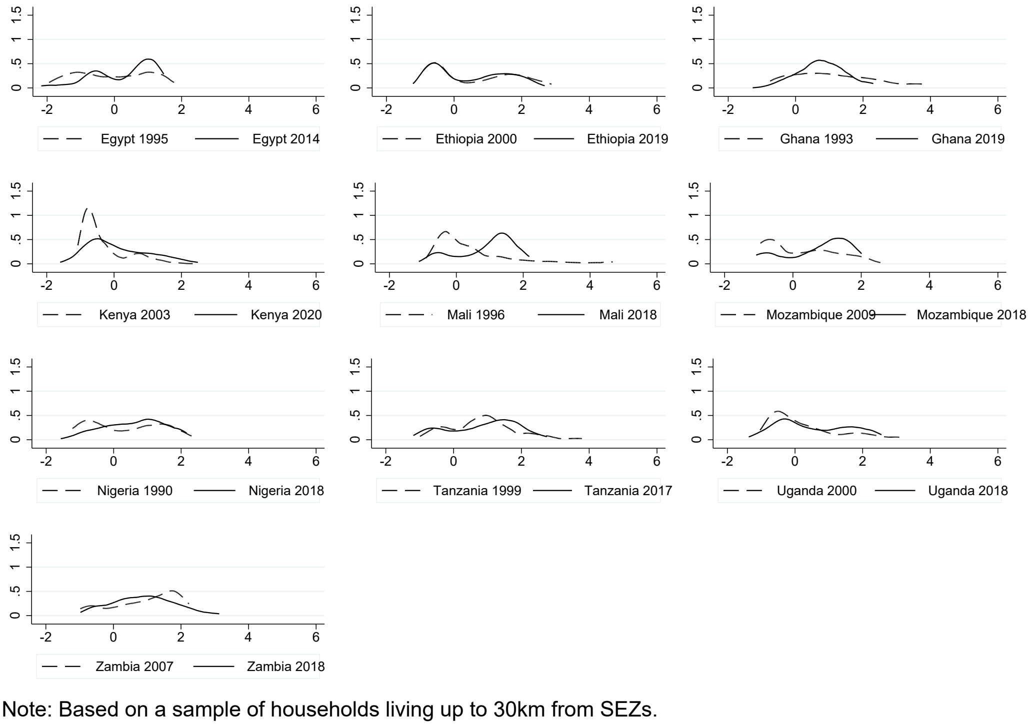
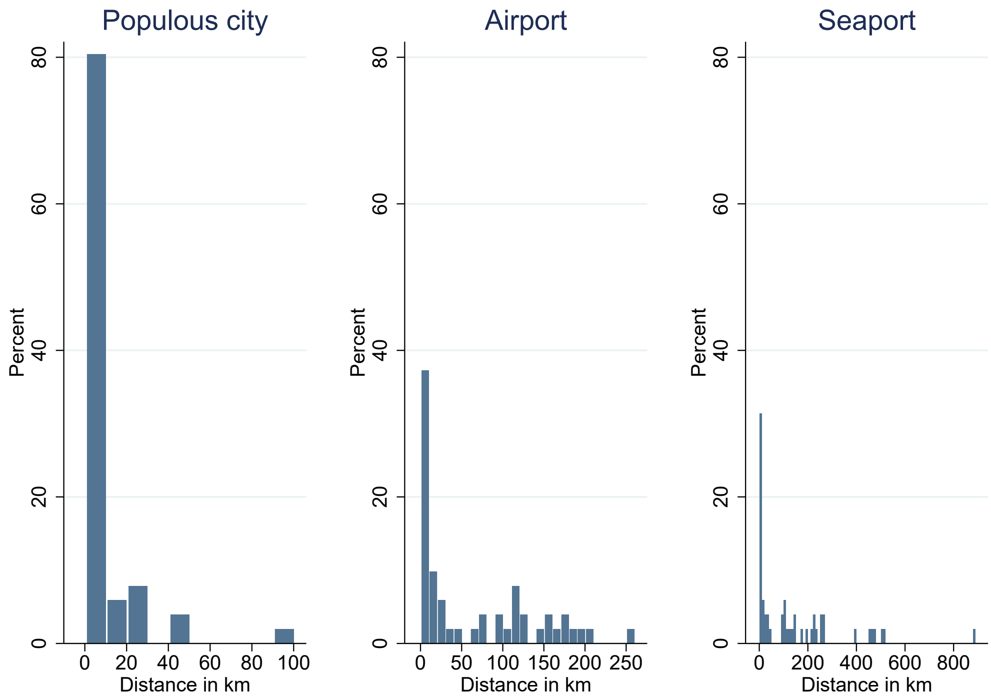
A Appendix

Appendix Figure A1: Household Wealth Distributions in the first and last DHS Years by Country.



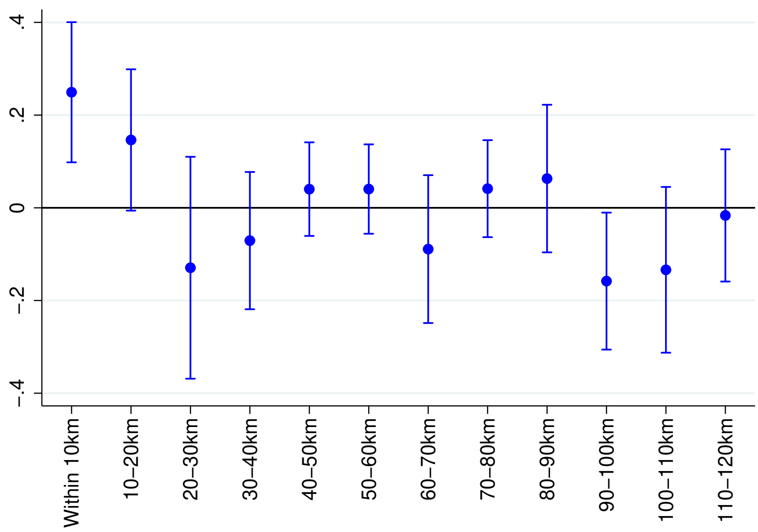
Note: Kernel density estimates for the wealth index factor score variable on household-level data. We clean the wealth index variable from possible outliers by winsorizing it at the 1st and 99th percentiles within country-year. Based on a sample of households living up to 30 kilometres from SEZs.

Appendix Figure A2: Distribution of SEZs by Distance to Populous City, Airport and Seaport.



Note: Distribution of SEZs in the sample by geographical distance to a populous city, major airport, and major seaport. The bin size is 10 kilometres. Source of information is the Open Zone Map.

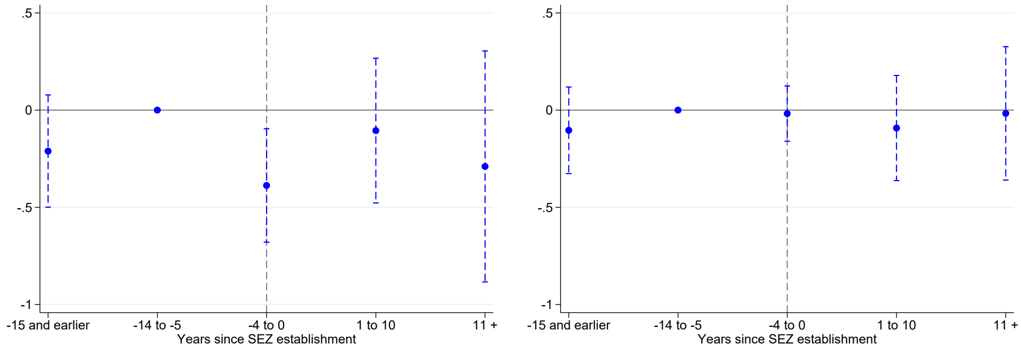
Appendix Figure A3: Estimates for Distance Bands Up to 120km.



Note: Treatment effect estimates with 95% confidence intervals from estimating Equation (1) for various distance bands up to 120 km distance from the SEZs. Households residing in a different country than the country of the SEZ are excluded from the estimation sample.

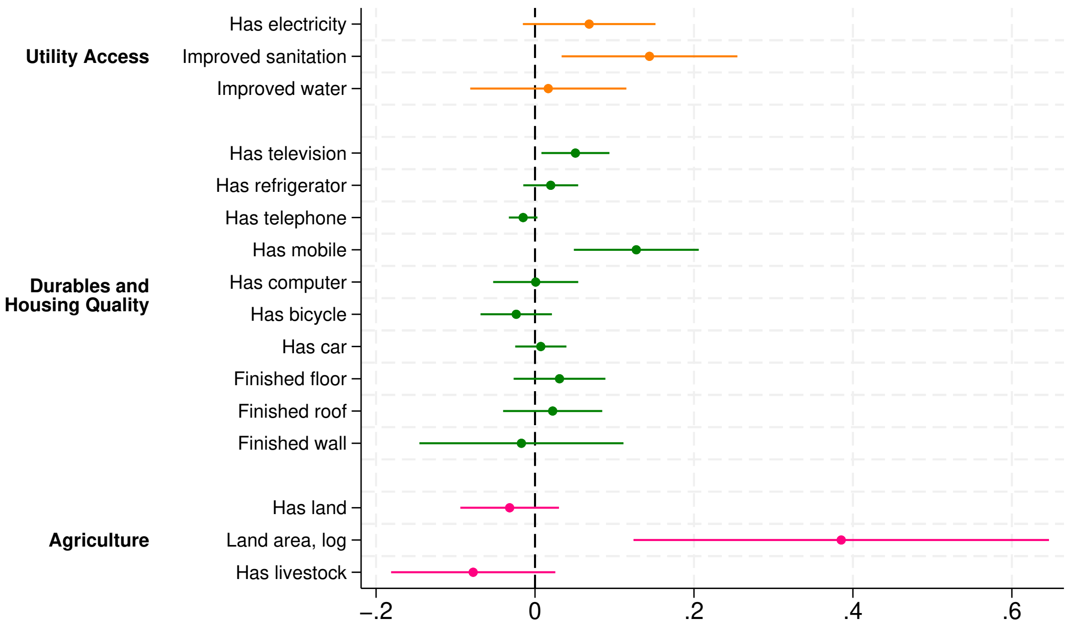
Appendix Figure A4: Event Study Graphs for Further Distance Bands.

(a) 10-20 km (b) 20-30 km



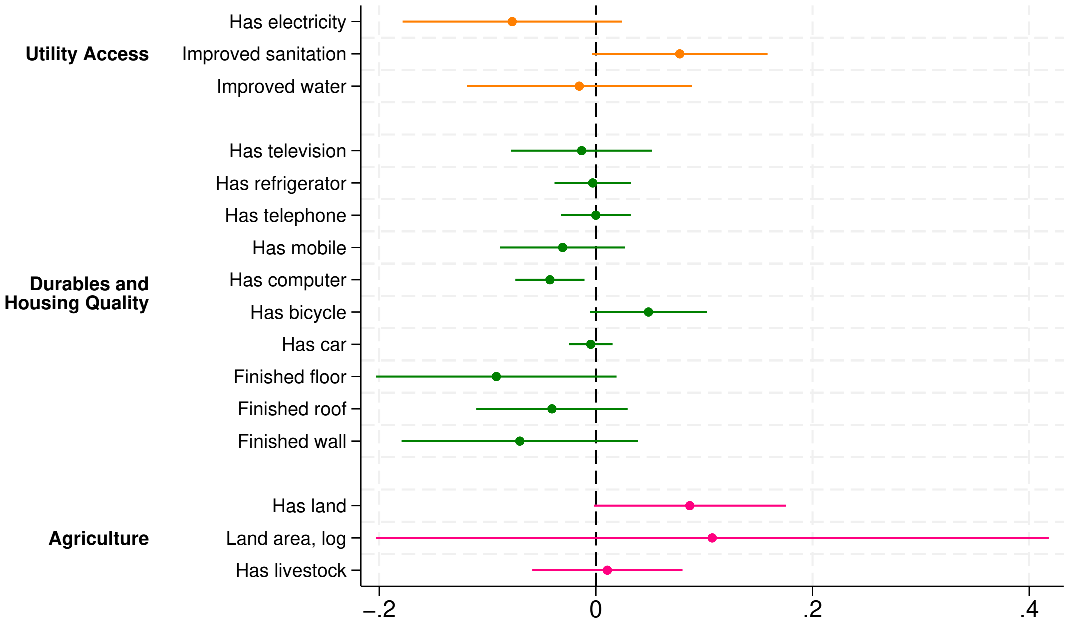
Note: The figure plots OLS estimates with 95% confidence intervals on the sample of households living (a) in the 10-20 km distance band and (b) in the 20-30 km distance band. The coefficient for the period preceding the period of SEZ establishment is set to zero. Estimation with binned endpoints.

Appendix Figure A5: Decomposition of Aggregate Wealth Index for Households within 10-20 km Distance Band.



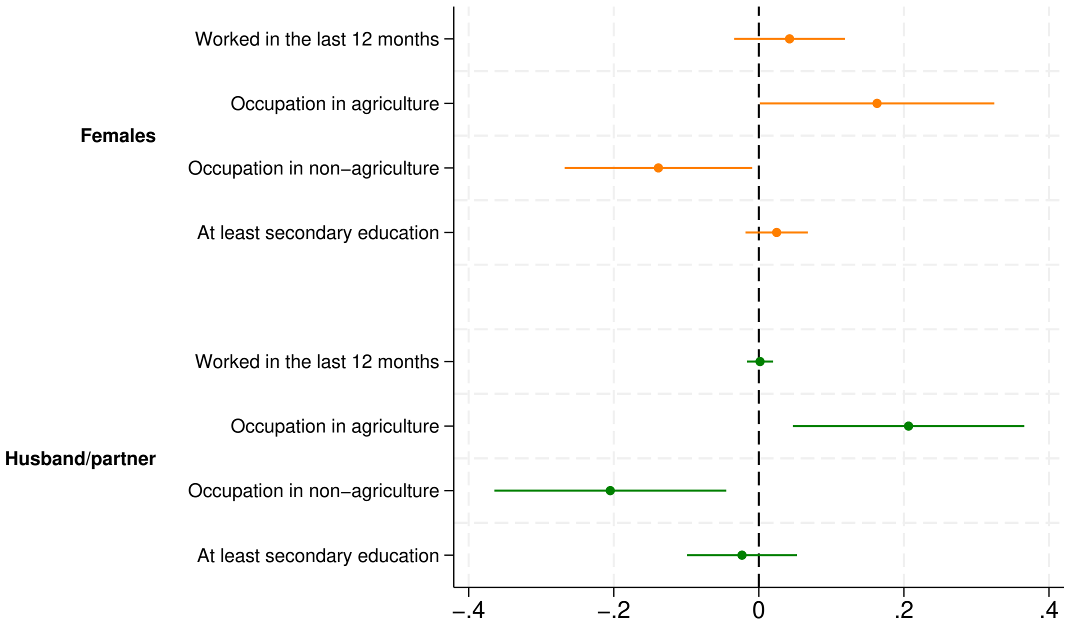
Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the sample of households living in 10-20 km distance band. Land area is winsorized at the top 95 percentile. All regressions include SEZ fixed-effect, country-year dummies and household-level control variables for the household size and the age and gender of the household head.

Appendix Figure A6: Decomposition of Aggregate Wealth Index for Households within 20-30 km Distance Band.



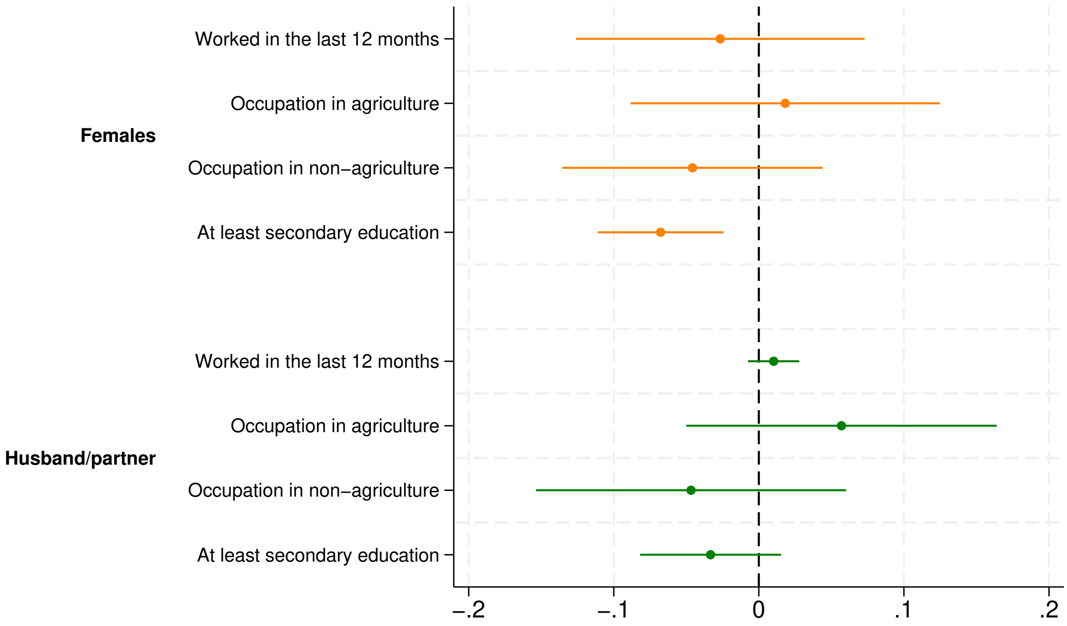
Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the sample of households living in 20-30 km distance band. Land area is winsorized at the top 95 percentile. All regressions include SEZ fixed-effect, country-year dummies and household-level control variables for the household size and the age and gender of the household head.

Appendix Figure A7: Employment Outcomes by Gender for Households within 10-20 km.



Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the subsample of females of age 15-49 with at least one child living in the 10-20 km distance band. All regressions include SEZ fixed-effect, country-year dummies, household-level control variables for the household size and the age and gender of the household head, and female-level controls such as age, age squared, indicators for whether a woman is married, pregnant and the number of children under 5 years of age alive.

Appendix Figure A8: Employment Outcomes by Gender for Households within 20-30 km.



Note: The figure plots OLS estimates with 95% confidence intervals from estimating Equation (1) on the subsample of females of age 15-49 with at least one child living in the 20-30 km distance band. All regressions include SEZ fixed-effect, country-year dummies, household-level control variables for the household size and the age and gender of the household head, and female-level controls such as age, age squared, indicators for whether a woman is married, pregnant and the number of children under 5 years of age alive.

Appendix Table A1: SEZ by Country and Date of Establishment.

	All SEZs		Estimation sample	
	Freq.	Percent	Freq.	Percent
Egypt	12	10.5	3	5.9
Ethiopia	17	14.9	7	13.7
Ghana	4	3.5	4	7.8
Kenya	12	10.5	3	5.9
Mali	11	9.7	7	13.7
Mozambique	9	7.9	4	7.8
Nigeria	12	10.5	6	11.8
Tanzania	15	13.2	7	13.7
Uganda	14	12.3	8	15.7
Zambia	8	7.0	2	3.9
Time of Operation start:				
1966-1990	7	6.1	0	0.0
1991-2000	11	9.6	5	9.8
2001-2010	26	22.8	11	21.6
2011-2020	51	44.7	28	54.9
Not operational end-2020	13	11.4	7	13.7
No information found	6	5.3	0	0.0
Total	114	100.0	51	100.0

Appendix Table A2: SEZ by Type in the 10 Countries.

	All SEZs		Estimation sample	
	Freq.	Percent	Freq.	Percent
Management				
Private	22	19.3	11	21.6
Public	52	45.6	26	51.0
Public-Private Partnership	40	35.1	14	27.5
Activity				
Industry	49	43.0	25	49.0
Services	15	13.2	6	11.8
Mixed Activities	28	24.6	13	25.5
Not identified	22	19.3	7	13.7
Area size				
Small ($\leq$100 ha)	41	36.0	18	35.3
Medium-sized	47	41.2	24	47.1
Large ($>$1000 ha)	26	22.8	9	17.7
Total	114	100.0	51	100.0

Appendix Table A3: Mean Distances of SEZs to City, Airport and Seaport.

	All	Early	Late	Test Early=Late (p-val)
Distance to populous city in km	10.7	14.0	8.2	0.189
Distance to major airport in km	65.5	41.7	83.6	0.035
Distance to major seaport in km	147.0	129.7	160.2	0.564
Number of SEZ	51	22	29	

Note: Simple averages of the SEZs in the estimation sample. Early SEZs are establishment before 2015, late SEZ are established in 2015 or later.

Appendix Table A4: Summary Statistics of Household Variables.

	(within 10 km)			(10-20 km)			(20-30 km)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Key Variables									
Household size (persons)	39537	4.83	3.26	24452	4.68	2.94	24764	4.63	2.91
Age of head (years)	39427	43.61	14.81	24383	43.19	15.41	24716	44.52	15.90
Female head	39537	0.23	0.42	24452	0.26	0.44	24764	0.27	0.44
Wealth index	39537	0.98	1.04	24452	0.48	1.09	24764	0.10	0.92
Further Variables									
Has electricity	39329	0.69	0.46	24317	0.50	0.50	24350	0.42	0.49
Improved sanitation	39310	0.66	0.47	24304	0.53	0.50	24358	0.43	0.50
Improved water	39335	0.85	0.35	24329	0.77	0.42	24359	0.66	0.47
Has television	39310	0.58	0.49	24305	0.42	0.49	24350	0.33	0.47
Has refrigerator	38538	0.33	0.47	23928	0.20	0.40	24085	0.19	0.39
Has telephone	37677	0.12	0.32	23566	0.04	0.20	22765	0.03	0.16
Has mobile	23337	0.77	0.42	18723	0.70	0.46	18484	0.66	0.47
Has computer	18219	0.17	0.38	11687	0.11	0.31	13598	0.08	0.27
Has bicycle	39298	0.19	0.40	24309	0.21	0.41	24349	0.25	0.43
Has car	38582	0.11	0.32	23970	0.08	0.28	24153	0.05	0.22
Finished floor	37636	0.73	0.45	24044	0.58	0.49	23888	0.49	0.50
Finished roof	27363	0.90	0.31	20565	0.85	0.36	19787	0.77	0.42
Finished wall	27236	0.80	0.40	20340	0.71	0.46	19516	0.61	0.49
Has land	30759	0.24	0.43	20968	0.49	0.50	20005	0.59	0.49
Land area (log hectares)	5455	2.52	1.54	6867	2.17	1.48	8099	2.15	1.46
Has livestock	28256	0.24	0.43	18604	0.43	0.49	18500	0.51	0.50
Head's years of education	34883	7.02	5.63	19953	6.44	5.44	20461	5.81	5.09
Head has secondary education	39537	0.40	0.49	24452	0.32	0.47	24764	0.29	0.45
Key Variables for the Sub-sample with Never-mover Information									
Never-mover household	15290	0.39	0.49	7788	0.39	0.49	8334	0.38	0.49
Recent migrant household	15289	0.20	0.40	7770	0.22	0.41	8331	0.20	0.40
Household size (persons)	15289	5.94	3.27	7770	5.87	2.89	8331	5.67	2.71
Age of head (years)	15272	42.50	12.19	7760	41.25	12.33	8323	41.39	12.38
Female head	15289	0.19	0.39	7770	0.21	0.41	8331	0.23	0.42
Wealth index	15289	1.01	1.12	7770	0.31	1.11	8331	0.09	0.97

Note: Summary statistics of household-specific variables. We clean the wealth index variable of possible outliers by winsorizing it at the 1st and 99th percentiles within country-year.

Appendix Table A5: Means of Key Household Variables by Migration Status.

	Mean	Std. Err.	[95% Conf.	Interval]
Household size				
Recent migrant	4.653	0.045	4.565	4.740
Other migrant	6.513	0.045	6.424	6.602
Never-mover	5.971	0.040	5.893	6.048
Age of head				
Recent migrant	36.960	0.210	36.548	37.371
Other migrant	43.953	0.143	43.672	44.234
Never-mover	43.730	0.163	43.410	44.050
Female head				
Recent migrant	0.204	0.007	0.190	0.219
Other migrant	0.197	0.005	0.187	0.207
Never-mover	0.168	0.005	0.158	0.177
Head has secondary education				
Recent migrant	0.484	0.009	0.466	0.502
Other migrant	0.398	0.006	0.386	0.410
Never-mover	0.421	0.006	0.409	0.434
Wealth index				
Recent migrant	1.163	0.019	1.126	1.201
Other migrant	1.124	0.014	1.096	1.151
Never-mover	0.814	0.015	0.785	0.843

Note: Sample of households living within 10 km of SEZs with observed migration status. Number of observations is 15,272.

Appendix Table A6: Summary Statistics of Individual-Level Variables.

	(within 10 km)			(10-20 km)			(20-30 km)		
	N	Mean	Std. Dev.	N	Mean	Std. Dev.	N	Mean	Std. Dev.
Females									
Age (years)	27786	31.31	8.35	15462	31.00	8.29	15412	31.73	8.49
Married or living with partner	27786	0.71	0.45	15462	0.67	0.47	15412	0.70	0.46
Pregnant	27786	0.08	0.28	15462	0.10	0.30	15412	0.10	0.30
Children under 5 years (number)	27786	0.82	0.86	15462	0.97	0.90	15412	0.98	0.91
Worked in the last 12 months	24515	0.60	0.49	12930	0.65	0.48	12901	0.69	0.46
Occupation in agriculture	19977	0.11	0.31	10786	0.29	0.45	11202	0.38	0.49
Occupation in non-agriculture	23750	0.53	0.50	12575	0.43	0.50	12668	0.40	0.49
At least secondary education	27786	0.37	0.48	15461	0.32	0.47	15410	0.27	0.44
Husbands/partners									
Worked in the last 12 months	19977	0.87	0.34	10786	0.84	0.37	11202	0.91	0.28
Occupation in agriculture	19977	0.11	0.31	10786	0.29	0.45	11202	0.38	0.49
Occupation in non-agriculture	19977	0.76	0.43	10786	0.55	0.50	11202	0.53	0.50
At least secondary education	19913	0.48	0.50	10632	0.41	0.49	11116	0.36	0.48

Note: Summary statistics of individual-specific variables.

Appendix Table A7: Estimation Results with Sampling Weights.

Depvar: Wealth index	(1) (within 10km)	(2) (10-20km)	(3) (20-30km)
SEZ	0.2638***	-0.0252	-0.0334
	(0.0940)	(0.1693)	(0.1168)
N	39,537	24,452	24,764
Number of clusters	51	47	49
R-squared	0.324	0.408	0.450

Note: Results from estimating Equation (1) with Weighted Ordinary Least Squares on the repeated cross-section of households in various distance bands around SEZs. The original DHS sampling weights are rescaled within every DHS survey to account for the different estimation sample size. All regressions include SEZ fixed-effect, country-year dummies and household-level control variables for the household size and the age and gender of the household head. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A8: Heterogeneity Results by SEZs Characteristics for Households within 10km.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SEZ	0.3017***	0.3174*	0.2926***	0.3424***	0.2451***	0.4388***	0.3593***
	(0.0916)	(0.1847)	(0.0917)	(0.1161)	(0.0737)	(0.0987)	(0.0941)
By host country (base: Low-income)							
SEZ × Lower-middle income	-0.1469						
	(0.1571)						
By management (base: Private)							
SEZ × Public		-0.0653					
		(0.2053)					
SEZ × Public-Private Part.		-0.1392					
		(0.2054)					
By activity (base: Industry)							
SEZ × Services			-0.1417				
			(0.1566)				
SEZ × Mixed Activities			-0.0185				
			(0.1090)				
SEZ × Not identified			-0.6558***				
			(0.0859)				
By area size (base: Small)							
SEZ × Medium (100-1000 ha)				-0.1807			
				(0.1254)			
SEZ × Large (1000+ ha)				0.0301			
				(0.1671)			
By age of SEZ							
SEZ × Age 10 years or more					-0.1114		
					(0.0716)		
By distance to airport							
SEZ × Below-median distance						-0.3433**	
						(0.1401)	
By distance to seaport							
SEZ × Below-median distance							-0.1916
							(0.1375)
N	39,537	39,537	39,537	39,537	39,537	39,537	39,537
Number of clusters	51	51	51	51	51	51	51
R-squared	0.264	0.264	0.264	0.264	0.264	0.265	0.264

Note: Results from OLS estimation of versions of Equation (1) interacted with various characteristics of SEZs. Lower-middle-income countries are Egypt, Ghana, Kenya, Nigeria, Tanzania and Zambia. *Industry* includes manufacturing, agro-processing and energy. *Services* include transport, logistics, R&D, ICT, and medical and financial services. The sample median distance to an airport is 22 kilometres and to a seaport 41 kilometres. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A9: Employment Effect by Skill Level Within 10km.

	(1) Worked in the last 12 months	(2) Occupation in agriculture	(3) Occupation in non-agriculture
		Female Outcome	
Average effect			
SEZ	-0.0222	-0.0573***	0.0311
	(0.0323)	(0.0195)	(0.0361)
N	23,744	23,744	23,744
R-squared	0.209	0.217	0.168
By skill level of female			
SEZ x Low-skill	0.0136	-0.0724***	0.0818**
	(0.0362)	(0.0214)	(0.0383)
SEZ x High-skill	-0.0867**	-0.0181	-0.0720*
	(0.0399)	(0.0206)	(0.0416)
N	23,744	23,744	23,744
R-squared	0.223	0.228	0.192
		Husband/Partner Outcome	
Average effect			
SEZ	0.0158*	-0.0196	0.0353
	(0.0092)	(0.0285)	(0.0279)
N	19,317	19,317	19,317
R-squared	0.858	0.118	0.464
By skill level of husband/partner			
SEZ x Low-skill	0.0187*	-0.0649**	0.0836***
	(0.0104)	(0.0311)	(0.0300)
SEZ x High-skill	0.0119	0.0410	-0.0291
	(0.0085)	(0.0347)	(0.0325)
N	19,317	19,317	19,317
R-squared	0.858	0.161	0.489

Note: High-skill is defined as having at least secondary education. Results from OLS estimation of versions of Equation (1) interacted with a binary indicator of having high skills. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$

Appendix Table A10: Education Effect by Age Within 10km.

	(1) At least secondary education	(2) At least secondary education
Average Effect		
SEZ	0.0341	0.0243
	(0.0224)	(0.0208)
Female Outcome		
SEZ × Female age 20 or younger	0.0630**	
	(0.0269)	
Partner/Husband Outcome		
SEZ × Partner age 20 or younger		0.2883***
		(0.0883)
N	27,786	19,912
R-squared	0.196	0.184

Note: Results from OLS estimation of versions of Equation (1) interacted with a binary indicator of being at most 20 years old. Standard errors (in parentheses) are clustered at the SEZs level. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$