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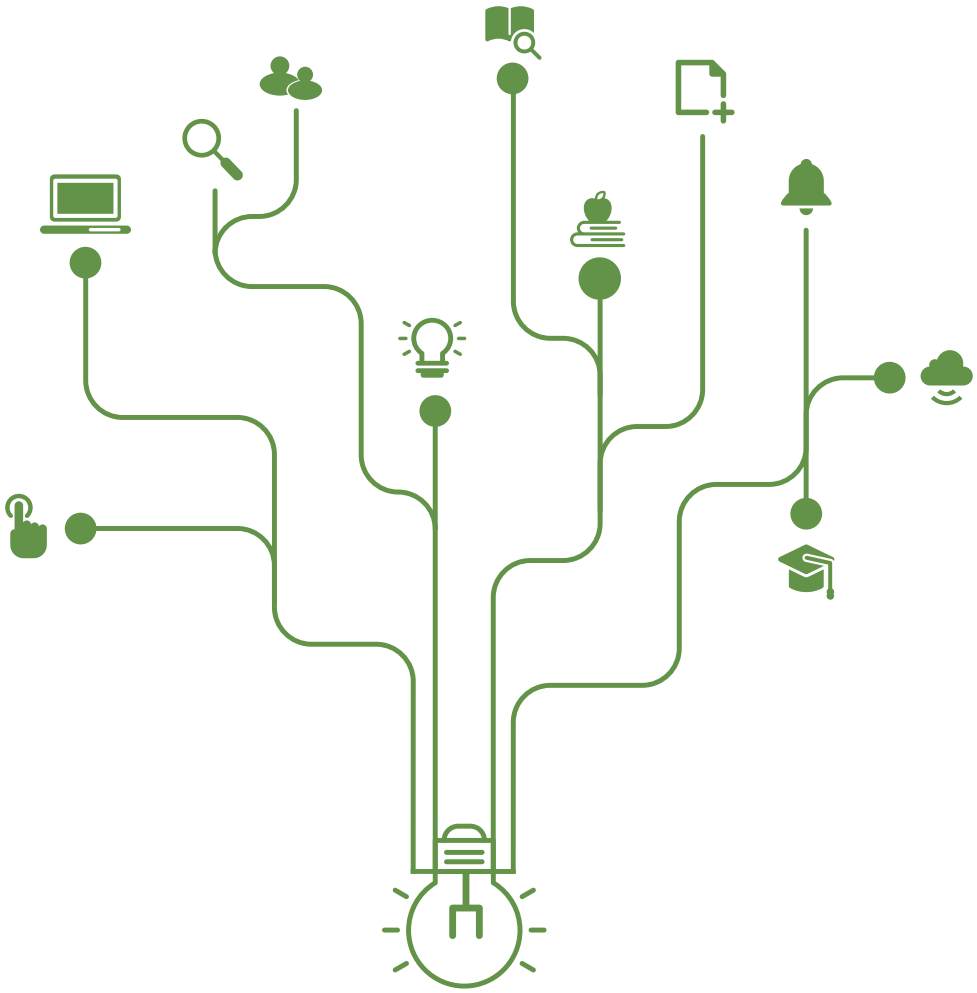
Evaluating Economic Impact of Industrial Parks Development Projects in Ethiopia

Sime, Workenh Eshatuu (Ethiopian Civil Service University)
Almaz Eshetu (Rift Valley University)
Mestawot Shemilis (Industrial Parks Development Corporation)



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By: Sime, Workenh Eshatuu

(Principal Researcher, Ethiopian Civil Service University)

Almaz Eshetu

(Research Assistant, Rift Valley University)

Mestawot Shemilis

(Research Assistant, Industrial Parks Development Corporation)

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List of Acronyms

IP= Industrial Parks

IPDP= Industrial Parks Development Projects

DID= Difference in Differences

IPDC= Industrial Parks Development Corporation

UNIDO= United Nation Industrial Development Organization

FIAS= Foreign Investment Advisory Service

EIC= Ethiopian Investment Commission

FDI= Foreign Direct Investment

CSA= Central Statistical Agency

GTP= Growth and Transformation Plan

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Abstract

The construction and operation of industrial parks development projects are widely used as a major economic development strategy for most policy and decision-makers. Currently, there are 32 industrial parks in different zones, special zones and city administrations in Ethiopia. In this study, those zones and city administrations that have industrial parks in their geographic setting are categorized under treated zones and other zones that have no industrial parks in their geographic settings are categorized under controlled zones. This study aims to assess the factors that affect economic impact of Industrial Parks and to evaluate the micro and macro-economic impact of Industrial Parks Development Projects in Ethiopia. To address these research objectives, the authors used two estimation techniques: Ordered Probit and Difference in Differences (DID) estimation techniques. Both primary and secondary data sources were used to address the research objectives. The finding of the study revealed existence of high community commitment, abundant non-financial resource, tangible government support and good social capital in Ethiopia as the major factors that optimize economic impact of industrial parks development project whereas existence of unskilled labour supply, concentration of Ethiopian Industrial parks in the urban areas and out-dated technology are the major factors that diminish economic impact of Industrial Parks development projects in Ethiopia. The establishment and operation of Industrial Parks Development Projects significantly increased all assessed macro-economic indicators except domestic capital formation. The majority of our respondents strongly agree on the positive role of industrial parks development projects for environmental protection, infrastructure development, employment opportunities generation and technology transfer. Hence, it is highly recommended for the government to design special policies and incentives packages that encourage domestic investors to invest in the Ethiopian industrial parks.

***Keywords**: Difference in Differences (DID), Ordered Probit, Ethiopian Industrial Parks Development Projects, Economic Impact*

□

1. Introduction

1.1. Background of the Study

Industrial parks also known as Industrial zones or Special Economic Zones include different economic concepts which include Free Trade Zones, Export Processing zones, Free Ports and others. There are different types and forms of industrial parks in the world. The major goals of these industrial parks are producing export-oriented products and becoming competent in international markets. According to a report by Foreign Investment Advisory Service (FIAS), despite having different names and forms, all industrial parks could be defined in the following ways:

"*It is a separately designed business place under the national boundary where the rule of business doing are different from other places in the country. The government also gives special treatment and support for international and domestic investors that operate inside the industrial parks. Some of these special procedures are flexible investment conditions, easily access to international markets and lower customs, taxations and regulatory environment and create an enabling environment for enterprises that operate inside industrial parks* (FIAS, 2008)."

The construction and operation of industrial parks development projects are widely used as a major economic development strategy by most policy and decision-makers. A World Bank report revealed that there are more than three thousand industrial parks in 135 countries, which generate more than 68 million job opportunities and five hundred billion trade-related value additions (World Bank, 2008). Even though many economic theories demonstrate that industrial parks development projects have a positive impact through the inflow of foreign-owned investment, there is a shortage of empirical research that evaluates the economic impact of industrial parks development projects.

After the government of the Federal Democratic Republic of Ethiopia came to power in 1991, it has designed different policies and strategies to realize sustainable economic development in the country. Industrial parks development is one of the strategies that are designed to ensure sustainable economic development goals in Ethiopia. The Ethiopian Industrial policy has the objective of realizing sustainable economic development by modernizing industrial sectors in the

country. The policy is aimed at installing industry sectors that manufacture different products and contribute towards the country's long-term plan of realizing sustainable economic development goals and good living standards of Ethiopia by 2025. The Ethiopian government develops industrial policy to realize economic, social and political revolution in the country. This policy aims to contribute 27 per cent of national economic growth and modernize and globalize the role of industrial sectors in the country. The Ethiopian government designed the Industrial Parks Proclamation in 2014 with the following five major objectives; 1) Managing and regulating the establishment, construction and operation of Ethiopian Industrial Parks; 2) Creating conducive conditions for the development of technical and industrial infrastructure; 3) Enhancing the participation and role of the private sectors in the national economy; 4) Increasing the country's competitiveness in the global economy; 5) Creating abundant employment opportunities and realizing sustainable economic development goal in the country. Hence, the Ethiopian industrial parks development proclamation gives different incentives, as identified below, for both domestic and international investors:

Property Protection: The proclamation encourages international investors to operate inside the industrial parks either by their own capital or in cooperation with the local investors. A government secures the protection of their capital, assets, and profits.

Tax and customs subsidies: The government arranges different tax and customs break for enterprises that operate within the Ethiopian Industrial Parks. Furthermore, the government grants income exemptions for at least 5 to 10 years for investors operating within the industrial parks.

Free Shade provision: For investors operating within the industrial parks, the government gives free or highly discounted shade for their business.

This study aims to evaluate the economic impact of industrial parks development projects mainly in terms of measuring the micro economic and macro-economic impact of industrial parks development projects in Ethiopia as well as identify the factors that affect the Economic Impact of Industrial Parks Development Projects in Ethiopia.

1.2. Statement of the problem

Currently, existing empirical research revealed the mixed or inconclusive economic impact of industrial parks development projects. A significant number of researchers identified a positive and statistically significant impact of industrial parks development projects. These researchers recommend for policy and decision-makers of both developing and advanced nations to establish industrial parks as the best strategies to realize sustainable economic development. They revealed the positive impact of industrial parks development projects through its impact on enhancing inflows of foreign direct investment, generating job opportunities, and increasing export level (Chen, 1993; Jayanthakumaran, 2003; Monge-Gonzalez et al 2005; Warr, 1989; Zeng, 2010; Fuller and Romer, 2012; Hamada, 1974; Madani, 1999; World Bank, 1992; Kaplinsky, 1993; Johansson and Nilsson, 1997; Farole, 2011; FIAS, 2008; Balasubramanyam, 1988; and Willmore, 1995). These scholars revealed the role of industrial parks development projects for realizing sustainable economic development goals and reforming the macroeconomic sphere of a nation. They identified that most industrial parks development projects in East Asia's 'tiger economies' were the best example for reforming and upgrading industrial sectors. The mass expansion of industrial sectors development projects in China enhance foreign direct investment inflows and increase China's export-oriented manufacturing sectors. Furthermore, it enhances structural and economic reform in China. Alder et al (2013), Jenkins et al (1998), Miyagiwa (1986) and Wang (2013) found that industrial parks development enhances social welfare by increasing foreign direct investment inflows and diversifying export sectors.

On the other hand, other researchers such as Engman et al. (2007) revealed that the economic impact of industrial parks development is insignificant, and it distorts resource allocation. Hamada (1974) and Madani (1999) also concluded that the impact of industrial parks development depends on specific conditions over a limited time horizon. Chen (1995), Hamada (1974), Hamilton and Svensson (1982), and Wong (1986) argued that implementation of industrial parks development reduces well-being. Kaplinsky (1993) claims that the industrial parks development project "enclaves" the national investment direction of the nation. Ayres (1994) revealed that industrial parks development projects limit investment to the most potential sectors and disposes of other investments in the country. Humphrey (2000) revealed that optimum location advantage is the most influential factor that determines the impact of industrial parks development projects. Most investors have a location advantage in terms of easily

accessing the demand and supply market, easily hiring workers, tax and customs subsidies and other financial and non- financial support in order to penetrate the international markets. Unplanned and unnecessary industrial parks establishment and construction cause socio-economic wastage which includes empty industrial parks shades, unnecessary traffic on the road, sound and air pollution in the city, and unfit and unnecessary construction. Henriksen (1982) concluded that major consequences of unplanned establishment and construction of industrial parks are extended construction phase and useless capital investment. He recommended proper planning as the major strategy to optimize the economic impact of industrial parks development projects. He also revealed the major factors that diminish the economic impact of industrial parks development projects which included limited capacity of government for infrastructure arrangements (development), absence of one-stop shop services and lack of integration with the local economy. Many scholars also revealed that the major factors that cause the insignificant economic impact of industrial parks development include problems related to stakeholder identification, non-existence of clear policy and legal framework, absence of social and environmental impact assessment, shortage of labour force and the absence of industry-university linkage (Hamada, 1974; Hamilton & Svensson, 1982 and Wong, 1986).

The first Growth and Transformation Plan of Ethiopia aimed at encouraging and motivating the development of micro and small enterprises as the strategic focus for expanding the industrial sector's contribution to the national economy. Ethiopian Industrial Parks Development Corporation started operation in 2014 with the power to design, construct and manage Ethiopian Industrial Parks Development Projects throughout the country. As the stepping stone for initiating the construction and establishment of industrial parks development projects, the Industrial Parks Development Corporation evaluated the performance of the Textile and Leather manufacturing sectors in 2014. The result of the evaluation showed that Ethiopia had failed to reach targeted development in textile and leather exports due to the lack of mechanized industrial parks with the necessary institutions such as utilities, banks, customs and transport links. As the concept of industrial parks development projects is new in Ethiopia, there is limited research conducted to evaluate the economic impact of industrial parks development projects. The majority of research conducted in the area of industrial parks focused on identifying the implementation status, challenges, and prospects of industrial parks development projects (Hailu,

2014; Gebreeyesu, 2009; Mbreat, 2017; Azmach, 2019; Weldesilassie, 2017 and Gebreeyesus et al, 2017). Thus, this study aimed to fill these gaps by addressing the following three research questions: What are the factors that affect the economic impact of industrial parks development projects in Ethiopia? What is the macro economic impact of industrial parks development projects in Ethiopia? And what is the micro economic impact of industrial parks development projects in Ethiopia?

1.3. Research Gaps

Table 1: Research of gaps the study

Authors	Research Gaps
- Hailu (2014), Gebreeyesu (2009), Mbreat (2017), Azmach (2019), Weldesilassie (2017), Gebreeyesus (2017) - Berhe (2018), Jae H. Le (2015), Zhang et al (2018), Gebreeyesus et al (2015) - Oqubay (2018), Gizaw (2015), C Ezedinma (2018), Gebeyehu (2017) - Cling JP and G Letilly (2001), Ge Wei. (1999), Hamada K (1974) and Yeung et al. (2008)	- All researches conducted in the area of Industrial Park/Special Economic Zone in Ethiopia focused on the qualitative assessment of the challenges and opportunities of the implementation of industrial zone development. - All papers are narrow in scope in that they assess qualitatively, the implementation challenges and opportunities in the form of a case study for only one industrial park. - As the sample size selected in each study is not representative of the whole industrial park in the country, the finding, as well as the policy recommendation provided in each paper could not be generalized for the other industrial parks in the country. - The methods and methodology used in all papers could not measure the economic impact of Industrial Parks Development Projects. - Most of the studies conducted in the area of Industrial Parks in Ethiopia focus on identifying theoretically, the issues, practices and lessons for Ethiopia rather than quantitatively analysing the economic impact of the project

1.4. Purpose of the Study

The general purpose of the study is to evaluate the economic impact of the Industrial Parks development projects in Ethiopia.

1.5. Research Question of the Study

- What are the potential factors that affect the economic impact of industrial parks development projects in Ethiopia?
- What is the macro-economic impact of Industrial Parks Development Projects in Ethiopia?
- What is the micro-economic impact of Industrial Parks Development Projects in Ethiopia?

1.6. Potential Academic and Policy Contribution

- Ethiopia's economic policy makers aimed at industrial parks development projects as a marshal plan for sustainable economic development in the framework of the five-year Growth and Transformation Plan (GTP) of Ethiopia. Therefore, this research will provide a baseline for continuous research and assessment to identify the economic impact of the Industrial Park.
- Industrial Park/Special Economic Zone in Ethiopia is a new program that needs deep understanding and identification of its nature through continuous research and adoption of best practices. Therefore, the outcome of this research will be used as a stepping stone for administrators, managers, implementers, stakeholders, scholars, decision and policy makers of Ethiopia for improved industrial parks development projects.
- As the implementation of the Special Economic Zone is in its infant stage in Ethiopia, the conclusion and the policy recommendations from this study will be used as a guiding policy and input for the decision and policy makers of Ethiopia.
- By identifying the major factors that affect the economic impact of industrial parks development projects, this study will help the decision and policy makers to take necessary measures to get the maximum benefits from industrial parks development projects.
- For years it is well known that agriculture is the major backbone of the Ethiopian economy thus, the outcome of this research will project the impact of the industrial sector on Ethiopia's economy.
- As the implementation of the Industrial Park/Special Economic Zone is the new agenda in the macroeconomic policy of the country, the findings and the policy recommendations of the paper will

serve as evidence for decision and policy makers of Ethiopia to decide the future fate of Industrial Parks/Special Economic Zones in Ethiopia.

- To the best of authors' knowledge, there is no research that evaluates the economic impact of Industrial Park/Special Economic Zone development projects in Ethiopia. This paper is the first of its kind to measure the economic impact of Industrial Park and to present empirical evidence. Therefore, this study will serve as a baseline for continuous research and assessment to identify the economic impact of Industrial Park development projects.
- The outcomes of this research will serve as evidence for decision-making on whether to expand the project to the other zones or re-examine the implementation status of the currently established Industrial Park/Special Economic Zone project in Ethiopia.

The study assessed the major factors that affect the economic impact of industrial parks development projects in Ethiopia. Accordingly, existence of high community commitment, abundant non-financial resource, tangible government support and good social capital in Ethiopia as the major factors that boost the positive economic impact of industrial parks development project whereas existence of unskilled labour supply, concentration of Ethiopian Industrial parks in the urban areas and availability of out-dated technology in Ethiopia are the major factors that diminish the positive economic impact of the Ethiopian Industrial Parks Development Projects.

The study also aimed to evaluate the macro economic impact of industrial parks development projects for the second generation of Industrial Parks Development Projects in Ethiopia. The macroeconomic impact of Industrial Parks Development Project is measured by type and sources of investment, products and by-products of Industrial Parks, the value of fixed assets, the total wages and salaries of employees, domestic capital formation and the total number of employees employed in Industrial Enterprise. In the study annual value of Investment by type and source is measured by the value of investment in fixed assets and annual working capital of industrial enterprises, products and by-products is measured by the total annual sale values, total annual export and total annual value of production, the value of fixed assets is measured by annual value of investment for purchase and capital repair of fixed assets, the beginning and the end of year value of fixed assets, the wages and salaries of employees is measured by total annual wages of employees, the total wages for male employees and the total commission, bonus and professional

allowances for employees, the domestic capital formation is measured by total number of domestic investors/owners, total initial paid up capital by domestic investors and total working capital of domestic investors, the total numbers of persons employed in Industrial Enterprises is measured by total employees employed in industrial enterprises, total number of female employees employed in industrial enterprise and total number of persons employed per month in industrial enterprise.

The establishment and operation of Industrial Parks Development Projects doubled the value of investment in fixed assets, value of working capital, total sales value, the total export value, the total value of production, investment for the purchase and capital repairs of fixed assets and the bonuses, commission and professional allowances of employees in zones that have Industrial Parks Development Projects in their geographic setting relative to zones that have no Industrial Parks assuming ceteris paribus. The finding of the study also revealed that the establishment and operation of the Industrial Parks Development Project increased the book value of fixed assets at the beginning and the end of the year by 14 and 11 per cent, respectively for the zones that have industrial parks relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant. The total wages of employees' and total male wages increased by 5 and 55 percent, respectively in zones that have the Industrial Parks Development Projects in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant. The establishment and operation of Ethiopian Industrial Parks Development Projects significantly increased the total number of employees engaged in an industrial enterprise by 2,117 persons, total female employees by 501 persons and total number of employees hired per month by 260 persons in zones treated zones relative to controlled zones assuming all other controlled variables stay constant in the model. On the other hand, the establishment of Industrial Parks Development Projects have no significant impact on the total number of domestic investors, initial and working capital of domestic investors assuming ceteris paribus. Generally, the findings of the study show that establishment of industrial parks development projects significantly increase all macroeconomic variables listed above except domestic capital formation.

The study also examines the microeconomic impact of industrial parks development projects by assessing its impact at household level and individual levels. We used both qualitative and quantitative data collected through self-administered questionnaires, interviews with key informants and focus group discussion with the community that dwells around the industrial parks. These major household and community level variables address different micro economic issues which include: economic issues, social issues, political issues, environmental issues, cultural issues and Technological spill over issues. In all observed household level microeconomic variables, more than 50 per cent of respondents strongly agreed or agreed that industrial parks development and operation has positive impact on the household that dwell around the parks: Development of industrial parks enhances the beauty of the surrounding environment (77.32%), reduce sound pollution in the surrounding community (66.78%), increase social communication (70.36%), modernize labour force of surrounding community (71.94%), enhance social security of the community (64.19%), increase creativity skill of employees (61.66%), increase access to social service for the community around the parks (68.06%), strengthen domestic markets for surrounding community (59.42%), increase productivity of the surrounding community (65.82%) and increases the construction of infrastructure for the surrounding community (77.1%). Thus, the finding of this study shows the positive role of industrial parks development for the households that dwell around the parks. In both focus group discussion and interview with the surrounding community, researchers confirmed the positive effect of the construction and operation of industrial parks for the surrounding community.

The study also shows that more than 50 per cent of the respondents strongly agree and agree with the positive role of industrial parks development for individuals that work in industrial parks development projects: create employment opportunities (89.57%), provide health insurance (60.97%), provide social security for employees (62.91%), provide capacity building training (60.65 %), Provide special incentive package for workers (56.58 %), increase knowledge and knowhow of employees (76.77 %), increase per capita income of employees (59.04 %), increase the living standard of employees (57.42 %) and encourage domestic investors (61.03 %). The finding supports the conclusion reached from interviews and focus group discussions with industrial parks' community. All participants confirmed the positive role of industrial parks development projects for their livelihood.

The study logically is organized in to such a manner. Part one present the introduction of the study, part two review theoretical and empirical literature, part three presents the methods and methodologies for data collection and analysis, part four contain analysis, presentation and discussion, part five offers conclusion and policy implication of the study and part six present references.

2. Literature Review

2.1. Concept of Industrial Parks/ Special Economic Zones

The idea of Industrial Park Development started during the industrial revolution in the 18th century with the objective of expanding industrialization. The earlier industrial parks had different causes and types for their construction and establishment. Some industrial parks were narrow in scope and few in number while others were large in scope and many in numbers. There are many categorizations of industrial parks depending on park specialization, and ownership of the parks and land. There is no single definition of industrial parks that all scholars agree on. Many authors give different definitions for the concept of industrial parks (Ahrens and Meyer-Baudeck, 1995, Rhee et al, 1990). UNIDO defined Industrial parks as "Special land with the necessary infrastructure arranged for domestic and international investors to design, develop and operate industry" (UNIDO, 1997).

Many scholars recommend Industrial park development as one of the best strategies for large-scale industrialization and urbanization. As a means of large-scale expansion of industry, industrial park development would increase the competitive power of enterprises through enhancing the productivity and efficiency of enterprises that operate inside industrial parks. It is also used as means to tackle the major macroeconomic problems like market failure, lack of modern technology and capital, lack of infrastructure, and outstanding policy and framework (Memedović, 2012).

As mentioned by Jarmila (2010) the evolution and expansion of industrial parks have different stages/phases of development. The first phase of Industrial Parks Development was started around the beginning of the 1970s which was highly administered and supported by the government. The second stage/phase of industrial parks development was started in the late 1970s and 1980s and was characterized by specialization in science, technology and business. The third phase/stage of industrial parks development which started in the 1990s gave more subsidies and freedom for industries to operate. After the 1990s, the roles of the private sector in the development of industrial parks increased, leading to improved service, enhanced efficiency

and effectiveness. The fourth generation of industrial parks development encourages the installation of modern technology and innovation as well as develops a good working and living environment for employees and society around the industrial parks (Jarmila, 2010).

2.2. Theoretical Literature

One of the advantages of the theoretical framework is to design what we know and what other researchers analyzed about the issue at any particular timeframe. As many policy makers in developing countries desired to change their economic status, they developed different framework for industrial park development. The study of industrial park development is multidimensional and multi-disciplinary, which encapsulates the works of different scholars from economics, political science, sociology and geography. Thus, the complexity of industrial park study implies the absence of a single analytical tool for further exploration and analysis. To reduce the scope of analyzing the impact of industrial parks development projects and minimize the complexity of the industrial park development project, different scholars designed five theoretical models classified as; (1) the neo-classical approach (orthodox view), (2) the political economy approach, (3) the heterodox approach, (4) the value chain approach and (5) the agglomeration economic approach (Baissac, 1996).

1. The Neo-Classical Approach (Orthodox View)

Under this theoretical framework, the industrial park development project is aimed at promoting international trade through facilitating an open and free trade policy framework. The scholars under this theoretical framework recommend the government to adopt free trade policy. From the static perspective, industrial parks development is considered as a distortionary trade instrument. The supporters of this ideology argue that industrial park development negatively affects both domestic and international trade, increases unfair competition between local and international investors, decreases government income and unless the government fully frees the rest of the economy, it will act as a major obstacle to product and production.

2. The Political Economy Approach

This theoretical framework of industrial parks development is based on public choice theory (Buchanan and Tullock, 1962). The scholars under this framework argued that the interference of

decision-makers encouraged lobbying interest groups for rent-seeking. This theoretical framework highly supports the principle of minimalist government intervention and full liberalization of the macroeconomic sphere of a nation. According to this theory the best strategy for the growth of a nation is free trade with minimum government intervention (Khan, 2004).

3. The Heterodox Approach

This school of thought argues that the interaction between state and market would determine the macroeconomic growth of a nation. Government intervention would maximize the investment level, human resource development, learning and innovation of new technology, institutional framework, and reforms (Chang, 2002). The heterodox school of thought depends on endogenous growth literature, developmental state and new institutional theories. The scholars under this school of thought argued that the local firms lack necessary managerial, technical, and marketing know-how and rarely participate in international trade. Thus, governments need to establish industrial parks to fill this market failure. By creating an enabling and attractive investment environment such as good infrastructure, good governance, easy and simple regulatory environment, trained labor, tax incentives, finance, and geographic location, the industrial park development will serve as a stepping stone to attract foreign investors. The existence of foreign investors would help the economy to benefit from direct and indirect spillover effects. Some of the spills over effects are human resource and administration skills from different training and day-to-day activities, copying and demonstration effects among others. The development and operation of industrial parks will increase the experience and know-how sharing for domestic investors and employees (Milberg, 2007). These scholars conclude that if the macroeconomic environment of the country significantly liberalized and improved, construction and expansion of industrial parks would be unnecessary.

4. The Global Value Chain Approach

As our world economically integrates and becomes one global village, the concepts of global value chains have become more pronounced. Because of globalization, the whole production cycle is shared among countries in which each stage could be run wherever the necessary ingredient is available through either off-shore outsourcing and/or offshoring. Offshore Outsourcing is sharing the parts of the whole cycle of production with other enterprises that have

deep knowledge in the area whereas offshoring is about investing capital in other countries through foreign direct investment techniques. Therefore, industrial parks development will enhance offshore outsourcing as well as offshoring through creating conducive investment climate like improved infrastructure and reducing bureaucracy to work in the parks. The construction and expansion of industrial parks development will enhance both domestic and foreign investment. The East Asian industrial parks development projects were the best examples for learning by exporting industrial parks output. As analyzed by Gereffi (1999), they upgraded from a simple assembly of imported products to more sophisticated and advanced technology operations and the export of their own branded products to international markets. Thus, industrial parks development and operation is a means to enhance offshore outsourcing and off shoring activities (Gereffi, 1999).

5. Agglomeration Economies Approach

This framework is aimed at reallocating resources to enhance productivity and innovativeness. This reallocation enhances the know-how spill over, sharing of resources and labour pooling. The scholars that support this school of thought believe that industrial parks is a government supported group of export-oriented investors, both domestic and international firms, and designed to maximize the benefits arising from global value chains. These groups of domestic and foreign firms increase productivity and innovation by attracting the latest technology, skill and know-how as well as by supporting enterprises, research and education institutions (Kim and Zhang, 2008).

2.3. Industrial Park Development in Ethiopia

Among developing countries, Ethiopia's socio-economic progress is impressive and its economy has, on average, experienced double-digit growth for more than two decades (World Bank, 2011). In order to realize sustainable economic growth, the Ethiopian government designed different long-term and short-term policies and strategies such as the first and second Growth and Transformation Plan (GTP 1 and 2) since 2010/11. Under this plan, the role of the private sector is boldly stated in terms of modernizing the agricultural and industrial sectors (Zeng, 2015 and MoI, 2015). The growth and transformation plan set the policy matrix for industrialization through developing industrial parks. Ethiopia's Growth and transformation plan supported by the Ethiopian Investment Proclamation No. 769/2012 targeted the industrialization of Ethiopia in a

short period. Ethiopia's investment proclamation guarantees the protection of private property rights and the repatriation of capital and profit (COMCEC, 2017). Thus, the Ethiopian government has designed industrial parks development projects to overcome two major macroeconomic problems which are access to land and high bureaucracy to start a business.

i. Ethiopian Industrial Parks Legislations and Regulations

The Ethiopian industrial park development program is guided by Industrial Parks Proclamation No. 886/2015 and investment proclamation No. 769/2012. The major objectives of the industrial parks proclamation are to draw the private investor in manufacturing sectors, increase the global competitiveness of the economy, create job opportunities in the country and realize sustainable economic development. The act also lays out the rights and obligations of the Industrial parks developer which include (1) providing industrial parkland, (2) giving necessary services for investors in the industrial parks, (3) providing a one-stop-shop facility, (4) taking advantage of incentives offered, and (5) replacing foreign workers by Ethiopians by providing the necessary training (FDRE Proclamation No. 886/2012).

ii. Organizational and Administrative Profile

The national organ for establishing and managing the industrial parks was designed in 2014 and was called Ethiopian Industrial Parks Development Corporation (IPDC). The major mandate of this organ is developing and administering Ethiopia's industrial parks, which includes leasing developed land and ensuring that Ethiopia's Industrial Park Development Corporation cooperates with Ethiopian Investment Commission and Ethiopian Revenues and Customs Authority to facilitate one-stop-shop service inside the industrial parks.

2.4. Why Industrial Parks Development Projects in Ethiopia?

a. To realize sustainable economic development in Ethiopia

Ethiopia is the second populous country and the fifth largest economy in Africa. After the socialist Derg government was defeated in 1991, Ethiopia underwent different structural and economic reforms (Selam 2017). Since then the country is experiencing double-digit economic growth which is greater than the regional average economic growth rate.

b. To Increase the role of the Industrial Sector in the Country

According to a report by the Ethiopian Central Statistical Agency, Ethiopia's economic growth is continuously increasing with the manufacturing sector leading in its contribution to the growth trajectory. The contribution of the industrial sector to the country's real GDP growth rate is 20.6 per cent. Thus, the roles of industrial sectors are continuously increasing for sustaining economic growth in Ethiopia ((Zhang et al 2018). The construction and operation of the Ethiopian Industrial Parks Development Project would accelerate the contribution of the industry sector to the national economy.

c. To Balance Current Account Deficit

About a decade ago the current account deficit of Ethiopian decreased because of the continuous reduction in import level. The level of export in the country remains low for quite a long period of time. According to the report by COMTRADE (2016), Ethiopia exported 1.71 billion dollar and imported 19.1 billion dollars with a -4.45 per cent reduction of imported value compared to the year 2011. Thus, the establishment of Industrial parks development projects was to reduce the negative balance of trade of the country.

d. To reduce the shortage of foreign currency

Like most developing countries, Ethiopia most often experiences a shortage of foreign exchange earnings. According to a report from the Central Statistical Agency of Ethiopia, by the end of 2016/17, national gross foreign exchange reserves were $3.2 billion, which will cover approximately 1.8 months of imports of goods and services. Shortage of foreign currency has a negative impact on business operations in the country. The shortage of foreign currency has been identified as a cause of the poor performance of the manufacturing sector. Industrial parks development strategies of Ethiopia were thus adopted to solve this major obstacle facing Ethiopia's economy (Zhang et al 2018).

e. To reduce the national debt

International debt servicing has a significant negative impact on Ethiopian economic growth. According to a report by the International Monetary Fund (IMF), Ethiopia's level of external debt is continuously increasing because of the government's high infrastructure investment. In 2016, the total tax revenue was 11.8 per cent of the GDP which was 3.2 per cent below the targeted goal. Thus, the development of industrial parks is the best strategy for the Ethiopian government to increase the total revenue for the country (Zhang et al 2018).

f. To increase the Role of Private Sectors in the National Economy

In most developing countries, the major public projects are carried out by the government. These government-funded projects are productive in the long run but increase the external imbalance in the short run. This imbalance would significantly affect the development of an effective private sector. Thus, the development of industrial parks would increase both the domestic and foreign private sector leading to the macroeconomic growth of the nation (Zhang et al 2018).

2.5. Empirical Literature

Many researchers have analyzed the effects and contributions of industrial parks development from different dimensions. Numerous documented researches revealed that industrial park development has a statistically significant impact on the economic growth of both developing and developed nations. Most policy and decision-makers develop industrial parks to reduce the level of unemployment and shortage of foreign exchange. Thus, many empirical researches revealed the real contribution of industrial park development in terms of reducing the level of unemployment in many developing countries. Selam (2017) revealed that Eastern industrial park development in Ethiopia has a significant impact on creating employment opportunities, government revenue, capital investment, technological spill-over, and cultural integration. He also identified insufficient local market, complex bureaucracy to get public service, and shortage of foreign currency as the major problems impeding the development of industrial parks. Bayisa (2016) revealed that industrial park development would increase industrialization through attracting foreign direct investment; enhance the export level, create job opportunities, increase capital investment and create a long-term dynamic effect on the domestic economy. Furthermore, Olga (2010) revealed the significant economic impact of special economic zone development in Poland. Johansson (1994), on the other hand, found three main factors to optimize the positive impact of industrial parks development on the economic development of Mauritius. First, the development of industrial parks would act as a motivational tool to attract export-oriented production. Second, industrial parks development will enhance knowledge and know-how for industrial park workers. Lastly, industrial park development would have a positive impact on improving trade-related structural reform. Romero (1995) identified the major factors that determine the level and amount of wage paid in industrial parks to be whether the employees in industrial parks are organized or not. In a study conducted in Bangladesh by Mondol (2003) shows that the minimum wage paid in the industrial parks is greater than the minimum wage paid

in the economy. The researcher confirms the necessity of the existence of labour unions to realize high minimum wages in industrial parks.

Many developing countries are following import substitution and export promotion strategies. Policy and decision-makers in developing countries are taking development and expansion of industrial park development as the best strategies to realize their goals of import substitution and export promotion. Furthermore, the development and expansion of industrial parks are used as the key weapon to catalyze economic development as well as to get additional capital and investment, knowledge and know-how, and technology transfer and employment generation. According to a report by the International Labour Organization (ILO), in 2003, around the globe, there are around 176 industrial zones in 47 countries. But these numbers increased by more than 3,000 in 116 countries after ten years. The majority of these industrial parks are in developing countries. There is also controversy on the impact of industrial parks development projects on labour standards, labour relations, and human capital. Some researchers conclude that as firms and investors in industrial parks are profit-oriented, all the labour standards, labour laws, human rights, health, and safety and environmental concerns are completely forgotten (ILO, 1998; ICFTU, 2004; PRIA, 2000; Hossain, 2001; Mazumdar, 2001 and Kemal 2001). The other groups of the study found the significant role of industrial parks development on human capital development (ILO/UNCTC, 1988; Basile and Germidis, 1984 and Willmore 1995).

Impact of industrial parks development project on the private sector

Evaluating the impact of industrial parks development projects on domestic enterprise has many challenges such as lack of well-managed data and difficultly of getting the right control group to make the right comparison. According to a study conducted by FIAS (2008), industrial parks development generates around 68 million direct jobs and US$ 851 billion worth of exports. Alder S et al. (2013) in their study analyzed the economic impact of industrial parks development in China using panel data of 270 cities. Their study revealed that the development of industrial parks increased the GDP level by 12 per cent. Wang (2013) in his study conducted in China using panel data from 1978 to 2008, revealed that Industrial parks development increased per capita foreign direct investment by 21.7 per cent and Foreign Direct Investment by

6.9 per cent and the technological spill-over by 1.6 percentage point and the wage level by 8 per cent for treated group relative to control group in his study. Johansson and Nilsson (1997) in their study revealed that industrial parks development has a positive and statistically significant impact on economic development in Malaysia, Mauritius, and Sri Lanka. Their finding also revealed the positive economic impact of industrial parks development is more significant when the country follows the outward-looking and export-oriented policies at a national level. According to a report from FIAS (2008), the Philippines benefits from industrial parks development through agro-industry, tourism, recreation, commerce, and financial service.

A report by IFC (2016) revealed as industrial parks development plays a critical role in enhancing the economic growth of a nation as well as generating mass employment. For instance, Jebel Ali Industrial Parks in Dubai hired more than 170,000 employees. Aqaba Industrial Parks in Jordan hired more than 10,000 employees. In Bangladesh, eight industrial parks hired more than 350,000 workers. In most developing countries industrial parks play a great role in terms of generating employment opportunities. For instance in the Dominican Republic, more than 500 employees were hired in Industrial parks but this number jumped to more than 200,000 in 2007. In Costa Rica, industrial parks play great a role in terms of increasing the level of export in the country. In 1990, less than 10 per cent of the total export was contributed by-products produced in industrial parks but the share of exports from products by industrial parks jumped to more than 55 per cent in 2003 (FIAS, 2008).

- Impact on export and diversification

Johansson and Nilsson (1997) revealed that, for countries that practice export promotion strategies, the development and expansion of industrial parks would increase the level of export in their economy. Rhee et al. (1990) in their study gives two opposing views from Mexico and the Dominican Republic. Mexico followed export promotion policy in the economy and this motivated the use of industrial parks to play a great role to increase employment and promote a high level of productivity. On the other hand, Dominican Republic practiced import substitution and trade barriers. This hinders industrial parks from playing a great role in the export sector of the country. As Carneiro et al. (2015) mentioned in their study, industrial parks play an insignificant role in economic development. Aggarwal (2000) and Aggarwal et al. (2005)

analyzed the impact of industrial parks on the economy and found mixed results in their study. In the long run, industrial parks development has an insignificant impact on India's economy where as in the short run it has apositive impact on Bangladesh and Sri Lanka's economies (Aggarwal et al. 2008).

- Technological Spill over and Modernization of Industry

The impact of industrial parks development on industrial upgrading and technological transfer has a mixed result. Different researchers concluded that industrial parks development would not play a significant role in terms of enhancing the skills and know-how of industrial parks workers (Chen, 1995; Hamada, 1974; Hamilton and Svensson, 1982 and Wong, 1986). On the other hand, researcher likes Lall (2000) show that industrial parks development played a catalytic role in the expansion of industrialization in different countries.

- Firm-level performance

There are not many research conducted to evaluate the impact of industrial parks development projects on firm-level performance. Aggarwal et al. (2008) found that park site place, availability of quality infrastructure, and institutional framework of the parks highly influence firm-level performance in parks. Rhee et al. (1990) in their study analyzed the association among overseas and local firms as well as the impact of industrial parks on firm-level performance. In their study, they found that the performance of foreign firms' is better than domestic firms in industrial parks. The authors also identified the knowledge and technical skills that foreign investors shared with domestic firms.

- Labour-market outcomes

Different authors have assessed the impact of industrial parks development on labour market outcomes such as job generation, working conditions and labour union. Cirera and Lakshman (2014) analyzed the impact of industrial parks development on employments generation, wages, and labour conditions. Their study shows the unsatisfactory impact of industrial parks on these three variables. Cling et al (2005) revealed that labour unionization is more practiced in industrial parks than outside the industrial parks in Madagascar. The finding from International Labour Organization (2008), as well as Sen and Dasgupta (2008), support the above finding. On

the other hand, Ver Beek (2001) revealed less unionization inside the industrial parks, while Zohir (2001) shows that unionization is completely forbidden inside industrial parks.

All research conducted to analyze the impact of industrial parks development projects on the health of industrial parks workers' shows conflicting results. Liberato and Fennell (2007) in a study conducted in the Dominican Republic revealed that the workers inside industrial parks have a high probability of hospitalization relative to workers outside the industrial parks. On the other hand, Guendelman and Silberg (1993) in their study which compared the health status of workers inside the industrial parks and outside the industrial parks in Mexico showed the absence of morbidity difference between women hired in Maquilador Industrial parks and other sectors.

2.6. The Economic Arguments For and Against Industrial parks Development projects

The Neo-classical school of thought explained that industrial parks development has a negative impact on the economic development of a nation through increasing inefficiency by altering production away from its comparative advantage (Hamada, 1974). On the other hand, Devereux and Chen (1995) argued that the development of industrial parks would increase the welfare of society. Warr oppose the neo-classical school of thought and argued that:

*"Warr (1989) by assuring the international mobility of capital rejected the assumption of the neo-classical school of thought. Lastly, Warr concluded the irrelevance of most of the study conducted in the area of industrial parks development projects" (*Warr, 1989).

Depending on Warr's argument, the benefits of industrial parks development includes the following:

A. Foreign Currency earning

The major purpose of developing industrial parks is to get enough foreign exchange earnings. Many scholars and policy makers argue that the development and expansion of industrial parks development projects would increase the foreign exchange earning potential (Azmach, 2019).

B. Tax Government Revenue

Evidently, the development of industrial parks will reduce the tax revenue of the government in the short run. In the long run the tax revenue of the government would increase (Azmach, 2019).

C. Technology Transfer and Knowledge Spill-Over

Decision and policy makers of many countries implicitly believe that the development and expansion of industrial parks would increase technological and knowledge transfer. Eventually such transfer and catalyst effect of industrial parks development projects would increase industrial development in developing countries (Azmach, 2019).

D. Women and industrial parks Employment

According to the study conducted by Summerfield (1995), many managers and administrative bodies want to hire women workers for the following reasons: first, most women workers will not stay for a long period in the industrial parks and so they do not participate in the organizing labor union. Second, plant managers believe that women workers are diligent and dexterous. Lastly, women workers ask for a lower wage relative to men workers.

E. Human Capital Development

Many researchers confirmed the knowledge spill over effects of industrial parks development. Informally it is generally agreeable that construction and operation of industrial parks would increase the probability of knowledge and know-how sharing because of on-the-job and off-the-job training and learning from doing (Azmach, 2019).

Rhee (1990) in his study analyzed how industrial parks development enhances the labour force productivity. He reports that in the first three months of a firm's operation, the labour productivity learning curve is very steep. After the first three years, the labour productivity learning curve turns to flatten. The knowledge and skill spill over would increase the earning of employees. Furthermore, it would increase the knowledge of a country's citizens as some employees are trained at the administrative and supervisory level.

F. Industrial upgrading

Many researchers confirmed that industrial parks development and expansion would lead to industrial upgrading and development. Lall (2000) revealed that industrial parks development has a significant role in the industrial upgrading and expansion in East Asian emerging economies like the Republic of Korea, China, Malaysia and the Philippines. A report by FIAS

(2000) also documented that the Philippines' economic parks enhanced the skills and knowhow of employees where the production upgraded innovation and research and development phases (Azmach, 2019).

G. Industrial Parks Development as employment creators

Many policy and decision-makers hope that the development and expansion of industrial parks would be a significant source of employment. Previously conducted papers confirmed three channels through which industrial parks development could affect human capabilities:

- Creating employment opportunities
- Human Resource Development
- Technological Spill Over

i. Creating Employment Opportunities

The direct jobs generated under industrial parks development highly depend on the size of the country concerned. Small countries mostly use industrial parks development as a strategic tool to generate employment opportunities for an active population. In small countries like Mauritius, Dominican Republic, and Costa Rica, a large number of the active population were hired in industrial parks. The employment generation role of industrial parks development is marginal for large countries. Whereas in large countries like Korea, Malaysia, and Indonesia insignificant number of the labours force were hired in industrial parks. Warden (2000) revealed that in Maquiladoras industrial parks of Mexico, despite their importance in the economy and export sectors, their employment contribution was insignificant. Only three per-cent of labour forces were hired in Mexico's industrial parks.

ii. Human Resource Development

Kusago and Tzannatos (1998) revealed in their study that industrial parks development would contribute to skill formation through training and learning by doing on the job. The industrial parks development directly enhances the skill and knowhow formation by providing workers both on and off-job training and experience sharing platform. Domestic employees of industrial parks' firm are mostly sent to their headquarters abroad or elsewhere for management training, experience sharing, and advanced technical training. The other approach for skill formation is through upgrading the education system. In Shenzhen industrial park in China, Sri Lankan industrial Park, and Mexican Maquiladoras industrial park, educational institutions are established to enhance the technical and vocational skills of employees in industrial parks.

iii. Technology Upgrading Effects

Gereffi (2005) in his study revealed that the development of industrial parks enhances the participation of domestic enterprises in the international value chain. These competitions enable firms to learn new knowledge and innovations which are important for human development. Gereffi et al. (2005) identified two types of value chain approaches: Producer-driven and buyer – driven value chain approaches. In the producer-driven value chains approach multinational enterprises (MNEs) outsource the production parts. Under this value chains approach multinational enterprises would provide technology and innovation for partner local producers. On the other hand, under buyer-driven value chains approaches multinational enterprises are marketers of products only. Under this approach, partner producers acquire the necessary raw materials and technology themselves. Heron (2004) revealed that participation under this value chains approaches allows partner firms to upgrade technologically on continuously.

H. Social and Environmental Sustainability:

There are different views on the social and environmental impact of industrial parks development projects. The social, economic and environmental impact of industrial parks is closely interrelated. Various evidences show that industrial parks that ignore the human resource development effect and environmental impact of industrial parks development projects are less likely to achieve their target profit from industrial parks development projects. On the other hand, industrial parks programs that provide due attention to the social and environmental impact of the parks' will be successful. Kusago and Tzannaos (1998) and Milberg and Amangual (2008) revealed the social impact of industrial parks development and expansion through the ratio of permanent women workers in the parks (Neves et al, 2019).

I. Local Market Linkages

In the development of industrial parks, there are two concepts that explain the linkage between domestic producers and firms inside the industrial parks: Forward and Backward linkage. Forward linkage is the buyer-driven partnerships between the local producers and producers inside the industrial parks. On the other hand, under the backward linkage, the local producer makes partnerships to supply raw materials and service for the firms inside industrial parks. Thus, this partnership will encourage the local producers to learn and adopt new technology and innovation from international producers (Neves, 2019).

The negative impact of Industrial Parks Development Projects

i. Industrial Parks and Economic Policy Environment

Different Scholars such as Schuur (2001), Needham and Louw (2003), Louw et al. (2004) and Blaauw (2007) identified the major negative impacts of industrial parks development on the macro and micro economic sphere of the country. Industrial parks development negatively affects the market value of assets around the parks due to a multitude of perceived dismantles such as noise, road crowdedness, congestion, environmental pollution and obstruction view. Farber (1998) analyzed a survey of different papers on the impact of undesirable facilities on house values. The study confirmed that, the existence of landfills, waste sites; and hazardous manufacturing facilities negatively affect the market value of properties around the parks. Visser and Van Dam (2006) analyzed the impact of the presence of parks, open space and industrial land, nature and quality of the building, social status of the neighbourhood, distance to services and infrastructure on house market value.

Many researchers criticize the impact of industrial parks development on social and environmental grounds versus economic grounds. Most scholars show the negative impact of industrial parks development on women, labour and working conditions. These scholars claim that women are highly exploited to work with lower salaries relative to their male counterparts. In addition, there is no training and experience sharing platform for women. Furthermore, these scholars claim that in most industrial parks the labour union is highly prohibited. This gives opportunities for managers and the administrative body of industrial parks to suppress the labour standards and labour rights. Jauch (2002) revealed that industrial parks have lax environmental standards.

ii. Working conditions*:*

ICFTU (2004) and Phillips and Xaba (2002) assessed the living condition of labour inside the industrial parks. They concluded that violation of workers' rights; mandatory overtime work, poor job security and poor working condition are highly widespread inside the industrial parks. Different economic researchers claim the existence of negative labour exploitation inside industrial parks: Sri Lanka (Voice of Women, 1983; Bastian, 1984; Hettiarachchi, 1991), India (Dewan, 2001; Majumdar, 2001; PRIA, 2000), Bangladesh (Hossain, 2001).

2.7. Factors that affect economic Impact of Industrial Parks

There are many factors that optimize or diminish the economic impact of industrial parks development projects in Ethiopia:

Potential factors that optimize the impact of industrial parks

1. Active government follow up

China has good practice and experience in building and managing global partnerships. Most developing countries by sharing this experience; show high commitment to developing and expanding the global partnership to construct and operate industrial parks development. The Ethiopian government has actively participated in the development of industrial parks since the announcement of the proclamation of the industrial parks in 2015. The major mandate of Industrial parks the Development Corporation is to develop and closely administer industrial parks development in Ethiopia (Anh, 2019).

2. Presence of quality infrastructure around the parks

In most countries, the major obstacle to developing and expanding industrial parks is the lack of adequate infrastructures such as power, roads, water, sanitation and others around the parks. The Ethiopian government built the necessary infrastructure before building the industrial parks (Anh, 2019).

3. Linkage with the domestic market

To optimize the economic impact of industrial parks development project generally in Africa and particularly in Ethiopia, policy, and decision-makers need to develop an environment that facilitates linkage between domestic private sectors and foreign enterprises investing inside industrial parks. One of the strategies that motivate this bond is to create a conducive environment for local investors to start operations inside industrial parks (Anh, 2019).

4. Promote Transparency and Communication within the Community:

For sustainable and fruitful industrial parks development, transparency and community relations play a significant role. Furthermore, good bonding with the local business and the community is important to realize the sustainable development of the parks (Anh, 2019).

Factors that diminish the impact of Industrial Parks

- **Unstable Socio-political situation**

Farole (2011), in his study sponsored by World Bank, analyzed the major constraints facing the effective implementation of Industrial Parks Development. He compared Ghana, Kenya, Lesotho, Nigeria, and Senegal with Dominican Republic, Honduras, Vietnam, and Bangladesh. He revealed that African countries which have good institutional framework such as Kenya and Ghana have a positive impact on industrial parks development whereas in the majority of African countries' industrial parks are ineffective. The study showed that the effectiveness and efficiency of African industrial parks in terms of investment, exports and employment creation is lower than peers in other continents. Farole (2011) revealed the weak business environment as the major reason for the poor performance of industrial parks in Africa. Zeng (2015) in his study revealed that most African countries with the exception of Mauritius were not successful in implementing industrial parks development (Anh, 2019).

- **Absence of effective legal and institutional framework**

Most African counties do not have a good business environment that enhances the productivity of industrial parks development. The legal system, governance approaches and institutional framework for construction and operation of industrial parks are out-dated and the level of corruption and bad bureaucracy is very high. Thus, all these drawbacks highly discourage potential investors to invest in African countries (Anh, 2019).

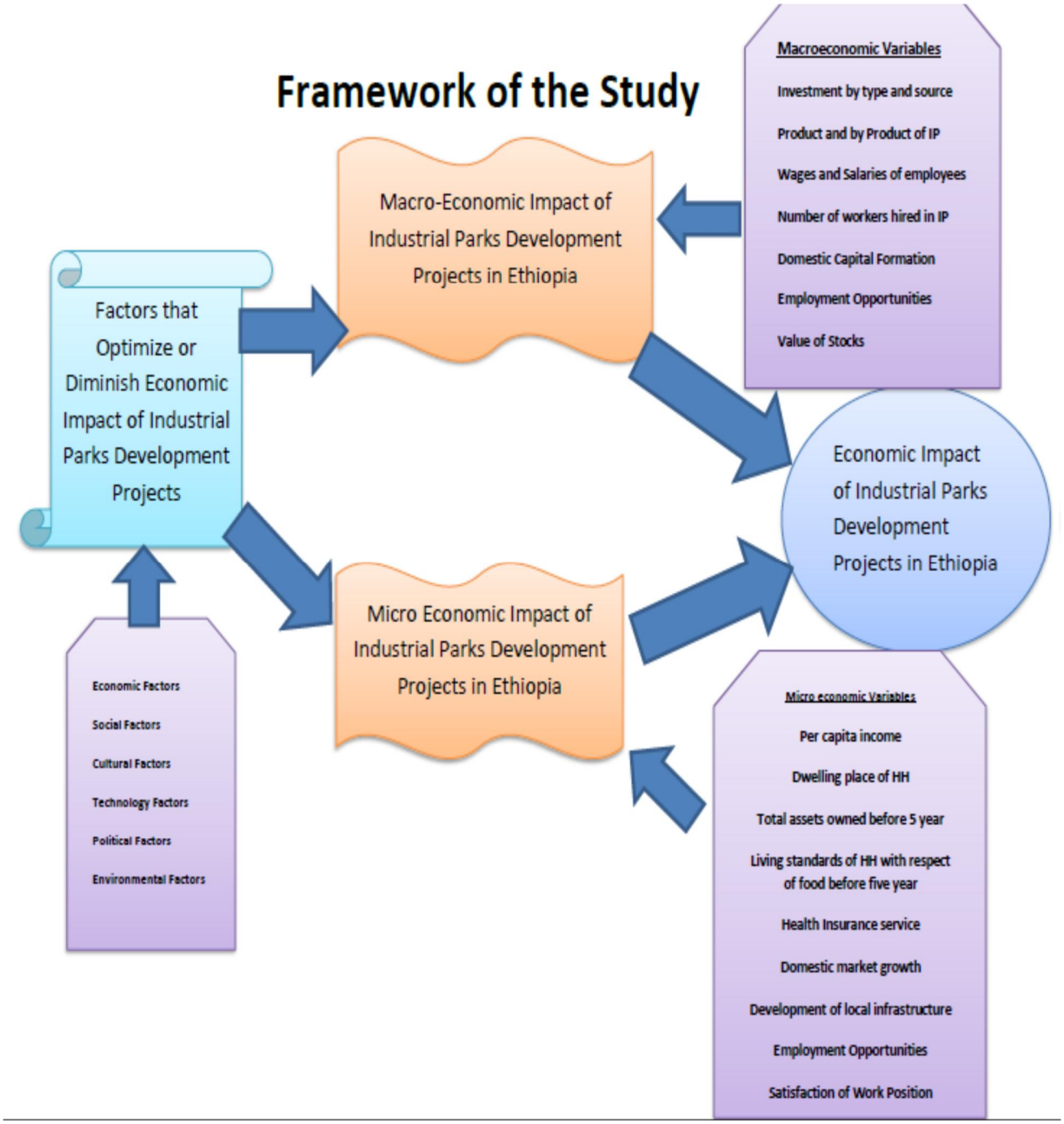
- **Existence of complex bureaucracy**

In many African countries the bureaucracy and costs of doing business are very high. The business environment is not comfortable for potential investors to register and start a business in many African Countries. Furthermore, in most African countries, the one-stop-shops are ineffectively implemented to deliver their mandates (Anh, 2019).

- **Lack of strategic planning**

If the national industrial parks development strategy is well planned and administered, it will be the strategic tool for realizing industrial and sustainable economic development in developing countries. The most successful industrial parks in Malaysia, China, the Republic of Korea and Mauritius establish a strong bond with other business sectors. On the other hand, most industrial parks in Africa are motivated by political will and they don't have good business-driven approaches (Anh, 2019).

Figure 1: Framework of the Study



3. Methods and Methodology

3.1. Identification strategy

In 2008, the Ethiopian government designed Industrial Parks Development Strategy and constructed the first group of Industrial Parks named Eastern Industrial Park. Based on the economic contribution of the first generation of Industrial Parks Development in Ethiopia, since 2014 the federal government (Ethiopia Industrial Parks Development Corporation) expanded the Industrial Park/Special Economic Zone experiment to different zones, special zones and city administrations of the country. Thus, there is the availability of both time and geographic variations to evaluate the economic impact of Industrial Park/Special Economic Zone Development Projects in Ethiopia.

3.2. Study Area/ Geographic Setting of the Study

This study is conducted in the **Federal Democratic Republic of Ethiopia**. The Federal Democratic Republic of Ethiopia comprises of ten Regions, 68 Zones, 770 Woredas and two federal-level City Administrations. This study focused on 68 Zones and 2 federal City Administrations where Industrial Park project experiments have been conducted. According to a report by the Investment Commission, the federal government authorized zones to establish Industrial Parks depending on their geographic location, industrial sectors development and supply of labor market. Currently, the Industrial Parks project is operating in 28 zones and special zones, and 2 city administrations. Thus, these zones, special zones and city administrations are considered as the treated zones and others as controlled zones.

3.3. Research Design

To evaluate the economic impact of Industrial parks development projects, both qualitative and quantitative research designs were employed. The mixed methods of research design help to analyze both qualitative and quantitative data to fully answer the major research questions of the study. To answer the research questions of the study, we used both primary data (using a survey questionnaire, focus group discussions and in-depth interviews) and secondary data. The questionnaire was filled by workers in Ethiopian industrial parks, managers and administrators of the industrial parks, and the people that live around industrial parks. The managers and

administrators of the industrial parks were invited for focus group discussions and interviews. The main sources of secondary data were the Ethiopian Investment Commission, Ethiopian Industrial Park Development Corporation, Central Statistical Agency (CSA), all Ethiopian Industrial Parks and from each Zones and Special Zones Investment Commission.

3.4. Dataset on Ethiopian Zones area

In order to evaluate the economic impact of Industrial Parks development projects, we collected a panel dataset on 68 zones, special zones and two federal-level city administrations in Ethiopia. The dataset tracks data from the zones and the city administrations on annual investments by type and sources, products and by-products outcome (Total Sales Values, Total Export Value, Annual Value of Production and Average sales per unit per dollar), the book value of fixed assets, total wages and other benefits for employee, domestic capital formation and the total number of employees employed in industrial enterprise. The authors mainly constructed these panel datasets using raw data from Central Statistical Agency, Ethiopian Investment Commission, Ethiopian Industrial Park Development Corporation, surveys from all Ethiopian industrial parks and for all zones from their respective offices.

Again, we collected microeconomic variables which included Employment opportunities, per capita income, the living standards of employees, the dwelling place of employees, total assets of employees, total assets of employees before five years, improvement of household skill and knowledge, availability of social service, enhanced management and administration skill, availability of health insurance service, social security coverage, enhanced implementation capacity of employees, the domestic market for local community and development of local infrastructure. Lastly to identify the factors that affect (diminish or optimize) the economic impact of industrial parks development projects, we gathered the potential economic, social, environmental, technical, cultural, and political factors that optimize or diminish the economic impact of industrial parks development projects in Ethiopia.

Industrial Parks/Industrial Zone Development Index

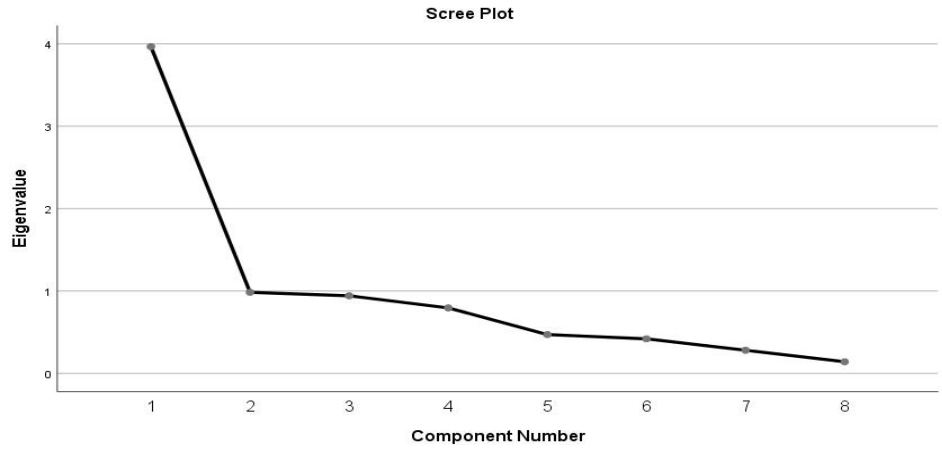
$$IDzonedummy = \begin{cases} 1, if\ zones, special\ zones\ or\ city\ administrations\ are\ granted\ Industrial\ Parks \\ 0, if\ zones, special\ zones\ or\ city\ adminstrations\ arn't\ granted\ industrila\ parks \end{cases}$$

IDzonedummy = represent industrial park dummy

Indexed Economic Impact of Industrial Parks Development Projects

To identify the potential factors that affect the economic impact of industrial parks development projects, **an indexed economic impact of IP the development project was extracted** from 8 different ordered economic questions. By referring to the different theoretical and empirical literature, we designed 8 ordered economic questions that address/evaluate the economic impact of IP development projects from different dimensions (which includes its impact on attracting Foreign Direct Investment (FDI), attracting domestic investors, employment generation, export earning, technological spill-over, per-capita income, employees' productivity and the living standard of employees). The Kaiser-Meyer-Olkin (KMO) test was conducted to test **whether the specified sample was adequate or not**. The test result was 0.79 which is above the threshold of 0.5 indicating that the sample was very adequate. The Bartlett's sphericity test, which indicates the **existence of at least one correlation in the sample,** was conducted to help us to extract the target indexed variable. The Bartlett's sphericity test resulted in 0.000 which shows the existence of at least one correlation in my datasets. Furthermore, the result from the 'Total Variance Explained table' and 'the scree plot' investigation revealed that there **was only one factor** that could be extracted from the given eight variables.

Figure 2: Factor Analysis: Scree Plot



As shown in the above graph we have only one factor that has an eigenvalue of greater than one. This implies that we can extract only one factor by combining the above eight economic variables. Finally, the reliability test was conducted to check the internal consistency of the identified target variables. Since the internal consistency test (Cronbach's α= 0.850) is greater than the threshold value of 0.7, our data set is confirmed as internally consistent. Thus, to get the index value of the economic impact of the Industrial Parks development project, the alternative value of each eight identified variables was summed up and we calculated the average for each question (Hair et al, 2009). Hence, the higher the values of the indexed Economic Impact of Industrial Parks Development Project, the higher the Economic Impact of Industrial Parks Development Projects.

3.5. Sampling procedures and sample size

3.5.1. Sampling procedures

This study was conducted to evaluate the economic impact of Industrial Park development projects in Ethiopia. Currently there are 30 industrial parks in Ethiopia (IPDC, 2019). One hundred twenty thousand, eight hundred forty-six (120,846) workers were hired in all Ethiopian Industrial Parks. A simple random sampling technique has been employed to select targeted employees in each industrial park. The employees were stratified according to sex to ensure proportionate representation of women and men. Employees from each stratum were selected using the purposive sampling technique.

3.5.2. Sample Size

To answer the research questions of the study, the authors collected the necessary data using the survey questionnaire. In the study authors calculated the right sample size using the following sample size calculation formulas (Kothari, 2004):

Sample Size Calculation:

$$samle\ size = \frac{Distribution\ of\ 50\%}{\left[\left(\frac{margin\ of\ error\ \%}{confidence\ level\ score}\right)^2\right]}$$

Finite population correction

$$True\ sample\ size = \frac{sample\ size\ \times population}{samle\ size + (population - 1)}$$

In this formula the confidence level score is the standard deviation value that goes along with the confidence level. In the case of a confidence level of 95%, the confidence level score would be equal to 1.96. Distribution, on the other hand, reflects how skewed the respondents are on a topic. In the survey world, it is almost always safest to stick with 50% distribution. In all Ethiopian Industrial Parks, the total population of the study is 120,846 and the desired confidence level is 95% and the margin of error is 5%:

1. $Sample\ size = \frac{0.5 \times (1-0.5)}{((0.05/1.96)^2)}$

$$Sample\ Size = 0.25/((0.02551)^2)$$

$$Sample\ size = \frac{0.25}{0.00065077}$$

$$Sample\ Size = 384.16$$

2. $True\ Sample = 384.16 \times 100{,}000/384.16 + 100{,}000 - 1$

$$True\ Sample = 38{,}416{,}000\ /\ 100{,}383.16$$

$$True\ Sample = 383$$

Therefore, in order to have a 95% confidence level with a 5% margin of error in the study, researchers would need to survey 383 respondents. Additionally, with the interview and focus group discussions at each industrial park we would purposively select one manager, one

employees' representative, one labor union representative, and one representative from the community. To estimate the sample size from each industrial park in Ethiopia, we used the following formula (Kothari, 2004):

$$\boldsymbol{Sample\ Size\ for\ \mathrm{X}\ industria\ parks} = \frac{\boldsymbol{N(Industrial\ Park\ \mathrm{x})} \times \boldsymbol{n(all\ industrial\ parks)}}{\boldsymbol{N(all\ industrial\ Parks)}}$$

N(industrial park x) = total population of the study at the given industrial park,

n(all industrial park)= the sample size of the study

N(all industrial parks) = total population of the study. Thus, the number of respondents from each industrial park was calculated using this formula:

$$n(Bole\ Lemi\ I\ Industrial\ Park\ (\boldsymbol{IP})) = \frac{383\ \times 15{,}798}{120{,}845} = 50, n(Bole\ Lemi\ II\ IP)$$

$$= \frac{383 \times 1000}{120{,}845} = 3, n(Kilinto\ IP) = \frac{383 \times 1500}{120{,}845}$$

$$= 5\ , n(Addis\ Industrial\ Village\ IP) = \frac{383 \times 1000}{120{,}845} = 3, n(Hawasa\ IP)$$

$$= \frac{383 \times 23{,}368}{120{,}845} = 74, n(Dire\ Dawa\ IP) = \frac{383 \times 1000}{120{,}845}$$

$$= 3, n(Kombolcha\ IP) = \frac{383 \times 3{,}426}{120{,}845} = 11, n(Mekelle\ IP) = \frac{383 \times 5{,}410}{120{,}845}$$

$$= 17, n(Adama\ IP) = \frac{383 \times 27{,}250}{120{,}845} = 86\ , n(Jimma\ IP) = \frac{383 \times 1000}{120{,}845}$$

$$= 3, n(Bahir\ Dar\ IP) = \frac{383 \times 1200}{120{,}845} = 4, n(Debre\ Berhan\ IP)$$

$$= \frac{383 \times 1250}{120{,}845} = 4, n(Bishoftu\ IP) = \frac{383\ \times 1400}{120{,}845}$$

$$= 4, n(Airline\ Logistic\ IP) = \frac{383 \times 1000}{120{,}845} = 3\ , n(Awsha\ Arba\ IP)$$

$$= \frac{383 \times 1100}{120{,}845} = 3, n(Andido\ IP) = \frac{383 \times 1005}{120{,}845} = 3\ , n(Asayta\ Semera\ IP)$$

$$= 3, n(Aysha\ or\ Dewale\ IP) = \frac{383 \times 1022}{120{,}845}$$

$$= 3, n(Eastern\ Industrial\ Zone) = \frac{383 \times 18{,}910}{120{,}845}$$

$$= 61, n(Huajian\ Shoe\ city) = \frac{383 \times 4{,}648}{120{,}845} = 15, n(Gaizo\ IP) = \frac{383 \times 923}{120{,}845}$$

$$= 5, n(Kingdom\ Line\ IP) = \frac{383 \times 905}{120{,}845}$$

$$= 3, n(Ethio - Turk\ International\ industrial\ city\ ) = \frac{383 \times 901}{120{,}845}$$

$$= 3\ , n(George\ City\ Shoe) = \frac{383\ \times 961}{120{,}845} = 3, n(Modjo\ Leather\ City\ IP)$$

$$= \frac{383\ \times 1000}{120{,}845} = 3,$$

$$n(Burea\ Intgrated\ Agro\ industrial\ Park) = \frac{383\ \times 500}{120{,}845}$$

$$= 2, n\left(Bulbula\ Intgrated\ Agro\ industril\ park\right) = \frac{383\ \times 500}{120{,}845}\Big)$$

$$= 2, n(Yirgalem\ Intgrated\ agro\ industrial\ park\ ) = \frac{383\ \times 553}{120{,}845}$$

$$= 2, respectively$$

3.6. Econometric Models of the study

3.6.1. The Difference in Differences Research Design (DID Model)

3.6.1.1. The treated and controlled zones

Ethiopia has more than 30 industrial parks in different special zones, zones and two city administrations. These geographic settings are categorized as treated geographic area. The treated geographic area are: Hawasa Special Zone, Mekelle Special Zone, Adama Special Zone, Jimma Special Zone, Bahir Dar Special Zone, Bole special zone, Oromia Special Zone (Finfine Zuria Special Zone), Akaki Kality Special Zone, Nefas Selke Special Zone, Dire Dawa City Administration, North Shewa Zone (Amhara region), East Shewa, West Shewe, Asosa, Zone 3, Zone 1, Shinile Zone, South Tigray Zone, South Gojam zone, Sidama zone, South Wello and West Tigray zone.

The controlled geographic area includes: Jijiga Special Zone, Konso Special Zone, Alaba Special Zone, Kirkos Special Zone, Arada Special Zone, Yeka Special Zone, Woliata, Arba Minch, South Gondar, Kamashi, Harari, East Wellega, Bale, Hadiya, Horogudru, Gujji, Borena, Sheka, West Wellega, Ilu Ababora, North Shewa (Oromia region), Silite, East Hararge, Guraghe zone, Zone 5, Anuak and Mezhenger.

List of Ethiopian Industrial Parks and Year of Establishment

The following table presents the list of Ethiopian Industrial Parks and the year of their establishment. Based on the economic contribution of the first generation of Industrial Parks Development Project in Ethiopia, since 2014 the Ethiopia Industrial Parks Development Corporation expanded the Industrial Parks experiment to different zones, special zones and city administrations of the country.

Table 2: List of Ethiopian Industrial Parks and year of establishment

No	Name industrial parks	Generation	Year of establishment
1.	Eastern Industrial Zone	First generation	2008
2.	Bole Lemi I Industrial Park	Second generation	2014
3.	Addis Industrial Village	Second generation	2014
4.	New Wide Garment Industrial Park	Second generation	2015
5.	George Shoe/Modjo Industrial Park	Second generation	2015
6.	Hawasa industrial park	Second generation	2015
7.	Sunshine Industrial Park	Second Generation	2015
8.	Huajian Shoe City	Second generation	2015
9.	Mekelle industrial park	Second generation	2015
10.	Velocity/ Vague Industrial parks	Second generation	2015
11.	Arerti Industrial Park	Second generation	2016
12.	Kombolcha industrial park	Second generation	2016
13.	Kingdom Linen industrial park	Second generation	2016
14.	ICT Industrial Park	Second Generation	2016
15.	DBL Industrial Parks	Second generation	2016
16.	Kilinto Industrial Park,	Second generation	2016
17.	Adama Industrial park	Second generation	2016
18.	Jimma Industrial park	Third generation	2018
19.	Debre Birhan Industrial Park	Third Generation	2019
20.	Dire Dawa industrial park	Third generation	2020
21.	Bole Lemi II Industrial Park	Third Generation	2020
22.	Aysha/Dewale Industrial Park	Third Generation	2020
23.	Andido Industrial Park	Third Generation	2020
24.	Awsha Arba Industrial Park	Third Generation	2020
25.	Bahir Dar Industrial Park	Third Generation	2020
26.	Ethio-Turk International Industrial City	Third Generation	2020
27.	Bure Integrated Agro-Industrial Park	Third Generation	2020
28.	Bulbula Integrated Agro-Industrial Park	Third Generation	2020
29.	Yirgalem Integrated agro-industrial park	Third Generation	2020
30.	Gaizo industrial park	Third Generation	2020
31.	Bishoftu Industrial Park	Third Generation	2021
32.	Asayta-Semera Industrial Park	Third Generation	2021

As shown in the above table, since 2014 the Federal Democratic Republic of Ethiopia government has expanded industrial parks development project throughout the country. Currently, more than 30 industrial parks are established in different zones, special zones and city

administrations. The Ethiopian government used Eastern Industrial Parks for pilot test to examine the effectiveness of industrial parks operation. After confirming the positive role of Eastern Industrial Zone on Ethiopia's economy, in 2014 the Federal government established the Federal Industrial Parks Development Corporation (IPDC) to build and administer the Industrial Parks in different Zones, Special Zones and City administrations of the country to optimize economic impact of industrial parks development projects. Since 2014 more than 30 industrial parks have been established in different zones, special zones and city administrations. These industrial parks have three generations. The first generation is eastern industrial park which was established for pilot tests to examine the effectiveness of Industrial Parks Development Project in Ethiopia. The second generation of industrial parks were built after the establishment of Federal Industrial Parks Development Corporation (IPDC) whereas the third generation of industrial parks are the latest industrial parks established after the political reform took place in Ethiopia. Out of the three research questions of this study, authors addressed the macroeconomic impact of Industrial Parks Development Projects using this data setup. Because of the lack of enough compiled data for the third generation of Industrial Parks, the analysis of this study uses the second generation of Industrial Parks in Ethiopia. To strengthen the significance level of the coefficient, authors used the intersection year of establishment of the second generation of industrial parks for post treatment period. Thus, post-treatment period start from 2016 to 2018 whereas the pre-treatment period includes 2012-2013. To evaluate the macroeconomic impact of Industrial Parks Development Projects, the authors compiled panel data structure.

3.6.1.2. Industry Production Decision / Investment Decision

If one firm decides to invest his/her capital, he/she should make two major decisions: **Location decision and investment level decision.** For instance if one firm wants to invest in zone 'i', let take i=0,1,3,…70, where i=0 represent the option of investing in other countries and i=1,2,3,…70 represent the options of investing in one of Ethiopia's special zones, zones and city administrations, then its profit optimization model is design:

$$\max_{L_i FDI_i Land_i} \pi_i = (1-\tau_i)(1-t_i)(pq_i - w_i L_i - R_i land_i - rFDI_t - F)$$

$$subject\ to\ \ q_i = Q(FDI_i, Land_i, L_i) \text{ ---------- (1)}$$

π_i = is the profit in zone i; τ_i = the possibility of expropriation in zone, special zone or city administration 'i'; t_i = is the corporate tax rate; p = is the price of the product produced by the investors; q_i = is the quantity sold; w_i = is the wage rate in zones, special zones or city administration 'i'; L_i = is number of labor hired in zones, special zones or city administration 'i'; R_i = the land use fee in zone, special zone or city administration 'i'; $Land_i$ = land firm used in zone, special zone or city administration 'i'; r =Opportunity cost of capital; FDI_i = is Foreign Direct Investment in zone, special zone or city administration 'i'; F = is the fixed cost of production.

The value of industrial output decision in zone 'i' is the function of the following policy package:

$$\boldsymbol{IndOutDec_{ij}^{*} = f\left(\tau_i, t_i, R_i\, w_i \middle| \{i: \pi_j^{*} > \pi_i^{*}, \forall_j \neq i\}\right)} \text{ ----------(2)}$$

Where $IndOutDec_{ij}$= Industrial Output decision in zone, special zone or city administration 'i' for 'j' firms. The industrial parks proclamation provides special property right protection (lower τ_i), lower the tax burden (lower t_i) and land fee reduction (lower R_i) for investors that invest inside the Ethiopian industrial parks. w_i measure the wage rate in the labor market. Thus, by including these industrial parks policy package leading to the following Difference in Differences estimation techniques:

$$\boldsymbol{lnindoutdec_{it} = \alpha + \varphi * IPdummy_{it} + \delta_i + \gamma_t + \beta X_{it} + \varepsilon_{it}} \text{ ---------- (3)}$$

Where $\boldsymbol{lnindoutdec_{it}}$ is zone, special zone or city administration 'i' Industrial Output decision at time't' which includes all macro-economic variables (Annual Investment by type and source, products and by-products, the value of fixed assets, wages and other benefits for employees, and employment opportunities), δ_i zones, special zones or city administrations 'i' fixed effect, γ_t time/year fixed effect and X_{it} all other exogenous variables that affect the industrial outcome decision in the zones, special zones or city administration 'i' at the time't' such as property right protection, different type of tax rate, land use fee and others.

3.6.1.3. Domestic Capital Formation:

If the construction and operation of Ethiopian industrial parks enhance the inflows of foreign investors, we believe that it will also affect the domestic business formation tendency:

$$\boldsymbol{directly, K_{ift} = K_{ift-1} * (1 - delta) + FDI_{it}(IDzonedummy)/deflator}$$

$$\boldsymbol{indirectly, K_{idt} = K_{ift-1} * (1 - delta) + domI_{it}(IDzonedummy)/deflator} \text{ ------ (4)}$$

Where k_{ift}represents for foreign owned capital stock in zone 'i' at a time 't', K_{ift-1} one year lag of foreign owned capital stock in zone 'i' at time 't', FDI_{it} measure foreign owned investment in zone, special zone or city administration 'i' at a time 't'; K_{idt} domestic owned capital stock in zone, special zone or city administration 'i'; $domI_{it}$ domestically owned investment in zone, special zone or city administration 'i'. The impact of industrial parks development projects on the tendency of domestic business formation would be determined by the relation between the tendency of domestic business formation and the inflow of foreign-owned capital. Thus, this interaction would determine the crowding out or crowding in effect of domestic investment through the inflow of foreign-owned capital. This drives the following empirical research:

$$lnDOMI_{it} = \alpha + \gamma * IDzonedummy_{it} + \delta_i + \gamma_t + \beta X_{it} + \varepsilon_{it}$$

$$lnK_{idt} = \alpha + \gamma * IDzonedummy_{it} + \delta_i + \gamma_t + \beta X_{it} + \varepsilon_{it} \text{ ---------- (5)}$$

Where $lnDOMI_{it}$ is a natural logarithms of domestically owned investment in zone, special zone or city administration 'i' at time 't'; lnK_{idt} is a natural logarithms of capital stock in zone, special zone or city administration 'i' at time 't'; $IDzonedummy_{it}$is a dummy variable that shows existence of industrial parks in zones, special zones or city administration 'i' at time 't'; δ_i zone, special zone or city administration fixed effect; γ_t is time or year fixed effect and X_{it} is all other exogenous explanatory variables that could affect the amount of domestic investment or domestically owned capital stock in zone, special zone or city administration 'i' at time 't'.

Parallel Trend Assumption

The Difference in Differences (DID) estimator coincides with the treatment effect under the critical assumption that, if there are no interventions of policy, both respondents in the treatment and control group would have followed a parallel trend over time. We can test the common trend assumption either by using the graphical justification of the effect of the treatment for the treated group or by using pre-treatment data. In this study the common trend assumption test is checked

through using the pre-treatment data and placebo post period. The result is presented in the next chapter.

3.6.2. Ordered probit model

To identify the factors that affect the economic impact of industrial parks development projects, we used the ordered response model. In our data set, we measure the micro-economic impact of industrial parks development projects as an ordered response. Thus, we prefer to use ordered response models that recognize the index nature of our dependent variable. After the honored work of Mckelvey and Zovoina (1975), over the last five decades, the ordered probit model has been used as the best estimation techniques for ordered data. Many scholars recommend the ordered probit model over other models including the Ordinary Least Square model (DeCanio 1986, Mason et al. 1995, Boex 2000 and Chan, Miller and Teha 2005).

Let take the following latent regression model

$$y^* = x'\beta + \varepsilon \text{ ---------- (10)}$$

Where y^* is unobserved latent indexed economic impact of industrial parks development projects in Ethiopia. What is observable is:

$$\begin{aligned} Y &= 0 \; if \; y^* \leq -\infty \\ &= 1 \; if \; 0 < y^* \leq \mu_1 \\ &= 2 \; if \; \mu_1 < y^* \leq \mu_2 \\ &= 3 \; if \; \mu_2 < y^* \leq \mu_3 \\ &= 4 \; if \; \mu_3 < y^* \leq \mu_4 \\ &= 5 \; if \; \mu_4 < y^* \leq +\infty \end{aligned} \text{ ---------- (11)}$$

The μ′s are unknown threshold variables that will be measured by the coefficient β. The threshold variables measure the average value for different measured value of Y. Our respondents indicated their magnitude of their experience/satisfaction/feeling for the given question depending on some factors that can be observed and measured and other unmeasured and unobserved factors categorized under ε. Let's take the ordinal scale of 1 to 5 range of degree of their feeling which represents 1 strong disagreement, 2 disagreements, 3 neutral, 4 agreements and 5 strong agreements. Thus, respondents choose the alternative that approximately

represented their feeling/perception of the given question. In the model ε is assumed as normally distributed with an expected value of zero and variance of unity.

The Ordered Probit model is summarized in the following probabilities (Mohammad and Clem, 2006):

$prob(y = 0|x) = \varphi(-x'\beta)\ (\mu_0 = 0)$

$prob(y = 1|x) = \varphi(\mu_1 - x'\beta) - \varphi(-x'\beta)$

$prob(y = 2|x) = \varphi(\mu_2 - x'\beta) - \varphi(\mu_1 - x'\beta)$

. .

. .

. .

… …

$prob(y = J|x) = 1 - \varphi(\mu_J - 1 - x^1\beta$ ---------- (12)

3.7. Methods of data analysis

In the study, data has been analyzed using both exploratory and descriptive data analysis approach. To evaluate the Macro economic impact of industrial park development in Ethiopia, we used the Difference in Differences research design of data estimation techniques. On the other hand, to estimate the Micro Economic Impact of Industrial Parks Development Projects and to identify the major factors that optimize or diminish the economic impact of industrial parks development projects, we used descriptive data analysis and ordered probit estimation techniques. The SPSS and STATA were used for data management and analysis.

3.8. Validity and Reliability Test

3.8.1. Validity Test

Ensuring the validity of data collection instruments help us to get answers to the following two questions: whether the designed tools have sufficient exogenous variables to have the full confidence that the finding of the study represent the true cause and effect relationship between dependent and independent variables and whether the conclusion of the study is generalized to other interested population beyond those specific controlled geographic setting. Thus, to get answers to the above questions we need to address different validity tests of data collection

instruments: Content validity, Construct validity, internal validity and external validity of the data collection instruments.

Content Validity

The content validity measures the extent to which the analysis and result of the data represent the expected cause and effect relationship between dependent and other independent variables (Kothari, 2004). To eliminate bias in the study, the authors used different mechanism to ensure the content validity of the data collection instruments. Once the draft questionnaire was prepared, we forwarded to data collectors' team members to get their comments and suggestion and to inform the revision of the questionnaire accordingly. The revised questionnaires were forwarded to different researchers and colleagues in Ethiopian Civil Service University to get their suggestions and comments on the data collection instruments. Once we modified data collection instruments accordingly, we conducted a pilot test on two federal institutions: Industrial Parks Development Corporation (IPDC) and Ethiopian Investment Commission (EIC)) as well as two Industrial parks: Bole Lemi and Kilinto Industrial Parks to cross-check the validity of the prepared data collection instruments. In each institution, we contacted 15 respondents to fill the questionnaires. Once the pilot test was completed, we investigated the data collected and modified the draft data collection instruments accordingly. Thus, all the above procedures helped us to ensure the content validity of the data collection instruments for further analysis and investigation.

Internal Validity

The confirmation of the internal validity shows the existence of a true cause and effect relationship between dependent and independent variables in our study. Thus, to confirm the existence of true cause and effect relationship between dependent and independent variables, we reviewed different a theoretical and empirical research and designed theoretical framework. The designed data collection instruments were prepared to collect various exogenous factors which included Economic factors, social factors, cultural factors, technological factors, environmental factors and political factors. Furthermore, to boost the internal validity of the data collection tools, we gave the chance for participants to write other exogenous factors by responding to open-ended questions.

External Validity

The external validity of the data collection instruments helped us to confirm that the conclusion and policy recommendation of the study could be generalized for other geographic area and populations in real-world life. As the issue of industrial parks development is a new agenda in the Ethiopian economy, studying this area gives us on-time policy recommendation and direction for all policy and decision-makers in Ethiopia. As we are using a large sample size, we believe that our study fulfills the external validity.

Construct Validity

The construct validity confirms whether the designed data collection instruments could measure the intended purpose or not. It measures the degree/ level that the designed data collection instruments measure the intended goal in the study. Confirming the construct validity helps us to ensure that the real definition of the designed variable represents the true theoretical meaning of the concept in the framework of the study. Thus, by referencing different theoretical and empirical research, we designed the framework of the study that guides the overall data collection and analysis phase of the study.

3.8.2. Reliability Test

According to the definition of Kumar (2011) reliability of the data collection instruments means ensuring the ability of the data collection tools to give the same result if they are collected and re-collected on the same targeted population of the study. To check whether our data collection instrument is reliable or not, the data from the pilot test was used for some statistical tests. Thus, to check the reliability of the data, we run the internal consistency test by using the Cronbach's alpha coefficient. The data collection instruments were found highly consistent because the Cronbach's alpha coefficient is 0.820 which is greater than the threshold value of 0.70.

3.9. Ethical Consideration

The project has been subjected to all ethical considerations which include the researcher's obligation to respect rights, desires, culture, religion, dignity, values, gender, and interests of respondents', articulation of the purpose of the study verbally and in writing for respondents and

receipt of respondents' written permission to proceed with the data collection. Furthermore, we exercised the responsibility not to exploit and influence the targeted population and use the collected data only for the intended purpose.

4. Results and Discussion

This study aimed to evaluate the economic impact of Industrial Parks Development Projects in Ethiopia. The study answered three research questions: What are the potential factors that affect the economic impact of Industrial Parks Development Projects in Ethiopia? What is the macro economic impact of Industrial Parks Development Projects in Ethiopia? And what is the microeconomic Impact of Industrial Parks Development Projects in Ethiopia? To answer these research questions, authors used two estimation techniques: Ordered Probit and Difference in Differences estimation techniques.

4.1. Demographic Characteristics of Respondents

The following table presents the response rate of the survey. The calculated sample size of the project is 383 respondents. To increase the response rate of the survey, 400 questionnaires were distributed for Ethiopian Industrial Parks workers, administrative bodies, managers, employees' representatives, and community representatives.

Table 3: Survey Response Rate

	Age categories in the questionnaire	**Sex of respondents**		**Both sex**
		Male	Female	Total
		Frequency (Percentage)	**Frequency (Percentage)**	**Frequency (Percentage)**
Age group of respondents	18-30	66 (21.1)	94 (30.0)	160 (51.1)
	31-40	63 (20.1)	82 (26.2)	145 (46.3)
	41-60	0 (0)	8 (2.6)	8 (2.6)
	Total questionnaires returned	129 (41.2)	184 (58.8)	313 (100)

As showed in the above table, 129 male respondents and 184 female respondents returned the questionnaires. In total, 313 questionnaires were returned which represented 82 per cent response rate. Thus, 41.2 per cent of the respondents were male and 58.8 per cent of respondents were female.

The following table shows the socio-demographic characteristics of respondents includes: sex, age, marital status, education level, religion, place of residence and position of respondents.

Table 4: Socio-demographic characteristics of respondents

Variables	Categories	Frequency	Percentage
Sex of Respondents	Male	156	49.8
	Female	157	50.2
Age of Respondents	18-30	160	51.1
	31-40	145	46.3
	41-60	8	2.6
	Above 60	0	0
Marital Status of Respondents	Married	117	37.4
	Single	178	56.9
	Divorced	18	5.8
	Widowed	0	0
Educational Status	Grade 10 not completed	0	0
	Grade 10 completed	44	14.1
	Vocational education completed	68	21.7
	Diploma	45	14.4
	Degree	118	37.7
	Masters and above	35	11.2
Place of Residence of respondents	Own house	37	11.8
	Rented house	264	84.3
	Company's house	0	0
	Other	8	2.6
Position of Respondents	Expert	215	68.7
	Group Leader	32	10.2
	Manager/CEO	9	2.9
	Other	52	16.6
Religion of Respondents	Orthodox	218	69.6
	Protestant	42	13.4
	Catholic	11	3.5
	Muslim	26	8.3
	Other	10	3.2.

In the above table the third and fourth columns show frequency and percentage of the socio-demographic characteristics of our respondents. As shown in the above table, our survey has an almost equal proportion of males and females respondents. From marital status, the majority of our respondents are single; in terms of education background the majority of our respondents have bachelor degree and in terms of work position the majority of our respondents are junior experts on their position.

4.2. Summary Statistics for Panel Data

In the following table column two and three present summary statistics for pooled panel data categorized under the treatment and control group to examine the macroeconomic impact of Industrial Parks Development Projects. To strengthen the significance level of the coefficient, the authors used the intersection year of establishment of all the second generation of Ethiopian Industrial Parks for post-treatment period. Thus, post-treatment periods start from 2016 to 2018 whereas the pre-treatment periods include 2012-2013. To run the difference in differences estimation techniques, we need to ensure the absence of a significant difference between treated and controlled zones before the implementation of the program. The 'p' value test under summary statistics checks whether there is a significant difference between controlled and treated zones before the implementation of the program. The null hypothesis for this test is state there is no significant difference between controlled and treated zones before the implementation of the Projects whereas the alternative hypothesis claims existence of a significant difference between controlled and treated zones before implementation of the projects. Thus, to continue our estimation of the difference in differences model, we need to fail to reject the null hypothesis.

Table 5: Summary Statistics for Panel Data

Variables	Summary Statistics for DID Treated Zones		Summary Statistics for DID Control Zones		p-value
	Observation	Mean	Observation	Mean	
Total export value	32,251	6183403	22,400	7290331	**0.459**
Total wage for Male employees	45,350	956338	28,818	1115104	**0.219**
Working Capital	55,350	2.79e+07	34,468	3.13e+07	**0.419**
The total sales value	74,704	1.44e+07	49,236	1.63e+07	**0.062**
The total Value of Production	75,606	1.51e+07	50,246	1.60e+07	**0.279**
The total wage for employees	45,708	1469920	29,070	1653341	**0.219**
Commission, bonus and professional allowances	27,003	149708.2	10,663	163841.2	**0.468**
The book value of fixed assets	68,469	6397126	42,929	1.04e+07	**0.956**
Investment on purchase and capital repair of fixed investment	54,548	2076400	34,441	2422989	**0.234**
Total wage for Male employees	45,350	956338	28,818	1115104	0.2187
Total number of domestic investors	8,931	5.16202	5,756	4.342425	**0.113**
Total current paid up capital	9,227	5.54e+07	5,892	7.53e+07	**0.060**
Investment on fixed assets	49,214	4010489	1,231	4605164	**0.251**
Total Female hired	37,275	68.40504	23,322	68.01638	**0.933**
Total Engaged per months	2,856	268.0742	2,677	436.0549	**0.744**

As shown in the above table, the p-value for the null hypothesis of there is no significant difference between control and treatment zones before the implementation of Ethiopian Industrial Parks Development Projects are statistically insignificant at five per cent significance level. We do not have enough evidence for the existence of a significant difference between controlled and treated zones before the implementation of the program. Hence, we fail to reject the null hypothesis. This evidence justifies our difference in differences estimation technique to evaluate/estimate the Economic Impact of Industrial Parks Development Projects.

4.3. Potential factors that affect Economic Impact of Industrial Parks Development Projects

4.3.1. Factor Analysis/ Principal Components Analyses

Factor analysis (FA) and Principal components analysis (PCA) are well-known statistical tools that help us to know the nature of the variables in our survey. It identifies a matrix of relationship/variability among different factors in the survey. In this study, to identify the factors

that affect the economic impact of industrial parks development projects, different variables were assessed from economic, social, political, technological, cultural and environmental perspectives. Thus, to reduce the dimension of the variables, we test the principal components analysis/ factor analysis. This study applied factor analysis to extract the validity of the major latent variables, using principal component analyses as the extraction method and Varimax rotation methods with Kaiser Normalization. The following tables summarized the factor analysis result for major observed economic, social, political, environmental, cultural and technological factors.

Factor Analysis for Economic related Variables

The following tables present the factor analysis result for economic-related variables that affect the economic impact of industrial parks development projects in Ethiopia. The survey includes 16 major economic-related variables that directly affect the economic impact of industrial parks development projects in Ethiopia.

Table 6: Factor Analysis result for Economic Related Variables

Observed Economic Related Factors	Factor Loading				Latent variable (Cronbachs Alpha)
	Factor one	Factor two	Factor three	Factor four	
There is sufficient domestic market in the country	.640				Existence of abundant non-financial factors that promote IP **(Cronbachs 0.895)**
There is an abundant land area for IP development projects	.735				
There is adequate infrastructure development	.865				
Ethiopia has a stable macroeconomic situation	.797				
There are many domestic stakeholders and investors	.773				
There are attractive investment sites for IP development	.663				
There is a cheaper energy supply in Ethiopia		.665			Existence of tangible government support **(Cronbachs 0.869)**
There is subsides for IP enterprise from the government		.811			
There is interest-free credit for IP investors		.782			
There are duty-free import and export opportunities		.871			
Weak implementation of international trade policy			**.721**		Existence of poor institutional setup **(Cronbach's 0.812)**
High control of foreign currency in Ethiopia			**.802**		
The majority of IP enterprises operate with out-dated technology				.688	Existence of out dated technology **(Cronbach's 0.812)**
There is out dated land management system in Ethiopia				.855	
Most of Ethiopia's technologies are out-dated				.866	

As showed in the above table, we observed 16 economic-related variables categorized into four dimensions according to the result from factor analysis using principal components analyses as extraction methods and Varimax rotation methods with Kaiser Normalization: Existence of abundant non-financial factors that promote IP development, the existence of tangible government support, the existence of poor institutional set up and existence of unsuitable foundations for industrial parks development project. In all dimensions, the Cronbach's alpha coefficient is also above the required minimum thresholds value (>0.7), which show the internal reliability of the variables under each category.

Factor Analysis for Cultural-related variables

The following table presents the factor analysis result for the cultural-related variables that directly affect the economic impact of industrial parks development projects in Ethiopia. The data collection instruments identify nine major cultural-related variables that directly affect the economic impact of industrial parks development projects in Ethiopia.

Table 7: Factor Analysis Result for Cultural Related Factors

Observed Cultural Related Factors	Factor Loading		Latent variable (Cronbachs Alpha)
	Factor One	Factor Two	
Ethiopians have a good working culture	.814		Existence of high social commitment for work (Cronbachs 0.923)
Ethiopians are punctual in their work	.923		
Ethiopians are good at team work spirit.	.818		
Ethiopians have a good communication skills	.662		
Ethiopians have a good culture of creativity	.747		
Ethiopians have a good culture of hospitality		.660	Existence of good social capital in Ethiopia (Cronbach's 0.875)
Ethiopians have a good culture of quickly adopting to the situation		.641	
Ethiopians have a good culture of tolerance		.885	
Ethiopian have a good culture of living together		.897	

As showed in the above table, the identified 9 cultural-related variables categorized into two dimensions according to the result from factor analysis using principal components analyses as extraction methods and Varimax rotation methods with Kaiser Normalization: Existence of high social commitment for work and existence of good social capital. The Cronbach's alpha coefficient is also above the required minimum thresholds value (>0.7) for all dimensions which shows the internal reliability of the variables under each category.

Factor Analysis for Political related Variables

The following table presents the factor analysis result for the political related variables that affect the economic impact of industrial parks development projects in Ethiopia. We identified 20 major political related variables that directly affect the economic impact of industrial parks development projects in Ethiopia.

Table 8: Factor Analysis Result for Political Related Variables

Observed Political Related Factors	Factor Loading				Latent variable (Cronbachs Alpha)
	Factor one	Factor two	Factor three	Factor four	
There is high political commitment in Ethiopia	.828				Existence of suitable institutional setup in Ethiopia **(Cronbachs 0.925)**
Ethiopians' laws support IP development project	.863				
Ethiopia has a clear vision for IP development projects	.811				
There is an effective one stop shopping service inside IP	.798				
There is a government consultancy body inside IP	.848				
Ethiopia investment laws encourage IP development	.794				
There is a special government body inside IP		.698			Existence of visionary leaders that realize the goal of IP development **(Cronbachs 0.831)**
There is no political intervention inside Ethiopian IP		.864			
There is comfortable management style in IP		.776			
There are eye-catching subsidies in Ethiopia		.586			
There is no sufficient land supply for IP development			.604		Absence of good administration at lower layers of the country **(Cronbach's 0.921)**
There is a bureaucratic administration system at lower layer of administration in Ethiopia			.736		
There is social unrest around IP			.748		
There is a conflict of interest between the federal and local government.			.692		
There is poor communication between IP and gov't				.699	Existence of poor working environment inside the IP **(Cronbach's 0.901)**
There is a complex operational system inside IP				.753	
There is an unsuitable international trade policy				.752	
There are complex regulations and procedures				.878	
There is active government intervention in IP				.803	
The protection of copy-right is not strong in Ethiopia				.791	

As showed in the above table, there were 20 observed political-related variables categorized into four dimensions according to the result from factor analysis using principal components analyses as extraction methods and Varimax rotation methods with Kaiser Normalization: Existence of suitable institutional setup in Ethiopia, Existence of visionary leaders that realize the goal of industrial parks, absence of good administration at the lower layers of the country and existence of poor working environment in the country. The Cronbach's alpha coefficient is also above the required minimum thresholds value (> 0.7) for all dimensions which show the internal reliability of the factors under each category.

Factor Analysis for Environmental Related Factors

The following table presents the factor analysis results for the environmental-related variables that affect the economic impact of industrial parks development projects in Ethiopia. The survey identifies 9 environmental-related variables that affect the economic impact of industrial parks development projects in Ethiopia.

Table 9: Factor Analysis Result for Environmental related variables

Observed Environment Related Factors	Factor Loading		Latent variable (Cronbachs Alpha)
	Factor One	Factor Two	
There is convenient accommodation around IP	.534		Existence of sufficient space that promote IP development **(Cronbach's 0.838)**
There is a large area for disposal of liquid waste	.823		
There is enough place for recycling dry waste inside IP	.874		
There is plenty of space for supply markets around IP	.797		
There is favourable weather condition for IP production		.898	Existence of plenty of nature gifted resource around the parks that promote IP development **(Cronbach's 0.871)**
There is a long dry/summer season in Ethiopia		.866	
The natural resource around the park enhance the development of IP		.563	
Ethiopian landscape is suitable to promote IP development		.695	
There are plenty of land areas that promote industrial parks development		.522	

As showed in the above table, we observed 9 environment-related variables categorized into two dimensions according to the result from factor analysis using principal components analyses as extraction methods and Varimax rotation methods with Kaiser Normalization: Existence of sufficient space that promote IP development and the existence of nature-gifted resources around the parks that promote IP development. The Cronbach's alpha coefficient is also above the required minimum thresholds value (> 0.7) for all dimensions which confirm the existence of internal reliability of the factors under each category.

Factor analysis for Social related Variables

The following table presents the factor analysis result for social variables that directly affect the economic impact of industrial parks development projects in Ethiopia. The survey includes 15 different variables that address social-related variables that affect the economic impact of industrial parks development projects in Ethiopia.

Table 10: Factor Analysis Result for Social Related Variables

Observed Social related factors	Factor Loading			Latent Factor (Cronbachs Alpha)
	Factor One	Factor Two	Factor three	
The working environment inside the IP is not suitable	.838			Inconvenient social interaction among agents participate inside industrial parks **(Cronbach's 0.905)**
IP workers have low communication skill	.880			
There is no agreement among enterprises operate inside IP	.712			
No partnership between domestic and international investors	.678			
There are highly demotivated IP workers		.661		Unfit human resource supply for IP **(Cronbach's 0.842)**
The administrative staffs of IP have no relevant experience		.765		
IP workers are not eager for skill and knowledge transfer		.866		
Ethiopia's labour proclamation is not conducive		.816		
English is widely spoken in Ethiopia			.779	Existence of commitment from the community that promote IP development **(Cronbach's 0.881)**
There are large domestic supply markets in Ethiopia			.814	
There are many easily trained human resources supply in Ethiopia			.764	
There is high demand from the community to have IP project			.753	
There is a high interest from the community to work inside IP			.726	
There are affordable house supplies around IP in Ethiopia			.703	
There are no laws that prohibited inter and intra-regional migration			.668	

As showed in the above table, we observed 15 social-related variables categorized into three dimensions according to the result from factor analysis using principal components analyses as extraction methods and Varimax rotation methods with Kaiser Normalization: inconvenient social interaction among agents participate inside industrial parks, the existence of unfitting human resource supply for IP and high commitment from the community that promote IP development. The Cronbach's alpha coefficient is also above the required minimum thresholds value (>0.7) for all dimensions which show the internal reliability of the variables under each category.

4.3.2. Factors Affecting Economic Impact of Industrial Parks Development Projects in Ethiopia

4.3.2.1. Test of Causality between Potential Observed Factors and Indexed Economic Impact

The following table test the existence of causality between the potential factors that affect economic impact of industrial parks development projects and the indexed economic impact of industrial parks using the Chi-square test. Under the Chi-square test the null hypothesis states that there is no causality between listed potential factors and indexed economic impact of industrial parks project. The alternative hypothesis claims existence of a significant causality between potential factors and indexed economic impact of Industrial Parks Development Projects.

Table 11: Test of causality between potential observed factors and indexed economic impact of Industrial Parks Development Projects

Potential factors that affect the economic Impact of Industrial Parks Development	Indexed Economic Impact of Industrial Park Projects	
	Number of observation	Chi-square tests
Indexed Economic factors	299	(108.4)***
The existence of abundant non-financial factors that promote IP	299	(176.7)***
The existence of tangible government support	305	(174.3)***
The existence of poor institutional setup	306	(134.5)***
The existence of out-dated technology	310	(34.9)***
Indexed Cultural factors	305	(129.5)***
The existence of high social commitment for work	305	(157.6)***
The existence of good social capital in Ethiopia	307	(228.5)***
Indexed Political Factors	309	(151.6)***
The existence of suitable institutional setup in Ethiopia	309	(259.7)***
The existence of visionary leaders that realize the goal of IP development	310	(141.9)***
Absence of good administration at lower layers of the country	309	(54.7)***
The existence of poor working environment inside the IP	305	(95.4)***
Indexed Environment factors	307	(156.3)***
The existence of sufficient space that promote IP development	310	(95.88)***
The existence of plenty of nature gifted resource around the parks that promote IP development	307	(217.9)***
Indexed Social factors	310	(147.2)***
Inconvenient social interaction among agents participate inside industrial parks	311	(52.6)***
Unfit human resource supply for IP	311	(88.5)***
The existence of commitment from the community that promote IP development	301	(172.4)***
Index technological factors	302	(155.2)***

Source authors' estimation
****, **, * one, five and ten percent significance level, respectively*

As shown in the above table, all observed potential factors have a strong and statistically significant causality with indexed economic impact of Industrial Parks Development Projects in Ethiopia. We rejected the null hypothesis and concluded that listed potential factors have a strong and statistically significant causality with indexed economic impact of Industrial Parks Development Project. Once the existence of the causality between the dependent and independent is confirmed, in the following table authors examined the potential factors that

diminish or optimize the economic impact of Industrial Parks Development Project. Authors assessed different potential factors that diminish or optimize the economic impact of Industrial Parks Development Projects. The table presents the major latent factors categorized under economic, social, cultural, political, and technological and environmental variables that affect the economic impact of Industrial Parks Development Projects in Ethiopia. Those identified variables include variables that either optimize or diminish the economic impact of Industrial Parks Development Projects in Ethiopia. These major observed variables are reduced to latent variables using the factor analysis techniques.

Table 12: Potential factors that affect Economic Impact of Industrial Parks Development Projects in Ethiopia

Indexed Latent Factors	Indexed Economic Impact of Industrial Parks Development Projects					
	Model One		Model Two		Model Three	
	OProbit	Ologit	Oprobit	Ologit	Oprobit	OLogit
High community commitment	.071 (.018)***	.138 (.041)***	.071 (.022)***	.148 (.050)***	.072 (.024)***	.161 (.060)***
The existence of Abundant non-financial resource	.0322 (.019)*	.073 (.034)**	.065 (.025)***	.123 (.051)**	.063 (.034)*	.141 (.067)**
Tangible gov't support	.172 (.099)*	.312 (.191)	.371 (.110)***	.713 (.245)***	.377 (.183)**	.828 (.428)**
Good social Capital in Ethiopia	.036 (.036)	.108 (.067)*	.105 (.046)**	.272 (.099)***	.099 (.045)**	.247 (.103)**
Unskilled labour supply	-.057 (.116)	-.030 (.232)	-.265 (.134)**	-.299 (.201)	-.271 (.135)**	-.341 (.207)*
Geographic disadvantage	-.091 (.094)	-.112 (.177)	-.234 (.142)*	-.519 (.275)*	-.252 (.147)*	-.578 (.286)**
Out-dated technology operate	-.2427 (.096)**	-.382 (.175)**	-.156 (.112)	-.136 (.240)	-.438 (.214)**	-.815 (.506)
Poor administration at lower layers	-.153 (.109)	-.129 (.219)	-.001 (.146)***	.266 (.254)	.065 (.193)	.385 (.369)
Basic Information of respondents	No	No	Controlled	Controlled	Controlled	Controlled
Indexed average factors values	No	No	No	No	Controlled	Controlled
Source authors' estimation ****, **, * one, five and ten percent significance level, respectively*						

The above table shows the factors that affect the economic impact of Industrial Parks Development Projects in Ethiopia. Accordingly, the existence of high community commitment, availability of abundant non-financial resource which promote the development and expansion of

Industrial Parks Development Projects, the existence of eye-catching and tangible government support, the existence of good social Capital in Ethiopia have a positive and statistically significant impact on the indexed economic impact of Industrial Parks Development Projects in Ethiopia. On the other hand, unskilled labour supply, out-dated technology is operating in Ethiopia and geographic location disadvantage of Ethiopia Industrial Parks which shows the concentration of Industrial Parks only in urban areas significantly decrease economic impact of industrial parks development projects in Ethiopia.

4.4. The Macro-economic Impact of Industrial Parks Development Projects in Ethiopia

One of the objectives of this project is to evaluate the macro economic impact of industrial parks development projects in Ethiopia. The major macro-economic variables identified to measure the macro economic impacts are annual investments by type and sources, Products and by-products outcome (Total Sales Values, Total Export Value and Annual Value of Production), value of fixed assets, total Wages and Salaries of employees, Domestic capital formation and the total number of employees employed in industrial enterprise.

4.4.1. Impact of Industrial Parks Development Projects on Annual investment by type and sources

The following table revealed the impact of industrial parks development project on the value of annual investments by type and sources for zones that have industrial parks in their geographic setting relative to those zones that have no industrial parks in their geographic setting. The annual level of investment by type and source is measured by investment in fixed assets and the level of annual working capital of industrial enterprises in Ethiopia.

Table 13: Impact of Ethiopian Industrial Parks Development Project on investment on fixed assets and Working capital

Controlled Exogenous variables	Ln of Investment on fixed assets			Controlled Exogenous variables	Ln of Working capital		
Treatment*Post	.159 (.080)**	1.191 (.761)*	2.528 (1.152)**	Treatment* Post	.248 (.048)***	2.551 (.681)***	2.410 (.905)***
Post	.368 (.076)***	-1.402 (.497)***	-2.593 (1.009)**	Post	.177 (.043)***	1.034 (.549)**	1.963 (.726)***
Treatment	.121 (.065)*	-.216 (.314)	3.551 (1.367)**	Treatment	-1.091 (.260)***	-.271 (.275)	.256 (.675)
Ln average sales value		.004 (.012)	.031 (.013)**	Ln total wage		.075 (.044)*	.384 .058) ***
Ln difference in value of stock		-.017 (.010)*	-.017 (.010)*	Ln difference in value of stock		.005 .045)	-.013 (.051)
Ln value of total raw material		-.038 (.009)***	-.041 (.010)***	Ln total sale value		.160 (.047)***	.122 (.058)**
Constant	11.370 (.376)***	1.713 (1.581)	3.749 (3.329)	Constant		8.912 (1.682)***	10.293 (2.00)***
Additional exogenous covariates	No	Yes	Yes	Additional exogenous covariates	Yes	Yes	Yes
Fixed Effect	Yes	No	Yes	Fixed Effect	Yes	No	Yes
Additional exogenous covariates controlled in the model are ln of the annual value of export, ln of value added tax, source of finance for investors, ln annual working capital and ln of average value of sales in birr.							
Source authors' estimation ******, **, * one, five and ten percent significance level, respectively***							

As showed in the above table, the first two columns revealed the impact of industrial parks development projects on investment in fixed assets in Ethiopia. The establishment and operation of industrial parks development projects increased investment in fixed assets by more than 100 per cent for zones that have industrial parks relative to zones that have no industrial parks in their geographic setting assuming that all other controlled variables stay constant in the model. The implementation of the projects significantly enhances the value of investment in fixed assets for treated zones in the study. The construction and operation of industrial parks also have a positive and statistically significant impact on investment on fixed assets. Investment in fixed assets increased by more than 100 per cent in treated zones because of the construction and operation of industrial parks development projects. In these models average sales values significantly increase the value of investment on fixed assets. As the

average sales value increase by one percent, investment on fixed assets increases by 0.03 percentage points assuming ceteris paribus. In the same model the value of total raw material significantly decrease investment on fixed assets. As the value of total raw material increase by one percent, investments on fixed assets decrease by 0.04 percentage points assuming ceteris paribus.

The last two columns of the above table show the impact of industrial parks development projects on the amount of annual working capital. Construction and operation of industrial parks development projects have a positive and statistically significant impact on the annual working capital for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks. The value of annual working capital doubled for zones that have industrial parks development projects relative to zones that have no industrial parks development projects in their geographic setting assuming that other controlled variables in the model stay constant. In this model the total sales value and total wage significantly increase the annual working capital. As the total wage value and total sales value increase by one percent, the annual working capital will increase by 0.122 and 0.384 percentage points, respectively assuming ceteris paribus.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption holds or not. The following tables numerically justify the parallel trend assumption using time varying (event study specification) Difference in Difference setup. To generate the pseudo post value, we develop three time varying Difference in Differences setup depending on the year of establishment of Industrial Parks Development Projects: 2012-2013, 2013-2014 and 2014-2015. For 2012-2013 setup we assigned 1 for the data collected in 2013 and 0 for the data collected 2012, for 2013-2014 setup we assigned 1 for data collected in 2014 and 0 for data collected in 2013 and for 2014-2015 setup we assigned 1 for data collected 2015 and 0 for data collected in 2014. Thus, in the following table the authors conduct the placebo test using time varying Difference in Difference setup to know whether the investment by type and source have similar trend before the implementation of Industrial Parks Development Projects using pseudo post value.

Table 14: Placebo test/Parallel line test for fixed assets and Working Capital

Controlled Exogenous Variables	Ln of Investment on Fixed Assets			Controlled Exogenous variables	Ln of Working Capital		
	2012-2013	2013-2014	2014-2015		2012-2013	2013-2014	2014-2015
Treat*pseudo post	**-.483 (.773)**	**-1.878 (1.248)**	**-.143 (.642)**	**Treat*pseudo post**	**.228 (.916)**	**-.141 (.448)**	**1.338 (.864)**
Treatment	-1.037 (.898)	-.837 (.859)	.266 (.701)	Treatment	-.620 (.675)	-.530 (.386)	-.874 (.705)
Pseudo Post	.639 (.607)	-.016 (.157)	-.319 (.280)	Pseudo Post	.769 (.530)	1.726 (.288)***	.820 (2.424)
Ln of working capital	.824 (.085)***	.765 (.016)***	.773 (.031)***	Ln of total sale value	-.026 (.071)	-.020 (.051)	-.009 (.101)
Ln of stock difference	-.0079 (.0096)	-.021 (.011)*	-.0008602 .0463191	Ln of stock difference	.017 (.060)	.022 (.067)	-.112 (.114)
Constant	-.618 (.267)	.071 (.321)	1.289 (.815)	Constant	10.764 (1.713)***	9.620 (1.029)***	10.99 (2.74)***
Additional zones' factors	Yes	Yes	Yes	Additional Zones' factors	Yes	Yes	Yes
Zone and time fixed effect	Yes	Yes	Yes	Zone and time fixed effect	Yes	Yes	Yes
Source authors' estimation							
******, **, * one, five and ten per cent significance level, respectively***							

In the above table, the coefficient of the interaction term is negative and statistically insignificant for investment on fixed assets in all three time varying DID setup. This shows the absence of any effect of the introduction of industrial parks development projects on investment on fixed assets before the implementation of the program. The last three columns show the impact of the introduction of industrial parks development projects on working capital. In all time varying difference in difference setup the value of interaction term is insignificant. The introduction of the industrial parks development project has no impact on working capital before the implementation of the program. Thus, the absence of significant impact of the introduction of Industrial Parks Development Projects before implementation of the program implies the holding of parallel trend assumption for difference in differences model.

The above analysis approved that there is a positive and statistically significant impact of industrial parks development projects on Annual Investment by type and source measured by the amount of investment on fixed assets and annual working capital of the investors. This finding of the study is in line with the conclusion reached by (Humphrey, 2000; Enriksen, 1982; Lall, 2000; Farole, 2011; Milberg and Amangual, 2008; Warr, 1989; Johansson and Nilsson, 1997; Jayanthakumaran, 2003; Zeng, 2010; Fuller and Romer, 2012; Madani, 1999; World Bank, 1992; Kaplinsky, 1993; Willmore, 1995; FIAS, 2008 and Balasubramanyam, 1988). On the other hand, the findings of this study reject the conclusion of the study conducted by (Ayres, 1994; Zeng, 2015; Hamada, 1974 and In the short run Aggarwal et al, 2008).

4.4.2. Impact of Ethiopian Industrial Parks Development Project on Products and by Products of Industrial Output

The following table shows the macro-economic impact of industrial parks development project on the annual products and by-products for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks development projects. The annual products and by-products are measured by total sales values, total export values and the annual value of production.

Table 15: Impact of Ethiopian Industrial Parks Development Project on Total sales value, Total export value and value of production

Variables	Ln of total annual sales value			Ln of total annual Export Value			Ln of annual value of Production	
Treatment*Post	.166 (.033)***	1.550 (.606)**	2.417 (.616)***	.585 (.190)***	1.285 (.590)**	2.147 (.532)***	4.099 (1.814)**	5.223 (1.891)***
Post	.453 (.037)***	.0157 (.434)	.196 (.487)	-.232 (.223)	-.047 (.499)	-.768 (.271)***	2.094 (1.574)	-.185 (1.555)
Treatment	1.300 (.327)***	-3.363 (.818)***	-2.730 (.605)***	-.462 (.155)***	-1.608 (2.008)	-1.184 (.438)***	-4.086 (1.781)**	-9.121 (2.317)***
Ln of total wage		-.114 (.031)***	-.108 (.031)***		-.405 (.200)**	-.401 (.206)*	-.001 (.005)	-.002 (.005)
Ln of working Capital		.112 (.015)***	.194 (.025)***		.185 (.085)**	.093 (.060)*	.001 (.002)	.0022 (.0018)
Ln of total tax paid		-.460 (.891)	-.349 (.975)		-5.276 (1.656)***	-1.761 (1.064)*	-.145 (.108)	-.213 (.107)**
Constant	12.827 (.3194)***	18.663 (.834)***	-1.731 (1.320)	15.003 (.163)***	105.685 (11.222)***	105.370 (7.506)***	5.007 (.197)***	3.77 (.15)***
Fixed Effect	Yes	Yes	No	Yes	Yes	No	No	Yes
Additional exogenous covariates	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Additional exogenous covariates controlled in the model are: ln of annual deprecation values, ln of investment on fixed assets, ln of imported raw material values, ln of total raw material value and ln of electricity values								
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***								

The above table revealed the impact of industrial parks development projects on the products and by-products of industrial parks development projects in Ethiopia. Model one shows the impact of the construction and operation of industrial parks development projects on total annual sales values for treated zones relative to controlled zone. The study revealed that, on average, the construction and operation of industrial parks development projects increased the annual total sales value of production by more than 100 per cent for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variable stays constant. In this model the total wage value and total working capital significantly affect the total sales value of the companies. As the total wage value increase by one percent, the total sale value will decrease by 0.108 percentage points. In the same model as total working capital value increase by one percent, the total annual sales value will increase by 0.112 percentage points assuming ceteris paribus.

Model two shows the impact of the establishment and operation of industrial parks development projects on total annual export values for zones that have industrial parks relative to zones that have no industrial parks in their geographic setting. The establishment and operation of industrial parks development projects doubled the total annual export value form zones that have industrial parks in their geographic setting relative to zones that have no industrial parks assuming that all other controlled variables stay constant in the model. In the model all other controlled variables have the expected sign in the regression. In this model total wage value, total working capital and total tax paid significantly affect the total export value. As total wage value and total tax paid increase by one percent, the total annual export value will decrease by 0.4 and 1.761 percentage points assuming ceteris paribus. On the other hand, as the value of annual working capital increase by one percent, the total annual export value will increase by 0.092 percentage points assuming ceteris paribus.

Model three shows the impact of the establishment and operation of the industrial parks development projects on the total annual value of production in Ethiopia. The establishment and operation of Ethiopian industrial parks doubled the total annual value of production for zones that established industrial parks in their geographic setting relative to zones that have no industrial parks assuming that all other controlled variables in the model stay constant. All other controlled variables in the model have the expected sign in the regression. In this model total wage value and total tax paid negatively affect the annual value of production. As the total tax paid increases by one percent, annual values of production significantly decrease by 0.212 percentage points assuming ceteris paribus.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption holds or not. The following tables numerically justify the parallel trend assumption using time varying (event study specification) Difference in Difference setup. To generate the pseudo post value, we develop three time varying Difference in Differences setup depending on the year of establishment of the Industrial Parks Development Projects; 2012-2013, 2013-2014 and 2014-2015. For 2012-2013 setups we assigned 1 for the data collected in 2013 and 0 for the data collected 2012, for 2013-2014 setups

we assigned 1 for data collected in 2014 and 0 for data collected in 2013 and for 2014-2015 setups we assigned 1 for data collected in 2015 and 0 for data collected in 2014. For all setups, authors used post treatment data to generate pseudo post value that vary based on year of establishment of industrial parks in Ethiopia. Thus, in the following table authors conduct the placebo test using time varying Difference in Difference setup to know whether total annual sales value, annual export value and annual value of production have the same trends before the implementation of Industrial Parks Development Projects or not using pseudo post value.

Table 16: Placebo Test/Parallel Line test for Product and by-Products

Variables	Ln of Total annual sales value			Ln of Total annual export value			Ln of Total annual value of production		
	2012-2013	**2013-2014**	**2014-2015**	**2012-2013**	**2013-2014**	**2014-2015**	**2012-2013**	**2013-2014**	**2014-2015**
Treatment*pseudo post	**1.051 (.971)**	**-.188 (.421)**	**.042 (.171)**	**.858 (1.155)**	**-**	**1.64 (2.26)**	**1.5800 (1.2618)**	**-.265 (.411)**	
Treatment	-.861 (.591)	-.195 (1.464)	-.099 (.179)	-.010 (.794)	.320 (1.93)	2.78939 3 (1.99)	1.130 (.709)	**-.180 (1.583)**	.137 (.165)
Pseudo Post	1.801 (1.355)	-2.121 (.113)***	-.137 (.115)	-2.007 (1.737)	-.232 (.611)	1.26 (1.07)	2.431 (1.845)	-2.070 (.114)***	.072 (.084)
Ln of total wage	.101 (.240)	.081 (.084)	-.013 (.041)	-.010 (.325)	.594 (.400)	-.873 (.684)	-.049 (.235)	.088 (.082)	-.025 (.021)
Ln of working capital	.002 (.110)	.060 . 016)***	-.034 (.021)	.0180 (.152)	.149 .08 7)*	-.334 (.206)	-.111 (.097)	.062 (.016)***	-.026 (.021)
Constant	6.014 (2.848)**	12.827 (.748)***	1.150 (.685)	16.183 (2.880)***	9.20 (2.32)***	15.31 (7.29)**	15.314 (4.191)***	12.963 1.038)***	.331 (.354)
Zones exogenous variables	Yes	Yes	Yes	No	Yes	Yes	No	Yes	Yes
Zone and time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source authors' estimation

****, **, * one, five and ten per cent significance level, respectively***

The above table shows placebo test value of the economic impact of industrial parks development projects before the implementation of the program for zones that have industrial parks relative to zones that have no industrial parks. The first three time varying difference in difference setup show placebo impact of industrial parks development projects on the annual total sales values for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks using pseudo post value. The value on the interaction between pseudo post value and treatment shows insignificant placebo test value of the economic impact of industrial parks development projects before the implementation of the program. The second three time varying difference in difference setup show the placebo test value of economic impact of industrial parks development projects on total export value using the pseudo post value. The value on the interaction between pseudo post and treatment is statistically insignificant which implies absence of significant impact of industrial parks development projects on total export value before the implementation of the program. The last three time varying difference in

differences setup show the placebo impact of introduction of industrial parks development projects on total value of production using the pseudo post value. The coefficient on the interaction between pseudo post value and treatment is a statistically insignificant which shows absence of significant impact of industrial parks development projects on total value production before the implementation of the program. Thus, the absence of placebo significant impact of industrial parks development project before the implementation of the program implies holding of parallel trend assumption for difference in differences estimation techniques.

The above analysis rejected the null hypothesis of the absence of significant impact of industrial parks development projects on Products and by-products of industrial outcome measured by total export value, total sales value, and the total annual value of production. This finding revealed the positive and statistically significant impact of industrial parks development projects on products and by-products of industrial outcome in Ethiopia. The finding of the study is in line with the conclusion reached by (Devereux and Chen, 1995; FIAS, 2008; Johansson and Nilsson, 1997; Rhee et al, 1990; Johansson, 1994; Farole, 2011; Kusago and Tzannaos, 1998; Milberg and Amangual, 2008; Cling et al, 2005; ILO, 2008; Ver Beek, 2001 and Zohir, 2001). On the other hand this finding rejected the finding of the study conducted by (Aggarwal et al, 2005; War, 1989 and Ayres, 1994).

4.4.3. Impact of Ethiopian Industrial Parks Development Projects on Value of Fixed Assets

The following table shows the of impact on industrial parks development projects on the book value of fixed assets for zones that have industrial parks relative to zones that have no industrial parks in their geographic setting. The book value of fixed assets measured at the beginning and end of the year and the annual value of investment for purchase and capital repair of fixed assets.

Table 17: Impact of Ethiopian Industrial Parks Development Projects on book value of fixed assets

Variables	Ln Book value of fixed assets at the end of the year			Ln of Book value of Fixed assets at the beginning of the year		Variables	Ln investment for purchase and capital repair of fixed assets	
Treatment *Post	.140 (.052)***	.101 (.062)*	.101 (.062)*	.135 (.081)*	.135 (.081)*	Treatment * Post	.900 (.324)***	1.203 (.325)***
Post	.373 (.047)***	.0130 (.066)	-.033 (.0392)	-.030 (.090)	-.003 (.052)**	Post	-.622 (.295)**	-.498 (.185)***
Treatment	2.056 (.469)***	.075 (.038)**	.075 (.038)**	.073 (.051)	.073 (.051)	Treatment	.793 (.465)*	-.259 (.170)
Type of Fixed Assets		.043 (.014)***	.053 (.009)***	.041 (.012)***	.041 (.012)***	Type of fixed investment	.199 (.048)***	.197 (.045)***
Ln of total sale value		-.007 (.008)	-.007 (.008)	-.038 (.023)*	-.025 (.023)*	Ln of value of goods sold and disposed	.551 (.034)***	.609 (.027)***
The total value of tax paid		-1.27e-07 (3.80e-08)***	-1.27e-07 (3.80e-08)***	-.2785 (.14286)**	-.2257 (.1345)*	Ln of Total wage	-.0727 (.0397)*	-.0654 (.0341)**
Constant	11.243 (.689)***	4.042 (.760)***	4.042 (.760)***	4.339 (1.486)***	3.884 (.996)***	Constant	6.041 (.812)***	5.619 (.764)***
Fixed effect	Yes	Yes	No	Yes	No	Fixed Effect	Yes	No
Additional exogenous covariates	No	Yes	Yes	Yes	Yes	Additional Exogenous covariates	Yes	Yes
Source authors' estimation ***, **, * one, five and ten percent significance level, respectively								
Additional exogenous covariates controlled in the model are ln of total raw material values, source of finance for investors, ln of working capital, ln of annual value of deprecations and ln of local raw material value.								

The above table shows the impact of industrial parks development projects on the book value of fixed assets in Ethiopia for zones that have industrial parks relative to zones that have no industrial parks in their geographic setting. The establishment and operation of the industrial parks development project increased the book value of fixed assets at the end of the year by 11 per cent for the zones that have industrial parks relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant. The operation of industrial parks development projects increased the book value of fixed assets at the end of the year by 7 per cent in treated zones. In this model, the type of fixed assets and total tax paid significantly affect the book value of fixed assets at the end of the year. Relative to dwelling

place the value of other types of fixed assets significantly the value of fixed assets at the end of the year by 4.3 percentage points assuming that all other covariate controlled in the model stay constant.

Model two reports the impact of industrial parks development projects on book value of fixed assets at the beginning of the year for treated zones relative to controlled zones in Ethiopia. In the model, establishment and operation of industrial parks development projects increased the book value of fixed assets at the beginning of the year by 14 per cent for zones that have industrial parks development projects in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant. In the same model the establishment and operation of industrial parks increased the book value of fixed assets at the beginning of the year by 7 per cent in zones that have industrial parks. In this model type of fixed assets, total sales value and total value of tax paid significantly affect the book value of fixed assets at the beginning of the year. Relative to dwelling house the value of other type of fixed assets significantly increase the book value of fixed assets at the beginning of the year by 4.1 percentage points assuming that all other covariates controlled in the model stay constant. In the same model, as the value of tax paid increase by one percent, the value of fixed assets at the beginning of the year will decrease by 0.22 percentage points assuming ceteris paribus.

The third model shows the impact of the construction and operation of industrial parks development projects on the value of investment for purchase and capital repair of fixed assets. The construction and operation of industrial parks development projects doubled the investment for the purchase and capital repairs of fixed assets for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming that all other controlled variables stay constant in the model. In the same model the construction and operation of industrial parks development project increased the value of investment for purchase and capital repair of fixed assets by more than 100 per cent in treated zones. In this model type of fixed assets, the value of goods sold and disposed of during the year and total wage value significantly affect the value of investment for purchase and capital repair

of fixed assets. Relative to the value of dwelling place all other type of fixed assets increase the value of investment for purchase and capital repair of fixed assets by 21 percentage points assuming ceteris paribus. As the value of total wage increase by one percent, investment for purchase and capital repair of fixed assets will decrease by 0.06 percentage point assuming ceteris paribus.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption holds or not. The following tables numerically justify the parallel trend assumption using time varying (event study specification) Difference in Difference setup. To generate the pseudo post value, we develop three time varying Difference in Differences setup depending on the year of establishment of Industrial Parks Development Projects: 2012-2013, 2013-2014 and 2014-2015. For 2012-2013 setup we assigned 1 for the data collected in 2013 and 0 for the data collected 2012, for 2013-2014 setup we assigned 1 for data collected in 2014 and 0 for data collected in 2013 and for 2014-2015 setup we assigned 1 for data collected 2015 and 0 for data collected in 2014. For each time varying difference in difference estimation techniques, authors used post treatment data based on the year of establishment of each industrial park to generate pseudo post value. Thus, in the following table authors conduct the placebo test using time varying Difference in Difference setup to know whether book value of fixed assets at the beginning and end of the year and investment for purchase and capital repair of fixed assets have the same trend before the implementation of Industrial Parks Development Projects or not using pseudo post value.

Table 18: Placebo Test/Parallel Line Test for Book Value of Fixed Assets

Exogenous variables	Book value of fixed assets at the end of the year			Book value of fixed assets at the beginning of the year			Investment for purchase and capital repair of fixed assets		
	2012-2013	2013-2014	2014-2015	2012-2013	2013-2014	2014-2015	2012-2013	2013-2014	2014-2015
Treatment* pseudo post	-.224 (.243)	-.298 (.189)	.164 (.496)	-.292 (.256)	-.123 (.186)	.065 (.238)	-.311 (.199)	-.695 (.474)	.012 (.657)
Treatment	-.545 (.516)	-.425 (.288)	-.542 (.623)	-.540 (.555)	-.131 (.335)	.380 (.275)	.512 (.587)	.268 (1.05)	.464 (1.04)
Pseudo Post	-.221 (.164)	.008 (.021)	.202 (.171)	-.249 (.172)	.015 (.018)	.132 (.114)	.150 (.131)	-.029 (.074)	.275 (.338)
Type of fixed assets	-.101 (.032)***	-.141 .006)***	-.033 (.042)	-.108 (.034)**	-.145) (.005)***	.012 (.027)	-.092 (.029)***	-.121 (.021) ***	-.068 (.075)
Constant	14.667 (.517)***	3.270 (.238)***	2.80 (.783)***	14.775 (.553)***	3.04 (.271)***	-.299 (.553)	3.908 (.743)***	4.743 (1.019)	-.223 (1.56)
Zones exogenous variables	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	Yes
Zone and Time foxed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***									

The above table shows the placebo test value of the economic impact of industrial parks development projects before implementation of the program for zones that have industrial parks relative to zones that have no industrial parks in Ethiopia. The first three time varying difference in differences setup shows the impact of industrial parks development projects on the book value of fixed assets at the end of the year for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks using the pseudo post value. The coefficient on the interaction between the pseudo post value and treatment shows insignificant the placebo test value of the economic impact of industrial parks development projects before the implementation of the program. The second three time varying difference in difference setup show the placebo test value of economic impact of the industrial parks development projects on the book value of fixed assets at the beginning of the year using the pseudo post value. The coefficient on the interaction between the pseudo post and treatment shows a statistically insignificant placebo test value of the economic impact of industrial parks development projects on the book value of fixed assets at the beginning of the year before the implementation of the

program. The last three time varying difference in difference setup show the placebo impact of the introduction of industrial parks development projects on investment for purchase and capital repair of fixed assets using the pseudo post value. The coefficient of the interaction between pseudo post value and treatment shows statistically insignificant placebo test value of the economic impact of industrial parks development projects on investment for purchase and capital repair of fixed assets before the implementation of the program. Thus, the absence of placebo significant impact of the industrial parks development project before the implementation of the program implies holding of parallel trend assumption of the difference for differences estimation techniques.

The above analysis rejected the null hypothesis that claim the absence of positive and statistically significant impact of industrial parks development projects on the value of fixed assets measured by the book value of fixed assets at the beginning and the end of year and the value of investment for purchase and capital repair of fixed assets. This study confirmed the positive and statistically significant impact on industrial parks development projects on the value of fixed assets at the beginning and the end of year and the value of investment for purchase and capital repair of fixed assets in Ethiopia. This finding supports the finding of the study conducted by (Debrezion et al, 2006; Lall, 2000; Wang, 2013; Devereux and Chen, 1995; Humphrey, 2000; Bayisa, 2016; Milberg and Amangual, 2008; Visser and Van Dam, 2006; Farole, 2011; Rouwendal and Van der Straaten, 2008; Dekkers and Van Der Straaten, 2008). On the other hand, the above finding disapproves the finding of the study conducted by (Hamada, 1974; Zeng, 2015 and Aggarwal et al, 2005).

4.4.4. Impact of Ethiopian Industrial Parks Development Projects on Wages and other benefits for employees

Table 19 below shows the economic impact of Ethiopian Industrial parks development projects on wages and salaries of employees for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks in their geographic setting. In this study, the values of wages and salaries are measured by the total wages of employees, total wages for male employees and total commission, bonus, and professional allowances for employees.

Table 19: Impact of Ethiopian Industrial Parks Development Project on total wage and other benefits for employees

Variables	Ln of Total wage value for employees			Ln of wage for Male employees		Ln of commission, bonus and professional allowances		
Treatment *Post	.077 (.036)***	.426 (.176)**	.422 (.176)**	.449 (.264)*	.458 (.266)*	.111 (.120)	1.036 (.486)**	.948 (.467)**
Post	.634 (.040)***	.365 (.112)***	.265 (.120)**	.479 (.165)***	.365 (.160)**	.368 (.131)***	.408 (.396)	.558 (.387)
Treatment	-1.257 (.798)	.047 (.068)	.048 (.067)	.072 (.100)	.0750 (.101)	1.582 (.302)***	.004 (.112)	-.114 (.113)
Ln of working capital		.109 (.013)***	.109 (.013)***	.093 (.013)***	.093 (.013)***		.064 (.023)***	.098 (.024)***
Ln of total raw material values		.027 (.010)***	.019 (.010)**	.025 (.010)**	.015 (.010)		.065 (.065)	.086 (.068)
Source of Finance		.044 (.017)**	.034 (.014)**	.027 (.014)**	.026 (.014)*		.024 (.024)	.036 (.025)
Constant	12.410 (.797)***	8.825 (.389)***	9.258 (.370)***	8.813 (.380)***	9.335 (.361)***	9.336 (.321)***	7.869 (.595)***	8.368 (.541)***
Fixed effect	Yes	Yes	No	Yes	No	Yes	Yes	No
Additional exogenous covariates	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Source authors' estimation ******, **, * one, five and ten percent significance level, respectively***								
Additional exogenous covariates controlled in the model are ln of average annual sales, ln of value of the product at full capacity, ln of average value of the product, ln of difference in the annual value of stocks and ln of total value of domestic capital								

The above table revealed the economic impact of the construction and operation of Ethiopian Industrial Parks development projects on the annual value of wages and salaries of employees for zones that have industrial parks development projects in their geographic setting relative to zones that have no industrial parks development projects in their geographic setting. The first two columns revealed the impact of the construction and operation of industrial parks development projects on the total wages of employees. The establishment and operation of industrial parks development projects increased the value of the total annual wages of employees by 5 percent for zones that have industrial parks development projects in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant. In this model the annual the value of working capital, total raw material value and sources of finance significantly increase the total wage value of employees. As working capital

increase by one per cent, the total wage value of employees will increase by 0.109 percentage points assuming ceteris paribus. In the same model as total raw material value increase by one percent, the total wage of employees will increase by 0.019 percentage points assuming ceteris paribus. Relative to domestic sources of finance for investment, all other sources of finance significantly increase the total wage value by 0.03 percentage points assuming ceteris paribus.

Model two revealed the impact of industrial parks development projects on total wage for male employees. In the study, the establishment and operation of industrial parks development projects significantly increased total wage payment for male employees by 55 per cent for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant in the model. The establishment and operation of industrial parks development projects increased the total wage payment for male employees by 7 per cent in zones that have industrial parks development projects. In this model, annual value of working capital and source of finance significantly increase the value of wage for male employees. As the value of working capital increase by one percent, the wage for male employees will increase by 0.09 percentage points assuming ceteris paribus. Relative to domestic source of finance all other source of finance significantly increase the wage value of male employees by 0.03 percentage points assuming ceteris paribus.

Model three show the impact of the establishment and operation of Ethiopian Industrial parks development projects on Commission, bonus and professional allowance for employees in zones that have industrial parks development projects relative to zones that have no industrial parks development projects in their geographic setting. Thus, the establishment and operation of Ethiopian Industrial parks development projects significantly increased the bonuses, commission and professional allowances by more than 100 per cent in zones that have industrial parks development projects in their geographic setting relative to zones that have no industrial parks in their geographic setting assuming all other controlled variables stay constant in the model. In this model, the annual working capital significantly increases the value of commission, bonus and professional allowance. As the value of annual working capital increase by one percent,

commission, bonus and professional allowance will increase by 0.1 percentage points assuming ceteris paribus.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption holds or not. The following tables numerically justify the parallel trend assumption using time varying (event study specification) Difference in Difference setup. To generate the pseudo post value, we develop three time varying Difference in Differences setup depending on the year of establishment of Industrial Parks Development Projects: 2012-2013, 2013-2014 and 2014-2015. For 2012-2013 setup we assigned 1 for the data collected in 2013 and 0 for the data collected 2012, for 2013-2014 setup we assigned 1 for data collected in 2014 and 0 for data collected in 2013 and for 2014-2015 setup we assigned 1 for data collected 2015 and 0 for data collected in 2014. Thus, in the following table authors conduct the placebo test using time varying Difference in Difference setup to know whether total wage of employees, total wage of male employees and total annual commission, bonus and professional allowances of employees have the same trend before the implementation of Industrial Parks Development Projects or not using pseudo post value.

Table 20: Placebo test/ Parallel Line Test for Wages and other benefits for Employees

Variables	Ln of total wage value for employees			Ln of total wage for male employees			Ln of commission, bonus and professional allowance		
	2012-2013	2013-2014	2014-2015	2012-2013	2013-2014	2014-2015	2012-2013	2013-2014	2014-2015
Treatment* pseudo post	.417 (.345)	.508 (.551)	-.366 (.821)	.429 (.336)	.070 (.935)	-.207 (.754)	-.045 (1.44)	-.761 (1.462)	.608 (.994)
Treatment	-1.063 (.755)	-.041 (.553)	.644 (.648)	-.601 (.825)	-.532 (.537)	.204 (.729)	-3.110 (2.298)	-.399 (.505)	-.085 (1.139)
Pseudo Post	-.210 (.260)	.078 (.171)	-.776 (.401)*	-.235 (.250)	.040 (.168)	-.709 (.411)*	.564 (1.127)	(.144) (.320)	-.574 (.482)
Ln of working capital	.135 (.039)***	-.066 (.030)**	.184 (.044)***	.121 (.037)***	-.065 . 029)**	.150 (.043)	.248 (.121)**	-.071 (.053)	.157 (.088)*
Constant	11.082 (1.136)	9.183 (.743)***	8.451 (.854)***	10.566 (1.133)***	9.170 .733)***	8.818 (.836)***	2.113 (3.534)	13.440 (1.286)***	4.42 (1.87)
Zones exogenous variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone and Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source authors' estimation
******, **, * one, five and ten per cent significance level, respectively***

The above table shows the placebo test value of the economic impact of industrial parks development projects before the implementation of the program for zones that have industrial parks relative to zones that have no industrial parks in Ethiopia. The first three time varying difference in difference setup show the placebo impact of industrial parks development projects on the total wages of employees for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks using pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows an insignificant placebo test value of the economic impact of industrial parks development projects before the implementation of the program. The second three time varying difference in difference setup show the placebo test value of economic impact of industrial parks development projects on total wage for male employees using the pseudo post value. The coefficient on the interaction between pseudo post and treatment shows a statistically insignificant placebo test value of the economic impact of industrial parks development projects on wage for male employees before the implementation of the program. The last three time varying difference in differences setup show the placebo impact of introduction of industrial parks development projects on commission, bonus and professional

allowance using the pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows statistically insignificant placebo test value of the economic impact of industrial parks development projects on commission, bonus and professional allowances before the implementation of the program. Thus, absence of placebo significant impact of industrial parks development project before the implementation of the program implies holding of parallel trend assumption of the difference for differences estimation techniques.

The above finding rejected the null hypothesis which claims the absence of positive and statistically significant impact of industrial parks development projects on the wages and other benefits of employees measured by total wage for employees, annual wage for male employees and commission, bonus and professional allowance for employees. The study confirmed the positive and statistically significant impact of industrial parks development projects on wages and salaries of industrial parks enterprises in Ethiopia. Thus, the study supports the conclusion made by (Selam, 2017; Rhees, 1990; Farole, 2011; Kusago and Tzannaos, 1998; Milberg and Amangual, 2008; Romero, 1995; Mondol, 2003; FIAS, 2008; Warden, 2000; Cling et al, 2005; ILO, 2008; Ver Beek, 2001; Zohir, 2001; Wang, 2013; Johansson and Nilsson, 1997; Warr, 1989; Summerfield, 1995 and In the long run Aggarwal et al, 2008). On the other hand, this finding opposes the conclusion reached by (Hamada, 1974; ICFTU, 2004; PRIA, 2000; Hossain, 2001; Mazumdar, 2001 and Kemal, 2001).

4.4.5. Impact of Ethiopian Industrial Parks Development Projects on the Domestic Capital formation

Table 21 below shows the economic impact of Ethiopian Industrial parks development projects on domestic capital formation for zones that have industrial parks relative to zones that have no industrial parks in their geographic setting. Domestic capital formation is measured by the total number of domestic investors/owners, total initial paid up capital by domestic investors and total working capital of domestic investors.

Table 21: Impact of Industrial Parks Development on Domestic Capital Formation

Variables	Total number of domestic investors (Both sex)		Variables	Ln of total initial paid up capital by domestic investors		Variables	Ln of total working capital by domestic investors	
Treatment* Post	.127 (1.171)	1.099 (1.169)	Treatment*Post	.374 (1.447)	.920 (.800)	Treatment* Post	7.747 (9.466)	-4.045 (3.063)
Post	-2.070 (2.959)	-1.224 (1.010)	Post	-1.936 (.955)**	-1.826 (.482)***	Post	-5.800 (9.900)	1.914 (2.294)
Treatment	-.525 (1.149)	-1.014 (1.136)	Treatment	1.661 (2.081)	-.771 (.723)	Treatment	-8.508 (10.738)	4.583 (3.040)
Source of finance	.090 (.170)	.041 (.185)	Ln of Working Capital	-.288 (.100)***	-.133 (.074)*	Source of finance	.270 (.365)	-.157 (.250)
Ln of working Capital	-.145 (.236)	-.112 (.195)	Ln of License fee Paid	-.141 (.144)	-.061 (.102)	Ln of working capital	.581 (1.038)	-.632 (.493)
Ln of Banking charge	-.022 (.190)	-.004 (.124)	Ln of total wage value	-.004 (.098)	-.001 (.075)	Ln of total tax paid	-16.185 (24.818)	-12.784 (10.662)
Ln of income tax paid	-.076 (.249)	-.050 (.215)	Ln of Income tax paid	-.019 (.130)	-.006 (.097)	Ln of book value of fixed asset	.0193 (.077)	.556 (.633)
Ln of total wage value	-.304 (.154)**	-.180 (.113)**	Ln of Banking charge paid	-.075 (.114)	-.032 (.082)	Ln of annual export value	.572 (.811)	-.365 (.401)
Constant	14.288 (6.787)**	10.609 (3.741)***	Constant	20.162 (3.308)***	16.376 (2.187)***	Constant	2.7505 (23.4350)	-7.829 (9.691)
Fixed Effect	Yes	No	Fixed Effect	Yes	No	Fixed Effect	Yes	No
Additional exogenous covariates	Yes	Yes	Additional exogenous covariates	Yes	Yes	Additional exogenous covariates	Yes	Yes
Source authors' estimation ****, **, * one, five and ten percent significance level, respectively*								
Additional exogenous covariates controlled in the model are ln of value of total raw material, ln of total sale value, ln of the value of bank service charges, ln of value of total tax paid and ln of the value of products at full capacity								

The above model revealed the impact of the establishment and operation of Ethiopian industrial parks development projects on domestic capital formation measured by the total number of domestic enterprise owners/ownership of enterprise in zones that have industrial parks development projects relative to zones that have no industrial parks in their geographic setting. In the above table, the coefficient of the interaction terms is positive but statistically insignificant.

Thus, we do not have significant evidence to reject the null hypothesis. The establishment and operation of industrial parks development projects have no significant impact on the total number of domestic investors. In this model, the total wage value significantly increases the total number of domestic investors. As the total wage of employees increase by one percent, the total number of domestic investors will decrease by 30 percentage points assuming ceteris paribus.

Model two revealed the impacts of the establishment and operation of industrial parks development projects on domestic capital formation measured by the total initial paid up capital by domestic investors for zones that have industrial parks relative to zones that have no industrial parks development projects in their geographic setting. The above result shows that the coefficient on the interaction term is positive but statistically insignificant. The establishment and operation of industrial parks development projects have no significant impact on initial paid up capital by domestic investors.

Model three revealed the impact of Ethiopian industrial parks development projects on the total working capital of domestic investors for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks. The coefficient on the interaction terms revealed the absence of significant impact of industrial parks development projects on the total working capital of domestic investors.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption hold or not. The numbers from the following tables justify the parallel line test using two waves (2012 and 2013) of pre-implementation of Industrial Parks Development projects data. To generate the pseudo post value, we assigned 1 for the data collected in 2013 and 0 for the data collected in 2012. Thus, we conducted the placebo test to know whether Domestic Capital formation measured by total number of domestic investors, total initial and working capital of domestic investors have the same trend before the implementation of the program or not.

Table 22: Placebo Test/ Parallel Line Test for Domestic Capital Formation

Variables	Total number of domestic investors		Ln of total initial paid up capital by domestic investors		Ln of total working capital by domestic investors	
Treatment* pseudo post	-.124 (1.923)	-.197 (2.021)	-.017 (.115)	.363 (.33.)	-.019 (.120)	-098 (.280)
Treatment	-1.625 (1.349)	-1.462 (1.406)	.072 (.097)	-.924 (1.049)	.034 (.094)	.048 (.183)
Pseudo Post	.191 (.968)	.149 (1.049)	.111 (.071)	.138 (.213)	.064 (.075)	-1.395 (.877)
Ln of working capital		-.004 (.135)		.070 (.035)		.100 (.029)***
Source of finance		-.070 (.186)		.001 (.035)		-.002 (.031)
Constant	2.908 (.885)***	3.038 (3.096)	15.767 (.3185)***	14.320 (1.168)***	16.831 (.411)	14.865 (1.005)***
Zones exogenous variables	No	Yes	No	Yes	No	Yes
Zone and Time fixed effect	yes	Yes	Yes	Yes	Yes	Yes
Source authors' estimation ****, **, * one, five and ten percent significance level, respectively*						

The above table shows the placebo test value of the economic impact of industrial parks development projects before the implementation of the program for zones that have industrial parks relative to zones that have no industrial parks in Ethiopia. The second column shows the placebo impact of industrial parks development projects on the total number of domestic investors for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks using pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows the insignificant placebo test value of the economic impact of industrial parks development projects before the implementation of the program. The fourth columns show the placebo test value of the economic impact of industrial parks development projects on total initial paid up capital by domestic investors using the pseudo post value. The coefficient on the interaction between pseudo post and treatment shows a statistically insignificant placebo test value of the economic impact of industrial parks development projects on the total initial paid up capital by domestic investors before the implementation of the program. The last column shows the placebo impact of introduction of industrial parks

development projects on total working capital by domestic investors' using the pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows statistically insignificant placebo test value of the economic impact of industrial parks development projects on the total working capital of domestic investors before the implementation of the program. Thus, the absence of significant impact of industrial parks development project before the implementation of industrial parks development projects implies holding of parallel trend assumption of the difference in differences estimation techniques.

From the above results, we fail to reject the null hypothesis that claimed the absence of positive and statistically significant impact of industrial parks development projects on the domestic capital formation measured by the total number of domestic investors/capital owners, total initial paid up capital by domestic investors and total working capital of domestic investors. Thus, the above finding is in line with the conclusion reached by (Aggarwal et al, 2005; Ayres, 1994; Zeng, 2015 and Hamada, 1974). On the other hand, this finding disapproves the conclusion reached by (Devereux and Chen, 1995; Wang, 2013; Johansson and Nilsson, 1997; Humphrey, 2000; Lall, 2000; Farole, 2011; Kusago and Tzannaos, 1998 and Milberg and Amangual, 2008).

4.4.6. Impact of Industrial Parks Development Projects on the total number of persons employed in industrial enterprise

Table 23 shows the economic impact of industrial parks development projects on the total number of workers employed in industrial enterprise. The total numbers of persons employed in industrial enterprises are measured by total employees employed in industrial enterprises, the total number of female employees employed in industrial enterprise, and the total number of persons employed per month in industrial enterprise.

Table 23: Impact of Industrial Parks Development Projects on Total Number of Persons Employed in industrial enterprise

Variables	Total employees employed in industrial enterprise		Total Female employees employed in industrial enterprise		Variables	Total employees employed per months in industrial enterprise	
Treatment*Post	2117.28 (953.162)**	2242.383 (387.578)***	501.184 (196.545)**	403.324 (180.419)**	Treatment *Post	260.3733 (47.7817)***	119.246 (133.429)
Post	-3913.486 (1151.01)***	-1926.779 (393.7635)***	-292.350 (264.371)	-345.693 (169.427)**	Post	-270.224 (100.355)**	112.890 (61.1956)*
Treatment	-716.450 (892.532)	-1774.546 (522.116)***	-677.123 (472.341)	-335.634 (179.334)**	Treatment	-19.5819 (73.2532)	-14.2685 (47.5066)
Ln total value of production	571.190 (449.617)	39.8345 (247.450)	68.6233 (59.8360)	19.8390 (27.990)	Ln of total Value of Production	-566.079 (119.407)***	-267.394 (248.845)
Ln average Sales per unit in Birr	55.882 (52.358)	.58794 (24.846)	16.785 (19.875)	-12.113 (12.112)	Ln of average Sales per unit in Birr	417.322 (109.143)***	159.954 (197.107)
Constant	2275.253 (2631.715)	1125.33 (3134.863)	-858.237 (821.878)	-611.220 (661.623)	Constant	1031.522 (330.287)**	329.509 (301.811)
Fixed Effect	**Yes**	**No**	**Yes**	**No**	Fixed Effect	**Yes**	**No**
Additional Exogenous Covariates	**Yes**	**Yes**	**Yes**	**Yes**	Additional Exogenous Covariates	**Yes**	**Yes**
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***							
Additional exogenous covariates controlled in the model are ln of the value of investment on fixed assets, ln of the value of products, ln of total wage values, the value of wage square, position of respondents and years of experience of responders							

In the above table, the first two columns revealed the impact of Ethiopian industrial parks development projects on the total number of employees employed in industrial enterprise measured by the total number of employees engaged in an industrial enterprise for those zones that have industrial parks in their geographic setting relative to zones that have no industrial parks development projects. Thus, the establishment and operation of Ethiopian Industrial parks development projects significantly increased the total number of employees engaged in an industrial enterprise by 2,117 persons for zones that have industrial parks development projects relative to zones that have no industrial parks development projects assuming all other controlled variables stay constant in the model. All other controlled variables in the model have the right and expected sign in regression.

Model two shows the impact of industrial parks development projects on the total number of female employees engaged in an industrial enterprise for those zones that have industrial parks development projects in their geographic setting relative to zones that have no industrial parks development projects in their geographic setting. Thus, the study shows that the establishment and operation of industrial parks development projects significantly increased the total number of female employees engaged in an industrial enterprise by 501 employees for those zones that have industrial enterprise in their geographic setting relative to those zones that have no industrial enterprise in their geographic setting in Ethiopia assuming that all other controlled variable stays constant in the model. In the model all other controlled variables have the right and expected sign in the regression.

Model three shows the impact of Ethiopia's industrial parks development projects on the total number of employees engaged per months in industrial enterprise for those zones that have industrial enterprise in their geographic setting relative to zones that have no industrial enterprise in their geographic setting. Thus, the study shows that the establishment and operation of industrial parks development projects significantly increased the total number of employees engaged per month in the industrial enterprise by 260 persons for those zones that have industrial parks development projects in their geographic setting relative to those zones that have no industrial parks development projects in their geographic setting. The same model shows that the establishment and operation of industrial parks development projects significantly increased the total number of employees engaged per month in industrial enterprise for zones that have industrial parks development projects in their geographic setting. In this model, the total value of production and average sales per unit significantly affect the total employees employed per month in industrial enterprise. As the value of production increase by one percent, total employees employed per month in an industrial enterprise will decrease by more than half assuming ceteris paribus. This show as the value of production increases, it needs more of technology and less of human power. On the other hand, as average sales per unit increase by one percent, the total numbers of employees employed per month in industrial enterprise will increase by double assuming ceteris paribus.

Parallel Line Test /Placebo test

One of the basic assumptions we need to test under Difference in Differences estimation techniques is whether the parallel trend assumption holds or not. The following tables numerically justify the parallel trend assumption using time varying (event study specification) Difference in Difference setup. To generate the pseudo post value, we develop three time varying Difference in Differences setup depending on the year of establishment of Industrial Parks: 2012-2013, 2013-2014 and 2014-2015. For 2012-2013 setup we assigned 1 for the data collected in 2013 and 0 for the data collected 2012, for 2013-2014 setup we assigned 1 for data collected in 2014 and 0 for data collected in 2013 and for 2014-2015 setup we assigned 1 for data collected 2015 and 0 for data collected in 2014. Thus, in the following table authors conduct the placebo test using time varying Difference in Difference setup to know whether total number of employee hired, total number of female employees hired and total employees hired per month have the same trend before the implementation of Industrial Parks Development Projects or not using the pseudo post value.

Table 24: Parallel Line Test/Placebo test

Variables	Total employees employed in industrial enterprise			Total female employees employed in industrial enterprise			Total employees employed per months in industrial enterprise		
	2013-2014	**2014-2015**	**2015-2016**	**2013-2014**	**2014-2015**	**2015-2016**	**2013-2014**	**2014-2015**	**2015-2016**
Treatment* pseudo post	-312.3 (343.0)	-172.1 (271.9)	36.95 (325.5)	8.63 (25.4)	-16.54 (45.32)	101 (235)	43.3 (564.8)	-80.09 (193.4)	542.8 (3494)
Treatment	1059.5 (722.2)	166.2 (18.4)	-181.4 (479.1)	-61.1 (51.1)	181.0 (171.1)	-63.2 (374)	-237.9 (330.1)	-291.1 (197.4)	-1166 (2337)
Pseudo Post	295.4 (280.2)	-71.1 (54)	102.2 (147.5)	8.87 (16.6)	-12.3 (36.5)	22.8 (98.8)	12.9 (38.7)	12.86 (104.4)	-238.9 (1725)
Source of finance	-43.8 (45.9)	2.65 (18.2)	41.7 (25.1)	.334 (3.370)	8.260 (14.34)	27.8 (16.7) *	47.4 (72.3)	28.6 (37.17)	-470 (307)
Constant	1232 (506.2)	432.49 (281.5)	288.9 (580.9)	170.677 (54.360)***	250.3 (170.5)	661.5 (492.2)	195.9 (271.7)	1169.5 (888.2)	-1717 (5985)
Zones exogenous variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Zone and Time fixed effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***									

The above table shows placebo test value of the economic impact of industrial parks development projects before the implementation of the program for zones that have industrial parks relative to zones that have no industrial parks in Ethiopia. The first three time varying difference in difference setup show placebo impact of industrial parks development projects on total employees employed in industrial enterprise for zones that have industrial parks in their geographic setting relative to zones that have no industrial parks using pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows the insignificant placebo test value of the economic impact of industrial parks development projects before the implementation of the program. The second three time varying difference in difference setup show placebo test value of economic impact of industrial parks development projects on total female employees employed in industrial enterprise using the pseudo post value. The coefficient on the interaction between pseudo post and treatment shows statistically insignificant placebo test value of the economic impact of industrial parks development projects on total female employees employed in industrial enterprise before the implementation of the program. The last three time varying difference in difference setup show placebo impact of introduction of industrial parks development projects on total employees employed per month in industrial enterprise using pseudo post value. The coefficient on the interaction between pseudo post value and treatment shows statistically insignificant placebo test value of the economic impact of industrial parks development projects on total employees employed per month in industrial enterprise before the implementation of the program. Thus, absence of significant impact of industrial parks development project before the implementation of industrial parks development projects implies holding of parallel trend assumption of the difference in differences estimation techniques.

The above finding rejected the null hypothesis which claimed the absence of positive and statistically significant impact of industrial parks development projects on the total number of employees hired in the industrial enterprises measured by total employees hired, total female employees hired and total number of employees hired per month in industrial enterprises for zones that have industrial parks development projects relative to zones that have no industrial parks development projects. Thus, the above results confirmed the positive and statistically significant impact of industrial parks development projects on the total number of employees

hired in industrial enterprises. This finding supports the finding of the study conducted by (Warden, 2000; Cling et al, 2005; International Labor Organization, 2008; Ver Beek, 2001; Zohir, 2001; Selam, 2017; Farole, 2011; Liberato and Fennell, 2007; Kusago and Tzannaos, 1998; Milberg and Amangual, 2008; FIAS, 2008; Summerfield, 1995; Johansson and Nilsson, 1997 and Rhee et al, 1990). On the other hand, this finding opposes the finding of the study conducted by (Phillips and Xaba, 2002; Voice of Women, 1983; Bastian, 1984; Hettiarachchi, 1991; Dewan, 2001; Majumdar, 2001; War, 1989; Aggarwal, 2000; Aggarwal et al, 2005; ICFTU, 2004; PRIA, 2000 and Hossain, 2001).

4.5. The Microeconomic Impact of Industrial Parks Development Projects in Ethiopia

To examine the micro economic impact of industrial parks development projects, researchers used both qualitative and quantitative data collected through self-administered questionnaires, interviews with key informants and focus group discussions with the community that dwells around the industrial parks. This research question was assessed from two perspectives: Household and individual-level of microeconomic impact of industrial parks development projects in Ethiopia.

4.5.1. Household-level Microeconomic effect of Industrial Parks Development projects in Ethiopia

Test of Causality between Household-level Effect and Indexed Economic Impact of Industrial Parks Development Projects

The following table presents the test of causality between listed household-level effect and indexed Economic Impact of Industrial Parks Development Projects in Ethiopia using Chi-square test. Under this test the null hypothesis states absence of a strong and significant causality between the household-levels effect of industrial parks and indexed economic impact of industrial parks development projects. The alternative hypothesis claims existence of a strong and significant causality between listed household-level effect and indexed economic impact of industrial parks development projects.

Table 25: Test of Causality between Household-level Effect and Indexed Economic Impact of Industrial Parks Development Projects

Major Household level Impact of Industrial Parks Development Projects	Indexed Economic Impact of Industrial Parks Projects	
	Number of observation	Chi-square value
The development of industrial parks strengthen the domestic markets for the surrounding community	313	105.1)***
The development of industrial parks increased the productivity of the surrounding community	313	(115.2)***
The development of industrial parks increased social communication among the community	307	(124.7)***
The construction and operation of industrial parks play a great role in modernizing the Ethiopian labour force	310	(136.6)***
The development of industrial parks enhance social security for the community	310	(101.6)***
The development of industrial parks enhance the creativity skill of the community	313	(87.1)***
The development of industrial parks increased access to social services for the surrounding community.	310	(108.8)***
The development of Industrial parks enhance the beauty of the surrounding environment	310	(187.2)***
The development of Industrial parks reduce unmanaged sound pollution for the community	310	(112.4)***
The development of industrial parks has increased the construction of infrastructure for the surrounding community	307	(175.3)***
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***		

The above table shows, all listed household-level effects have strong and statistically significant causality with indexed economic impact of industrial parks development project. Thus, we rejected the null hypothesis and accepted the alternative hypothesis. These results confirmed existence of causality between listed household level effects and indexed economic impact of industrial parks development projects. Once existence of causality is confirmed, the following table analyze proportion of contribution the major household level microeconomic impact of industrial parks development projects in Ethiopia. The household level of microeconomic impact of industrial parks development projects is measured by 10 identified major household level variables. These major household variables address different micro economic issues which include: Economic issues, Social issues, Political issues, Environmental issues, and Technological spill over issues.

Table 26: Household-level of Microeconomic Impact of Industrial Parks Development in Ethiopia

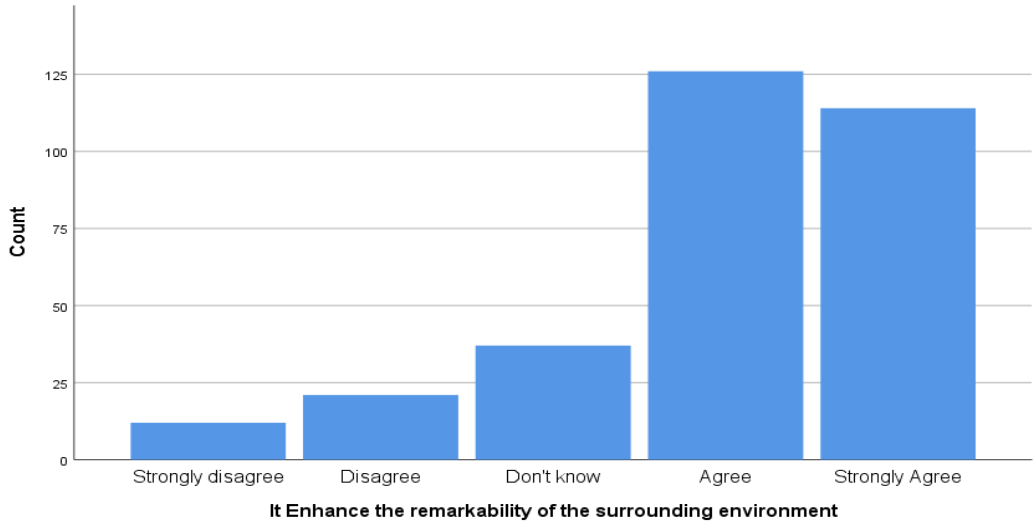
Major household level Micro economic variables	SA	A	N	DA	SD
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
The development of industrial parks strengthen the domestic markets for the surrounding community	94 (30.03)	92 (29.39)	48 (15.34)	46 (14.70)	33 (10.54)
The development of industrial parks increased the productivity of the surrounding community	83 (26.52)	123 (39.30)	61 (19.49)	25 (7.99)	21 (6.71)
The development of industrial parks increased social communication among the community	103 (33.55)	113 (36.81)	46 (14.98)	23 (7.49)	22 (7.17)
The construction and operation of industrial parks play a great role in modernizing the Ethiopian labour force	108 (34.84)	115 (37.10)	42 (13.55)	26 (8.39)	19 (6.13)
The development of industrial parks enhance social security for the community	82 (26.45)	117 (37.74)	68 (21.94)	20 (6.45)	23 (7.42)
The development of industrial parks enhance the creativity skill of the community	97 (30.99)	96 (30.67)	65 (20.77)	46 (14.70)	9 (2.88)
The development of industrial parks increased access to social services for the surrounding community.	88 (28.12)	125 (39.94)	57 (18.21)	27 (8.63)	16 (5.11)
The development of Industrial parks enhance the beauty of the surrounding environment	114 (36.77)	126 (40.65)	37 (11.94)	21 (6.77)	12 (3.87)
The development of Industrial parks reduce unmanaged sound pollution for the community	104 (33.55)	103 (33.23)	61 (19.68)	30 (9.68)	12 (3.87)
The development of industrial parks has increased the construction of infrastructure for the surrounding community	119 (38.39)	120 (38.71)	48 (15.48)	7 (2.26)	16 (5.16)

Source: Authors' field survey 2020
SA= Strongly agree, A= Agree, N= Neutral DA= Disagree and SD = Strongly Disagree

As the above table shows, for all identified household-level microeconomic variables, more than 50 per cent of respondents strongly agreed or agreed that industrial parks development and operation has a positive impact on the household that dwell around the parks: Development of industrial parks enhances the beauty of the surrounding environment (77.32%), reduce sound pollution in the surrounding community (66.78%), increase social communication (70.36%), modernize labour force of surrounding community (71.94%), enhance social security of the community (64.19%), increase creativity skill of employees (61.66%), increase access to social service for the community around the parks (68.06%), strengthen domestic markets for surrounding community (59.42%), increase the productivity of the surrounding community

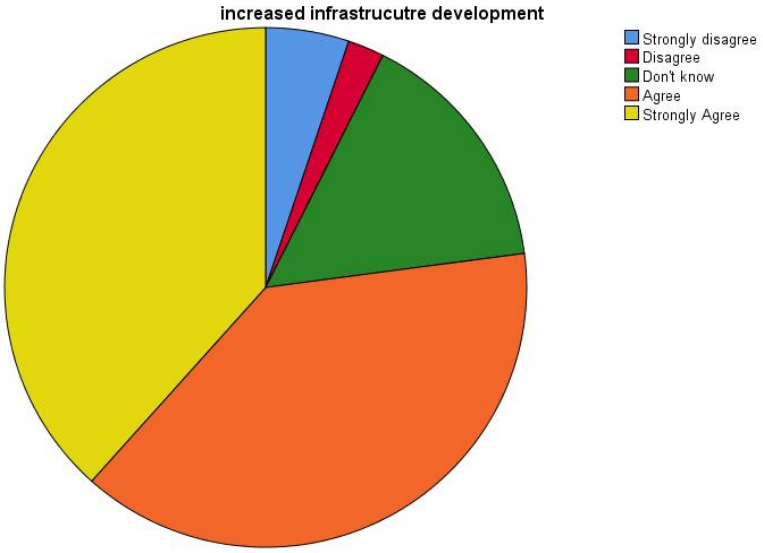
(65.82%) and increases the construction of infrastructure for the surrounding community (77.1%). Thus, the finding of this study shows the positive role of industrial parks development for the household that dwell around the parks in particular as well as for all Ethiopian household in general. In both focus group discussions and interviews with the surrounding community, researchers confirmed the positive effect of the construction and operation of industrial parks for the surrounding community. All respondents in interview and focus group discussion are highly grateful to the government for taking initiation to establish industrial parks for their community. Especially the surrounding communities fully agreed as the industrial parks' management protect the environment around the industrial parks.

Figure 3: Role of Industrial parks for surrounding community/Environmental Conservation



Furthermore, the majority of respondents both in the interview and in the focus group discussions confirmed the role of industrial parks development project for expanding infrastructure development for the surrounding community. When cross-checked with the questionnaire, more than 77 per cent of respondents agreed that industrial parks development plays a role in constructing new infrastructure for the surrounding community. The following pie chart shows the role of industrial parks in constructing as well as expanding the infrastructure for the surrounding community:

Figure 4: The role of Industrial Parks for surrounding community/ Infrastructure Development



4.5.2. Individual-Level Microeconomic effect of Industrial Parks Development Projects in Ethiopia

Test of Causality between Individual-level effect and indexed Economic Impact of Industrial Parks Development Projects

The following table presents test existence of causality between the individual-level effect and indexed Economic Impact of Industrial Parks Development Projects in Ethiopia using Chi-square tests. Under this test the null hypothesis states the absence of strong and significant causality between the individual-levels effect of industrial parks and indexed economic impact of industrial parks development projects. The alternative hypothesis claims existence of a strong and significant causality between individual-level effect and indexed economic impact of industrial parks development projects.

Table 27: Test of Causality between Individual-level effect and indexed Economic Impact of Industrial Parks Development Projects

Individual-level Economic effect of Industrial Parks Development Projects	Number of observation	Chi-square value
The operation of industrial parks has increased per capital income of employees	310	(136.8)***
The operation of industrial parks has increased the living standard of employees	310	(136.4)***
The construction of Industrial parks has created employment opportunities	313	(268.2)***
Industrial parks' employees got different capacity building training	310	(310.1)***
Industrial parks' employees have special incentive package for their workers	310	(63.5)***
The operation of Industrial parks increased knowledge and skill of its employees	310	(183.5)***
Employees of the Ethiopian Industrial Parks Development projects have health insurance.	305	(86.8)***
Ethiopia Industry parks employees have social security.	313	(127.9)***
The construction of industrial parks encouraged domestic investors	313	(71.5)***
The operation of industrial parks has enhanced the productivity of employees	305	(87.8)***
Source authors' estimation ******, **, * one, five and ten per cent significance level, respectively***		

As shown in the above table, all listed individual level effects have strong and statistically significant causality with indexed economic impact of industrial parks development projects. Thus, we rejected the null hypothesis and accepted the alternative hypothesis. These results confirmed the existence of strong causality between listed individual level effects and indexed economic impact of industrial parks development projects. Once the existence of causality is confirmed, the following table examines the proportion of contribution of each individual-level microeconomic impact of industrial parks development projects in Ethiopia. The individual-level microeconomic impact of industrial parks development is measured by the following 10 major identified indicators:

Table 28: Individual-level Microeconomic Impact of Industrial Parks Development Projects in Ethiopia

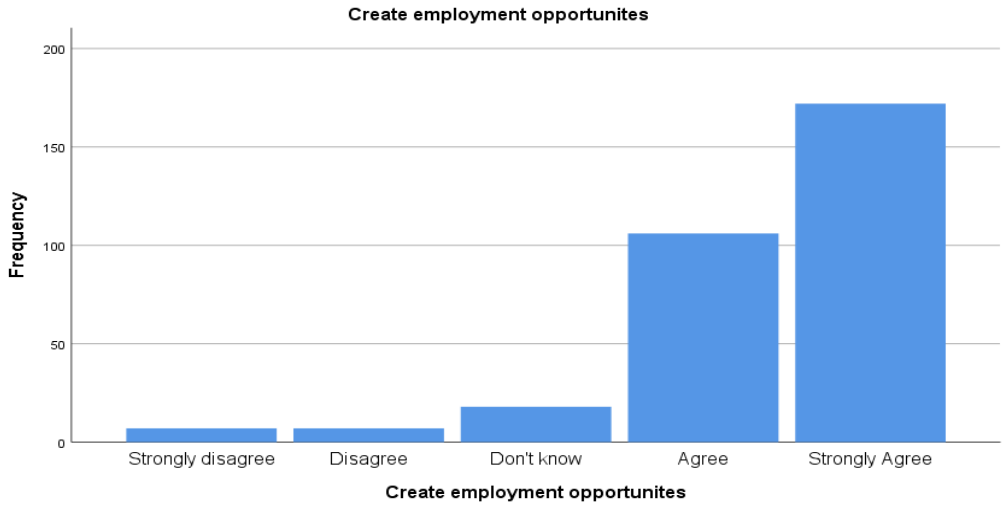
The major Individual-level Microeconomic Variables	SA	A	N	D	SD
	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)	Frequency (%)
The operation of industrial parks has increased per capital income of employees	88 (28.39)	95 (30.65)	68 (21.94)	27 (8.71)	31 (10.00)
The operation of industrial parks has increased the living standard of employees	80 (25.81)	98 (31.61)	73 (23.55)	34 (10.97)	24 (7.74)
The construction of Industrial parks has created employment opportunities	172 (55.48)	106 (34.19)	18 (5.81)	7 (2.26)	7 (2.26)
Industrial parks' employees got different capacity building training	95 (30.65)	93 (30.00)	69 (22.26)	30 (9.68)	23 (7.42)
Industrial parks' employees have special incentive package for their workers	88 (28.39)	88 (28.39)	77 (24.84)	21 (6.77)	36 (11.61)
The operation of Industrial parks increased knowledge and skill of its employees	117 (37.74)	121 (39.03)	43 (13.87)	15 (4.84)	14 (4.52)
Employees of the Ethiopian Industrial Parks Development projects have health insurance.	90 (29.03)	99 (31.94)	75 (24.19)	20 (6.45)	26 (8.39)
Ethiopia Industry parks employees have social security.	99 (31.94)	96 (30.97)	75 (24.19)	25 (8.06)	15 (4.84)
The construction of industrial parks encouraged domestic investors	105 (33.55)	86 (27.48)	62 (19.81)	29 (9.27)	31 (9.90)
The operation of industrial parks has enhanced the productivity of employees	74 (23.79)	113 (36.33)	71 (22.83)	34 (10.93)	19 (6.11)

Source: Authors' field survey 2020
SA= Strongly agree, A= Agree, N= Neutral DA= Disagree and SD = Strongly Disagree

The above table shows the individual level microeconomic impact of industrial parks development projects for individuals working inside the industrial parks. The above table shows more than 50 per-cent of the respondents strongly agree and agree with the positive role of industrial parks development on individuals that live around the industrial parks: create employment opportunities (89.57%), provide health insurance (60.97%), provide social security for employees (62.91%), provide capacity building training (60.65 %), Provide special incentive package for workers (56.58 %), increase knowledge and knowhow of employees (76.77 %), increase per capita income of employees (59.04 %), increase the living standard of employees (57.42 %) and encourage domestic investors (61.03 %). The above table confirmed the positive role of industrial parks development projects for individuals hired inside industrial parks. The above finding supports the conclusion reached from interviews and focus group discussions with the industrial parks' community. All participants confirmed the positive role of industrial parks

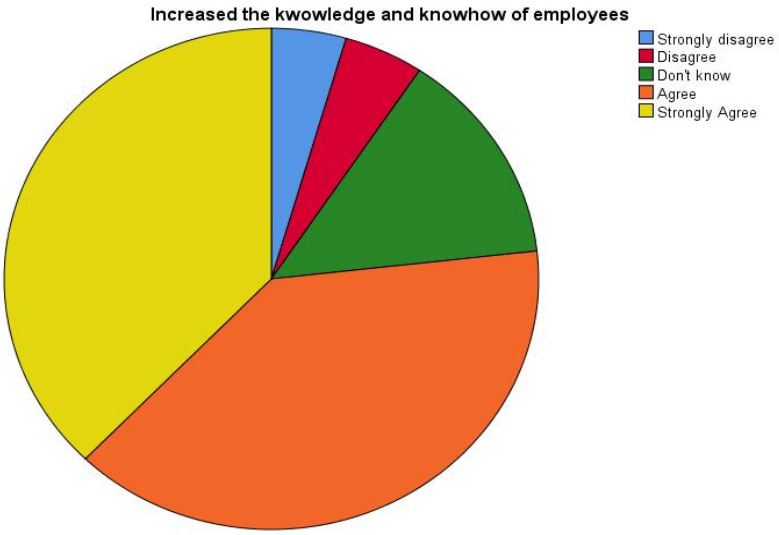
development projects for their livelihood. Especially, around 90 per cent of respondents agree with the positive role of industrial parks construction and operation in terms of employment generation.

Figure 5: Role of industrial parks development for individuals: Employment Generation



Furthermore, the majority of participants of the interview and focus group discussion confirmed the significant role of industrial parks development projects in increasing the knowledge and knowhow of employees. Working inside industrial parks allows the worker to get new exposure and experience on new technology and innovation. More than 76 per cent of respondents in the self-administered questionnaire strongly agreed and agreed that industrial parks development projects play a positive role in enhancing knowledge and transferring knowhow among employees. The following pie chart describes this finding:

Figure 6: Role of the Industrial Parks Development Project for Individual/ Enhanced Knowledge and know-how Transfer



5. Conclusion and Policy Implication

5.1. Conclusion

Industrial parks, also named as Industrial zones or special Economic Zones include different economic concepts which are Free Trade Zones, Export Processing zones and Free Ports and others. The construction and operation of industrial parks development projects are widely used as the major economic development strategy for most policy and decision-makers. Existing empirical research revealed mixed results on the economic impact of industrial parks development projects. Many researchers identified a positive and statistically significant impact of industrial parks development projects (Chen, 1993; Jayanthakumaran, 2003; Monge-Gonzalez et al, 2005; Warr, 1989; Zeng, 2010; Fuller and Romer, 2012; Hamada, 1974; Madani, 1999; World Bank, 1992; Kaplinsky, 1993; Johansson and Nilsson, 1997; Willmore, 1995; Farole, 2011; FIAS, 2008; Balasubramanyam, 1988 and Willmore 1995). On the other hand, other researchers such as Engman et al. (2007) revealed that the economic impact of industrial parks development is insignificant and distorts resource allocation. Hamada (1974) and Madani (1999) also concluded that the impact of industrial parks development projects depends on some specific conditions over a limited time horizon. War (1989) in his study revealed that the majority of industrial parks enterprises only take the tax break advantage without having a significant impact on employment generation and export earnings.

Having these inconclusive results of the economic impact of industrial parks development projects, this study aimed to evaluate the macroeconomic and microeconomic impact of industrial parks development projects as well as identifying the potential factors that affect (optimize or diminish) the economic impact of industrial parks development projects in Ethiopia. The study was conducted in the Federal Democratic Republic of Ethiopia. According to a report from the Investment Commission, the federal government authorized zones to establish Industrial Parks depending on their geographic proximity, industrial sector development and labour market supply. Currently, there are more than 30 industrial parks in different zones, special zones and city administrations of the country. Thus, these zones and city administrations are considered as the treated zones: Bole Lemi **I** Industrial Park, Bole Lemi **II** industrial Park, Kilinto Industrial Park, Addis Industrial Village, Hawasa industrial park, Dire Dawa industrial

park, Kombolcha industrial park, Mekelle industrial park, Adama industrial park, Jimma industrial park, Bahir Dar industrial park, Debre Birhan industrial park, Bishoftu industrial park, Airlines and Logistic industrial park, Awsha Arba industrial park, Andido industrial park, Asayta Semera industrial park, Arerti industrial park, Aysha/Dewale industrial park, Eastern Industrial Zone, Huajian Shoe City, Gaizo industrial park, Kingdom Linen industrial park, Ethio-Turk International Industrial City, George Shoe City industrial park, Modjo Leather City, Bure Integrated Agro-Industrial Park, Bulbula Integrated Agro-Industrial Park, Yirgalem Integrated agro-industrial park, Baeker Integrated agro-industrial park, ICT industrial park, Velocity IP and DBL industrial parks.

On the other hand, the study considered zones that have **NO** industrial parks in their geographic settings as controlled zones which were Jijiga Special Zone, Konso Special Zone, Alaba Special Zone, Kirkos Special Zone, Arada Special Zone, Yeka Special Zone, Woliata, Arba Minch, South Gondar, Kamashi, Harari, Guraghe, East Wellega, Bale, Hadiya, Horogudru, Gujji, Borena, Sheka, West Wellega, Ilu Ababora, North Shewa (Oromia region), Silite, East Hararge, Guraghe zone, Zone 5, Anuak and Mezhenger. This study focused on these treated and controlled geographic settings to analyze the economic impact of industrial parks development projects in Ethiopia.

To answer the research questions of the study, the authors used both qualitative and quantitative research frameworks. The combined method of research framework helps to analyze both qualitative and quantitative data to fully answer the major research questions of the study. The study used both primary data collected through a survey (questionnaire, focus group discussion and in-depth interview) and secondary data. The questionnaire has been filled by workers in Ethiopian industrial parks, managers, and administrators of the industrial parks, and the people who dwell around industrial parks. The managers and administrators of industrial parks have been invited for focus group discussions and interviews. The main sources of secondary data were the Ethiopian Investment Commission, Ethiopian Industrial Park Development Corporation, Central Statistical Agency (CSA), Zones Investment Commission and all of Ethiopian Industrial Parks.

In order to evaluate the economic impact of Industrial Parks development projects, the study collected a panel dataset on 68 of Ethiopia's zones and special zones and two federal level city administrations. The dataset tracks Ethiopia's zones through macroeconomic variables such as annual investment by type and sources, Products and by-products outcome (Total Sales Values, Total Export Value, Annual Value of Production), the book value of fixed assets, total Wages and other benefits for employees, Domestic capital Formation and the total number of employees employed in industrial enterprise. The study adopted Kothari's (2004) sample size calculation formula and arrived at a true sample size of 383 respondents with a 95% confidence level and a 5% margin of error.

Collected data has been analyzed using both exploratory and descriptive data analysis approach. To evaluate the macro economic impact of industrial park development in Ethiopia, the authors used the difference in differences research design. On the other hand, to estimate the micro-economic impact of Industrial Parks Development Projects and to identify the major factors that optimize or diminish the economic impact of industrial parks development projects, authors used simple descriptive methods and ordered probit estimation techniques. The SPSS and STATA were used for data management and analysis.

The finding of the study revealed the existence of high community commitment, abundant non-financial resources, tangible government support and good social capital in Ethiopia as the major factors that promote the positive economic impact of industrial parks development project whereas the existence of unskilled labour supply, the concentration of Ethiopian Industrial parks in the urban areas and availability of out-dated technology in Ethiopia are the major factors that diminish the positive economic impact of Ethiopian Industrial Parks development projects.

Except for domestic capital formation, the finding of this study rejected the null hypothesis that claimed the absence of positive and statistically significant economic impact of industrial parks development projects on all identified macroeconomic variables/indicators (Annual Investment by type and source, Products and by-products of the industrial outcome, Book value of fixed assets, wages and other benefits for employees and number of hired workers). The study also

analyzed the microeconomic impact of industrial parks development projects in Ethiopia. To achieve this objective, we used a self-administered questionnaire, focus group discussion and interview with relevant individuals from inside and outside the industrial parks. All participants strongly agreed and agreed with the positive role of the industrial parks development project in Ethiopia. Especially the study identifies the dominant household/community level and individual level microeconomic impact of industrial parks development projects in Ethiopia. Thus, the finding of the study showed environmental conservations at surrounding communities and infrastructure development as the major household/community level microeconomic impact of industrial parks development projects whereas employment generation opportunities and enhanced knowledge and know-how transfer as the major individual level microeconomic impact of industrial parks development projects in Ethiopia.

5.2. Policy Implication

Relative to other macro-economic variables, the impact of industrial parks development projects on domestic capital formation is not satisfactory. In the study, its impact on the tendency of domestic capital formation is barely significant at a 10 per cent significance level. Therefore, the authors recommend the Ethiopian government to design special incentive/policy packages for domestic investors to invest inside Industrial Parks.

The finding of this study shows that Industrial Parks Development Projects have a positive and statistically significant impact on economic development in Ethiopia. Thus we highly recommend for policy and decision makers to scale up Industrial Parks Development Projects into different zones, special zones and city administrations to optimize the positive impact of the Industrial Parks Development Projects in Ethiopia.

The finding of the study shows that the construction of Industrial Parks Development Projects positively increases short-term impact of the projects which are measured by different macro and micro economic variables. The majority of our respondents also confirmed the long term impact of industrial parks development projects in terms of technological and know-how transfer from foreign investors to local employees. Thus, we recommend for both federal and regional states to

design good working conditions for local employees to facilitate technology and know-how spill-over from foreign investors.

The finding of the study shows the insignificant impact of the establishment of Industrial parks development on domestic investors in Ethiopia. Thus, we recommend for policy and decision-makers to design a more adaptive, comprehensive and dynamic policy stance which includes credit subsidies for domestic investors, free shade provision, facilitating accessibility for both domestic and international markets and easily accessing foreign currency.

The finding of the study revealed as the unskilled labour market supply diminishes the economic impact of Ethiopian Industrial Parks. Thus we recommend for government to expand all skill-building institutions such as school, universities and other training centres and ensure the accessibility of these institutions. Furthermore, we recommend for the government to design comprehensive strategies for university-industry linkages and follow up its implementation.

The study reflects that currently operating out-dated technology significantly diminish economic impact of Ethiopian Industrial Parks development projects in Ethiopia. Thus, we recommend for both the federal and regional government to design the technology diffusion strategy to transfer the latest technology to the country.

The friendly and hospitable culture of Ethiopians optimizes the economic impact Industrial Parks Development program in Ethiopia. Thus, we recommend for policy and decision-makers from the Ministry of Culture and Tourism (MoCT) to preserve as well as design a strategy to promote this culture of hospitality and sociability of Ethiopian society in the global market.

The finding of the study showed that sky-rocketing prices of goods and services in most Ethiopian Industrial Parks built around big cities and special zones diminish the economic impact of industrial parks development projects in Ethiopia. Thus, we recommend for the policy and decision-makers from Ethiopian Industrial Parks Development Corporation (IPDC) to build

and expand the Industrial Parks development Projects strategically by taking into consideration all socio-economic variables as well as the strategic suitability of the place for national and international trade.

The finding of the study revealed poor working conditions in Ethiopia's Industrial Parks which confirm the complaints and dissatisfaction reflected by industrial parks' workers on the field trip, interview and the focus group discussion. Thus, we highly recommend the policy and decision-makers from the Ministry of Labour and Social Affairs (MoLSA) to closely work with stakeholders of industrial parks to design a workable strategy to improve working conditions in industrial parks. MoLSA should closely monitor and enforce the application of Ethiopian and International labour rules and regulations inside IPs and ensure the payment of fair wages to industrial parks workers. We highly recommend MoLSA to open branch offices inside each industrial park in the country and provide one-stop-shopping services for industrial parks workers.

The finding of the study also revealed that inaccessible media and telecommunication diminish the economic impact of industrial parks development projects in Ethiopia. As the government of Ethiopia has a plan to open telecommunication for international enterprises, we highly recommend for the policy and decision-makers from the Ethiopian Telecommunication Authority to decentralize the sector and open international enterprises to participate and increase the national accessibility of social media and telecommunication service in Ethiopia.

6. References

Aggarwal A (2005). Performance of Export Process Zones: A Comparative Analysis of India, Sri Lanka and Bangladesh. Working Paper No. 155 Indian Council for Research on International Economic Relations (ICRIER), New Delhi.

Aggarwal A et al (2008). Special Economic Zones in South Asia: Industrial Islands or Vehicles for Diversification? Working Paper, International Trade Department, the World Bank.

Ahrens J and Meyer Baudeck (1995). Special Economic Zones: Shortcut or Roundabout Way towards Capitalism. *Journal of Business and Economic Statistics.*

Alder S, Shao L and Zilibotti F (2016). Economic Reforms and Industrial Policy in a Panel of Chinese Cities. *Journal of Economic Growth.*

Alebel Bayrau Weldesilassie et al (2017). Study on Industrial Park Development: Issues, Practices and Lessons for Ethiopia. Ethiopian Development Research Institute.

Allenby, Braden R and Deanna J Richards (1994). The Greening of Industrial Ecosystems. Washington DC National Academy of Engineer.

Arkebe Oqubya (2018). The Structure and Performance of the Ethiopian Manufacturing Sector. *African Development Bank Group.*

Ayanthakumaran K (2003). Benefit-Cost Appraisals of Export Processing Zones: A Survey of the Literature. *Development Policy Review 21.*

Baissac C (2011). Brief History of Special Economic Zone (SEZs) and Overview of Policy Debates. in T. Farole (Ed.), Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience. Washington, DC: World Bank.

Balasubramanyam VN (1988). Export Processing Zones in Developing Countries: Theory and Empirical Evidence. In D. Greenaway (Ed.), Economic Development and International Trade (pp. 157-165). London: Macmillan.

Basile A and D Germidis (1984). Investing in Export Processing Zones. Organization for Economic Cooperation and Development (OECD) Paris.

Bayisa Tesfaye (2016). Prospect and Challenges of Industrial Zones Developments. *Addis Chamber Journal of Trade and Business. Vol. II no. I. Addis Ababa.*

Benakiya M and SR Lerman (1985). Discrete Choice Analysis. Cambridge, Mass: MIT press

Boex LFJ (2000). Attributes of Effective Economics Instructors: An Analysis of Student Evaluations. *Journal of Economic Education.*

Buchanan JM and G Tullock (1962). The Calculus of Consent: Logical Foundations of Constitutional Democracy. Ann Arbor MI: University of Michigan Press.

Carneiro FG et al (2012). Resilient Growth, Persisting Inequality: Identifying Potential Factors Limiting Shared Prosperity in the Dominican Republic. Caribbean Knowledge Series. World Bank Group.

CFTU (2004). Behind the Brands: Working Conditions and Labor Rights in Export Processing Zones. ICFTU annual reports.

Chan G, Miller PW and Tcha MJ. (2005). Happiness in University Education. *International Review of Economics Education*.

Chang HJ. (2002). Kicking Away the Ladder – Development Strategy in Historical Perspective. Anthem Press, London.

Chen J (1993). Social Cost-Benefit Analysis of China's Shenzhen Special Economic Zone. *Development Policy Review.*

Cirera X and R Lakshman (2014). The Impact of Export Processing Zones on Employment, Wages and Labour Conditions in Developing Countries. In 3ie Systematic Review 10. London: International Initiative for Impact Evaluation (3ie).

Cling et al (2005). Export Processing Zones in Madagascar: a Success Story under Threat? Journal of *World Development.*

Cling JP and Letilly G (2001). Export Processing Zones: A threatened instrument for global economy insertion. DIAL document de trabajo.

COMCEC (2017). Special Economic Zones in the OIC Region: Learning from Experience. Ankara, Turkey. *Formation in Shanghai, Growth and Change*.

Debrezion, Ghebreegziabiher, Eric Pels and Piet Rietveld (2007). The Impact of Railway Stations on Residential and Commercial Property Value: A Meta-Analysis. *Journal of Real Estate Finance and Economics.*

DeCanio SJ (1986). Student Evaluations of Teaching: A Multinomial Logit Approach. *Journal of Economic Education.*

Dekkers J and JW Van Der Straaten (2008). Monetary Valuation of Aircraft Noise; A Hedonic Analysis around Amsterdam Airport. Tinbergen Institute Discussion Paper, no. TI 2008-064/3, Amsterdam-Rotterdam.

Devereux J and LL Chien (1995). Export Zones and Welfare: Another Look in Oxford Economic Paper.

Ding Fei and Chuan Liao (2020). Chinese Eastern Industrial Zone in Ethiopia: Unpacking the Enclave. *Third World Quarterly*.

Engman M et al. (2007). Export Processing Zones: Past and Future Role in Trade and Development. *OECD Trade Committee*.

Ermias Wedajo Azmach (2019). Regulating Industrial Parks Development in Ethiopia: A Critical Analysis. *Beijing Review.*

Eskider Atnafu (2018). Socio-Economic Contribution of Manufacturing Industrial Parks in Ethiopia: Prospects and Challenges from Stakeholder Perspectives. Addis Ababa Science and Technology University.

Farber Henry S (1988). The Evolution of Public Sector Bargaining Laws. Chicago. University of Chicago Press. 129-166.

Farole Thomas (2011). Special Economic Zones in Africa: Comparing Performance and Learning from Global Experience. Washington, DC: World Bank.

Fasil Sisay (2015). Job Satisfaction and its Determinants: Evidence from Sub-city Level workers in Addis Ababa. Ethiopian Civil Service University.

FIAS (2008). Special Economic Zones: Performance, Lessons Learned and Implications for Zone Development. Washington. World Bank.

Fuller B and P Romer (2012). Success and the City: How Chartered Cities Could Transform the Developing World? Ottawa, Ontario, Canada: MacDonald-Laurier Institute.

Ge Wei (1999). Special Economic Zones and the Opening of the Chinese Economy: Some Lessons for Economic Liberalization. *Journal of World Development.*

Gereffi Gary (1999). International Trade and Industrial Upgrading In the Apparel Commodity Chain. *Journal of International Economics.*

Getu Hailu (2014). Impact of Private Manufacturing Investment on Local Economy: A Case Study at Mekelle Zone. Mekelle University.

Greene WH (2000). Econometric Analysis (4th Edition). New Jersey, Prentice Hall

Guendelman S and Silberg MJ (1993). The Health Consequences of Maquiladora Work: Women on the US-Mexican border. *American Journal of Public Health*.

Hamada K (1974). An Economic Analysis of Duty-Free Zones. *Journal of International Economics.*

Hamilton C and LO Svensson (1982). On the Welfare Effects of Duty-Free Zone. *Journal of International Economics.*

Heron T (2004). Export Processing Zones and Policy Competition for Foreign Direct Investment: The Offshore Caribbean Development Model.

Hossain MA (2001). Marketing Strategies of the Tourism Industry in Bangladesh: Implications for Bangladesh Parjatan Corporation. *Dhaka University Journal of Marketing.*

Humphrey J (2003). Globalization and Supply Chain Networks: The Auto Industry in Brazil and India. *Global Networks*.

ICFTU (2004). Behind the Brands: Working Conditions and Labour Rights in Export Processing Zones. ICFTU annual Report.

ILO/UNCTC (1988). Economic and Social Effects of Multinational Enterprises in Export Processing Zones. ILO Geneva.

International Labour Organization (1998). Labour and Social Issues Relating to Export Processing Zones. Working Papers of the Governing Body. Geneva.

International Labour Organization (2013). Working Conditions Laws Report 2012. *A Global Review/Naj Ghosheh ILO Office Geneva.*

Jae H Lee (2015). Research Notes on a Feasibility Study for the Development of Industrial Parks in Ethiopia. SGI Consulting Incorporated.

Jarmila Vidová (2010). Industrial Parks - History, Their Present and Influence on Employment. *Review of Economic Perspectives. Volume X.*

Jenkins M et al (1998). Export Processing Zones in Latin America. Harvard Institute for International Development, Development Discussion.

Johansson H (1994). The Economics of Export Processing Zones Revisited. *Development Policy Review.*

Johansson H and L Nilsson (1997). Export Process Zone as Catalysts. Journal of *World Development.*

Kaplinsky R (1993). Export Processing Zones in the Dominican Republic: Transforming Manufactures into Commodities. Journal of *World Development*.

Kemal AR (2001). Freedom of Association and Promotion of Social Dialogue in SEZs in Pakistan. International Labor Organization.

Khan (2004). State Failure in Developing Countries in Toward Pro-Poor Policies: Aid, Institution, and Globalization. World Bank New York.

Khee YW and T Belot (1990). Export Catalysts in Low Income Countries: A Review of Eleven Success Stories. World Bank Discussion Papers.

Kim Jun Yeup and Zhang Le-yin (2008). Formation of Foreign Direct Investment Clustering-A New Path to Local Economic Development? The Case of Qingdao. *Journal of Regional Studies.*

Kusago T and Z Tzannatos (1998). Export Processing Zones: A Review in Need of Update. The World Bank, Washington DC.

Lall S (2000). Technological Change and Industrialization in the Asian Newly Industrializing Economies. Technological Learning and Economic Development: The Experience of the Asian NIEs, Cambridge University Press.

Liberato AS and D Fennell (2007). Gender and Well-Being in the Dominican Republic: The Impact of Free Trade Zone on Employment and Female Headship. Journal of *World Development.*

Madani Dorsati (1999). A Review of the Role and Impact of Export Processing Zone (EPZ). World Bank and World Trade Organization, Annual Report 2000. Geneva.

Majumdar I (2001). Special Economic Zones (SEZs) and Their Workers in India: A Study of the Noida Processing Zone, in A.S. Oberoi, A. Sivananthiran and C.S.Venkata Ratnam, et al. (ed.) Labour Issues in Export Processing Zones : Role of Social Dialogue, South Asian Multidisciplinary Team and Indian Industrial Relations Association, ILO, New Delhi.

Mason PM, Steagall JW and Fabritius MM (1995). Student Evaluations of Faculty: A New Procedure for Using Aggregate Measures of Performance. *Economics of Education Review.*

Mazumdar S (1997). Rethinking Public and Private Space: Religion and Women in Muslim Society. *Journal of Architectural and Planning Research.*

McKelvey RD and Zoviona W (1975). A Statistical Model for the Analysis of Ordinal Level Dependent Variables. *Journal of Mathematical Sociology.*

Memedovic O (2012). Developing and Managing a Successful Industrial Park: Europe and Central Asia Regional Conference Baku, Azerbaijan.

Milberg W (2007). Exporting Processing Zones, Industrial Upgrading and Economic Development. A Survey, SCEPA Working Papers Schwartz Center for Economic Policy Analysis (SCEPA). New School University.

Milberg W and Amengual M (2008). Economic Development and Working Conditions in Export Processing Zones: A Survey of Trends. Working Paper No. 3, International Labour Office. Geneva.

Miyagiwa Kaz F (1986). A Reconsideration of the Welfare Economics of a Free-Trade Zone. *Journal of International Economics Elsevier vol. 21.*

Mohammad Alauddin and Clem Tisdell (2006). Students' Evaluation of Teaching Effectiveness: What Surveys Tell and What They Don't Tell. The University of Queensland. Australia

Mondal AH (2003). Role of the Export Processing Zones in the Industrialization Process of Bangladesh: Lessons for the Future in Rushidan Islam Rahman (ed.), Performance of the Bangladesh Economy: Selected Issues, Bangladesh Institute of Development Studies, Dhaka.

Monge-Gonzalez R et al (2005). Cost-Benefit Analysis of the Free Trade Zone System: The Impact of Foreign Direct Investment in Costa Rica. OAS Trade, Growth and Competitiveness Studies, Organization of American States.

Mulu Gebreeyesu (2009). Industrial Policy and Development in Ethiopia: Evolution and Present Experimentation. United Nation University.

Needham B and Louw E (2006). Institutional Economics and Policies for Changing Land Markets: the Case of Industrial Estates in the Netherlands. *Journal of Property Research*.

Nils Bonde-Henriksen (1982). Industrial Park Development: An Overview and Case Study of Myles Standish Industrial Park, Taunton, Massachusetts University Of Rhode Island Strategy. Working Paper.

Olga ZD (2010). Special Economic Zone in Poland. *World Commerce Review.*

Phillips G and Xaba J (2002). The Workers' Story: Labour Rights Violations at Hudson's Bay Supply Factories in Lesotho. A Report', University of Natal, Trade Union Research Project. Toronto: Ethical Trading Action Group.

Rhee YW (1990). The Catalyst Model of Development: Lessons from Bangladesh's Success with Garment Exports. *World Development.*

Rhee, Yung Whee, Katharina Katter Bach and Janette White (1990). Free Trade Zones in Export Strategies. Industry Series Paper. World Bank Washington DC.

Romero AT (1995). Labour Standards and Export Processing Zones: Situation and Pressures for Change. *Development Policy Review.*

Rouwendal J and Van der Straaten JW (2008). The Costs and Benefits of Providing Open Space in Cities. Tinbergen Discussion Paper.

Selam Gebeyehu (2017). The Challenges and Contributions of Industrial Park Development in Ethiopia: The Case of Eastern Industry Zone Plc, Dukem City, Oromiya, Ethiopia. MA Thesis. St. Mary‘s University.

Sen S and Dasgupta B (2008). Labor Under Stress: Findings from a Survey. *Economic and Political Weekly.*

Summerfield G (1995). The Shadow Price of Labour in Export Processing Zones: a Discussion of the social value of employing women in export processing in Mexico and China. *Review of Political Economy.*

Wang Jin (2013). The Economic Impact of Special Economic Zones: Evidence from Chinese Municipalities. *Journal of Development Economics.*

Wang X (2013).The Role of Economic Development Zones in National Development Strategies: The Case of China. Doctoral dissertation, Pardee RAND Graduate School China.

Warden S (2000). Assessing Export Platforms: The case of the Dominican Republic. CAER II Discussion Paper No.77.

Warr, P (1989). Export Processing Zones: The Economics of Enclave Manufacturing. *World Bank Research Observer 9 (1).*

Willmore Larry (1995). Export Processing Zones in the Dominican Republic: A Comment on Kaplinsky. *World Development.*

Wong TC (2001). The Transformation of Singapore’s Central Area: From Slums to a Global Business Hub? *Planning Practice & Research.*

World Bank (2008). Special Economic Zones. Performance, Lessons Learned, and Implications for Zone Development. Washington, DC: World Bank.

World Bank (2011). Special Economic Zones: Progress, Emerging Challenges and Future Directions. World Bank Washington DC.

Xiaodi Zhang et al (2018). Industrial Park Development in Ethiopia: Case Study Report. United Nations Industrial Development Organization.

Yeung et al (2008). China’s Special Economic Zones at 30. *Eurasian Geography and Economics*.

Zeng DZ (2015). Global Experiences with Special Economic Zones: With a Focus on China and Africa. Investing in Africa Forum, Addis Ababa, Ethiopia.

Zohir Salma Chaudhuri (2001). Social Impact of the Growth of Garment Industry in Bangladesh. Bangladesh Development Studies, Bangladesh Institute of Development Studies (BIDS).

Kamsahamnida !!!