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Sustainability of Industrialization and Agricultural Policies: Evidence from Developing Countries

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Abstract
Purpose – The purpose of this paper is to investigate sustainability of industrialization and agricultural policies among 129 developing countries.
Design/methodology/approach – The study utilizes panel data from the period 1986 to 2016 and Cox proportional hazard model for the analysis.
Findings – The results of the study indicate that, the establishment of commodity exchange markets will help towards sustainability of agricultural policies. Whiles the implementation of protectionism measures will help towards sustainability of industrialization policies.
Practical implications: - Governments among developing countries should work towards establishment of commodity exchange markets for sustainability of agricultural policies. There is also the need for implementation of protectionism measures and establishment of statutory funding in their budgets for industrialization policies to achieve sustainability.
Originality/value – Previous studies carried out focused on either industrialization policies or agricultural policies sustainability for developed and developing countries. This study fills the gap in existing empirical studies by focusing on both industrialization and agricultural policies sustainability for developing countries.
Keywords: Industrialization policies, Agricultural policies, Commodity Exchange Markets, Industrialization Policy Bank, Industrial Park.
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1. INTRODUCTION

Numerous policies have been implemented globally to help propel the growth of economies. Some of these policies are geared towards financial sector, manufacturing, agricultural sector and other relevant areas (Burritt & Schaltegger, 2012; Dittmar, 2014; Jiang et al., 2016). With resources channeled towards the implementation of these policies, one important issue for consideration borders on achieving sustainability of these policies (Angelakoglou & Gaidajis, 2015; Chowdhury et al., 2019). Information gathered indicates that, developed countries with robust policy frameworks, effective institutions, constant financing of policies and others, are able to achieve sustainability (Gómez-Limón & Sanchez-Fernandez, 2010; Movilla-Pateiro et al., 2021). Germany for instance after the World War II introduced Decentralized Industrialization Policy (DIP) with the motive of rebuilding their economy after the war through decentralization (Movilla-Pateiro et al., 2021; Fang et al., 2007). This policy helped to enhance the growth of the German economy and the country has been able to sustain the policies for more than five decades (Fang et al., 2007; Arbolino et al., 2018). This demonstrates how developed countries are able to sustain successful policies.

Developing countries over the period have implemented numerous industrialization and agricultural policies towards boosting the industrial and agriculture sector (Yu & Wu, 2018; Angelakoglou & Gaidajis, 2015). Mauritania for instance in early 1990s, in their quest to boost food security, increase export earnings from agricultural production and creation of jobs introduced Food Self-Sufficiency Agricultural Policy (FSAP) (Angelakoglou & Gaidajis, 2015). The policy achieved its mandate within 3-4 years of implementation (Angelakoglou & Gaidajis, 2015). There was massive production of sorghum, rice, maize, cassava, shea butter and others, for both domestic consumption and export earnings (Dittmar, 2014; Giordano, 2015; Ateba et al., 2019). Unfortunately, the government of Mauritania could not sustain the policy after 5 years of implementation

due to poor monitoring and over-dependence on foreign financial support (Angelakoglou & Gaidajis, 2015)

The information given concerning unsustainable policy in Mauritania is not different from that of Sri Linka. Sri Lanka in 1970s implemented Industrial Enhancement Development Policy (IEDP) (Gunasekaran & AlainSpalanzani, 2012; Gómez-Limón & Sanchez-Fernandez, 2010). The focus was to help the country establish more than 150 industries together with the private sector (Gunasekaran & AlainSpalanzani, 2012). The policy achieved its mandate for the first 6 years with the establishment of 42 factories but its sustainability was not realized (Gunasekaran & AlainSpalanzani, 2012). This is due to lack of protect measures for infant industries. This information presented and other existing cases are evidence that indicates that, sustainability of policies is very difficult task for most developing countries. What are the relevant measures needed to be operationalized by governments and other stakeholders to achieve sustainability of policies is critical? This study is of immense benefits to governments and other stakeholders in developing countries. This is because, it explains the appropriate measures that needs to be implemented to help achieve sustainability of industrialization and agricultural policies in developing countries.

Sustaining industrialization and agricultural policies are important because statistics from World Bank indicates that, the industrial and agricultural sectors of these countries over the past decade has grown on average 2.5% and 4.6% respectively as against the targeted growth rate of 7.8% and 10.4% (World Bank, 2016). Achieving the desirable growth rate of these sectors requires sustainable polices. Hence, the study contributes towards explaining the necessary measures to sustain these policies, that will help achieve the needed growth in these sectors. The remaining part of the study has been organized into; literature review, study methodology, results and discussions and conclusion of the study.

2. LITERATURE REVIEW

This section focuses on theoretical and empirical reviews to help enhance our understanding on the subject matter.

2.1 Theoretical review

Corporate sustainability theory was developed by Elkington in 1997. Basically, the theory has three main pillars; economic, environment and social. The key mandate of the theory is to create long-term stakeholder value through implementing coherent business strategy. That dwells on ethical, social, environmental, cultural and economic aspect of undertaking business activities. The theory predicts that, when these strategies are properly implemented, it will ensure development of skills of employees, transparency and longevity of the profitability of business organizations. The theory emphasizes that, under no circumstances should these strategies towards this objective be downplayed by stakeholders. The theory postulates that, each organization should show commitment towards implementing this theory through the adoption of Corporate Sustainability Standards (CSS).

These standards deal with measures channeled towards meeting regulatory requirement. Consistently, meeting this regulatory requirement will help towards instilling discipline among top management, employees and other stakeholders of the organization. Bansal and DesJardine (2014) emphasis that, the key concepts of this theory should permeate through policy frameworks of countries. This is because these key concepts will result in the sustainability of policies which will safeguard firms' growth in terms of equity and profitability. This theory is of much relevance to the study to help developing countries create long-term value for their industrialization and agricultural policies with coherent strategy to help build resilient economies.

2.2 Empirical review

Burritt and Schaltegger (2012) examined the appropriate ways of measuring sustainable usage and production of industrial biomass in Australia. The pressing problem of environmental degradation emanating from the use of fossil-fuel has called for alternative measures, for example the usage and production of biomass. Hence, the study filled the gap in existing empirical studies by exploring the sustainable applications for monitoring, controlling and accounting for the production and usage of biomass energy. The study employed data on biomass production from the industrial sector of Australia. The result of the study identified that, production of industrial biomass right from consumption to its industrial usage, monitoring and accounting should focus on sustainability.

Arbolino et al. (2018) contributes to the study conducted by Burritt and Schaltegger (2012) by examining the relevant approaches that needs to be operationalized. In order to ensure proper monitoring and evaluation of regional industrial policy sustainability in Italy. According to Arbolino et al. (2018), in most cases the government has been the key driver that promotes sustainability of policies with its effects on the environment and technology at national level. This study fills the gap in existing empirical studies by examining the appropriate monitoring and evaluation tools to help achieve industrial policies sustainability at the regional levels. The study employed data from Italy at regional levels and SWOT analysis. Results of the study indicates that, enhancing monitoring and evaluation at all regional levels of Italy is key towards achieving sustainable industrial policies.

Whiles the studies of Burritt and Schaltegger (2012) and Arbolino et al. (2018) focused on industrial sector. The study carried out by Murad et al. (2008) focused on examining the appropriates measures that need to be implemented in Malaysia towards achieving sustainability of their agricultural policies. The study contributes to existing empirical studies carried out on Malaysia by examining how The Third National Agricultural Policy (3NAP) can be sustainable. The study employed dataset collected from the policy for the analysis. The results of the study identified that, the policy's framework lacks the key ingredients of sustainability because it deviates from the core principles of sustainability. Hence, the study concluded by recommending that, the government of Malaysia should work towards ensuring that these principles of sustainability are well implemented.

These empirical studies and others (Fang et al., 2007; Chowdhury et al., 2019; Ragkos et al., 2017; Movilla-Pateiro et al., 2021; Angelakoglou & Gaidajis, 2015; Dittmar, 2014; Gómez-Limón & Sanchez-Fernandez, 2010; Gunasekaran & AlainSpalanzani, 2012; Ateba et al., 2019; Jiang et al., 2016). These studies focused on either sustainability of industrial or agricultural production, systems, growth, working environment, efficiency, policies, research development, monitoring and evaluation. Hence, this study contributes to existing empirical studies by focusing on both industrial and agricultural policies sustainability with the use of dataset from developing countries.

3. METHODOLOGY

This section focuses on model specification and variables used for the analysis.

3.1 Model specification

The study employs Cox proportional hazard model developed by Cox (1972) for the analysis. The model is appropriate for the study because it helps to estimate the probability of sustaining industrialization policies for developing countries, when appropriate measures are implemented. These measures include; development of industrial parks, the use of protectionism measures, ensuring favourable business economy, establishment of industrialization policy bank, infrastructure development, management of policies, growing the agriculture sector and enhancing domestic consumption of local products. With respect to agricultural policies, the study estimates the probability of sustaining agricultural policies when these measures; establishment of Commodity Exchange Market (CXM), growth of manufacturing sector, financial assistance, management of policies, infrastructure development, access to agricultural land and provision of agricultural facilities, are implemented.

In this study, the model uses panel data for analysis as done in the study of Fukunari and Takamune (2003). The Cox proportional hazard model is generally specified as;

$$\lambda(t, X_j) = \lambda_0(t)\exp\,[X_j\,\beta] \quad \text{.....(1)}$$

Where $\lambda(t, X_j)$ gives the hazard rate for the entity j, X_j is the set of p covariates for the entity j, β is the constant coefficient vector and $\lambda_0(t)$ is the baseline hazard. The use of Cox proportional hazard model is advantageous because it allows the β coefficients to be estimated even when the baseline hazard is not known. Baseline hazard measures how the risk of an event changes over time at given baseline level covariates. Whiles the hazard rate represents the probability of an event happening. For the purposes of this study, the hazard rate represents the probability of sustaining these policies in the next 10 years to 30 years. With the use of Cox proportional hazard model, it requires the selection of spell (time period) within which the objective can be achieved. In this study, 10 years to 30 years is selected because if these policies are sustained for these number of years. It will enhance the economic growth of these countries.

The general likelihood or probability function for the model is specified as;

$$L(\beta) = \prod_{j=t}^{r} \frac{\exp\,(X_j\,\beta)}{\sum_{t\epsilon R_j} \exp\,(X_j\,\beta)} \quad \text{.....(2)}$$

Where r is the number of time periods, X_j is the vector of covariates associated with the entity experiencing the event at time i, $i = 1,2.....r$ and R_j is the risk set at time i. That is, the risk that will be accrued to the entity if it fails to achieve the needed mandate.

The equation measures the probability of achieving the needed objective. With respect to this study, it measures the probability of sustaining agricultural and industrialization policies among developing countries. For the purposes of this study, the x_i represents measures that will help developing countries to achieve this objective. Where r represents the number of years this objective will be achieved and R_j is the risk developing countries will face if this objective is not achieved. Event represents; 1 probability of sustaining these policies and 0 failure of not sustaining these policies. Spell/time measures how long this can be achieved, that is within 10 years to 30 years.

For the purposes of this study, (1) is rewritten as;

$$\lambda(t, X_i) = \lambda_0(t)\exp\,[X_i\beta_i] \quad \text{..... (3)}$$

Where X_i are the covariates (measures) needed to help achieve this objective. β_i are the regression coefficients, $\lambda_0(t)$ is the baseline hazard and $\lambda(t, X_i)$ gives the hazard rate.

Based on equation (3), the model for sustaining industrialization policies is specified as;

$\lambda(t, X_i) = \lambda_0(t)\exp\left[\beta_0 + \beta_1 Park + \beta_2 Protect + \beta_3 Pbank + \beta_4 Mgt + \beta_5 Gagric + \beta_6 Fbusiness + \beta_7 Infrast + \beta_8 Dconsumption + \beta_9 labour + \beta_{10} Pstability + \beta_{11} Governan + \beta_{12} Trade + \mu_i\right]$ ……(4)

Where $Park = Industrial\ park$

$Protect = Protectionism\ measures$ $Mgt = Management\ of\ policies$

$Pbank = Establishment\ of\ Industrialisation\ \ Policy\ bank$

$Gagric = Growth\ of\ Agricultural\ sector$

$Fbusinesss = Favourable\ business\ economy$ *Infrast = Infrastructure Development*

Dconsumption = Domestic consumption of local products *Pstability= Political Stability*

Governan= Effectiveness of Governance *Trade= Trade openness* *Labour= Quality of labour force.*

The dependent variable [sustainability of industrialization policies, $\lambda(t, X_i)$] represents the hazard rate which is the combination of time and event. Time/spell represents the length of period in which this objective will be achieved. Event represents; 1 if this objective will be achieved and 0 failure to achieve this objective. In equation 4, political stability, trade openness and governance are the control variables.

Based on equation (3), the model for sustaining agricultural policies is specified as;

$\lambda(t, X_i) = \lambda_0(t)\exp\left[\gamma_0 + \gamma_1 Cexchange + \gamma_2\ Gmanufact + \gamma_3 Infrast + \gamma_4 Mgt + \beta_5 Agricfac + \beta_6 Agricland + \beta_7 Infrast + \beta_8 Trade + \beta_9 Pstability + \beta_{10} Governan + \mu_i\right]$ ……(5)

Where $Cexchange = Commodity\ Exchange\ Market$

$Gmanufact = Growth\ of\ manufacturing\ sector$

$Mgt = Management\ of\ policies$

$Infrast = Infrastructure\ Development$

$Agricfac = Provision\ of\ agriculture\ facilities$

$Agricland = Access\ to\ agriculture\ land$ *Infrast = Infrastructure Development*

Trade = Trade openness *Pstability= Political Stability*

Governan= Effectiveness of governance

The dependent variable [sustainability of agricultural policies, $\lambda(t, X_i)$] represents the hazard rate which is the combination of time and event. Time/spell represents the length of period in which this objective will be achieved. Event is represented as; 1 if this objective will be achieved and 0 failure to achieve this objective. In equation 5, political stability, trade openness and governance are the control variables.

3.2 Variables, measurement and expected outcomes (Industrialization policies)

This section presents the variables used for the study, their proxies and expected results. All the variables are collected from World Bank WDI database with the exception of political stability and effectiveness of governance, that are collected from World Governance Indicators (WGI).

Dependent variable

With this analysis, the dependent variable (sustainability of industrialization policies) represents the hazard rate which is the combination of time and event. Time represents the length of period within which this objective can be achieved that is between 10 years to 30 years. Event represents; 1 probability of sustaining industrialization policies and 0 failure to achieve this objective.

Independent variables

Development of Industrial park is proxied by land reserved for special purposes for example production of cereals and other industrial purposes. As used in the study of Chowdhury et al. (2019). Developing countries ability to develop more industrial parks will speed up the establishment of new factories and the sustainability of industrialization policies. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable is measured in hectares of lands.

Implementation of protectionism is proxied by customs and other import duties, as used in the study of Movilla-Pateiro et al. (2021). These governments' ability to impose import and customs duties on foreign products will reduce importation and promote the growth of local industries leading to sustainability of industrialization policies. Hence, it is expected to have positive effect. The variable is measured U.S dollars. Creating favourable business economy is proxied by the ease of doing business score, as used in the study of Giordano (2015). Ease of doing business score is a score for benchmark economies based on their ability to implement proper regulatory practice to promote easy establishment of business. When economies are able to create business friendly environment, it attracts more establishment of industries. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable is measured on a score from 0 to 100.

Establishment of Industrialization Policy bank is proxied by domestic credit to private sector by banks, as used in the study of Gómez-Limón and Sanchez-Fernandez (2010). Domestic credit to private sector by banks

measures domestic credit given to the private sector (for example manufacturing sector) provided by banks (example policy bank) to propel economic activities. Governments ability to establish this bank will provide consistent long-term concessional credit facility to industrialists. Hence, it is expected to have positive effect on sustainability. The variable is measured as a percentage of GDP. Growth of the agriculture sector is proxied by growth rate of agriculture (which consist of forestry and fishing) as used in the study of Murad et al. (2008). For industrialization to be successful, the agriculture sector should be productive to feed these industries with the needed raw materials. Hence, the growth of the agriculture sector is expected to boost industrial activities leading to the sustainability of industrialization policies. Hence, the expected effect is positive. The variable is measured in percentage.

Quality of labour force is proxied by human capital index as used in the study of Angelakoglou and Gaidajis (2015). Human capital index measures workers' productivity due to health and educational investment in these workers. Quality labour force helps to manufacture machines to turn raw materials into finished products. Hence, it is expected to have positive effect on sustainability. The variable is measured on a scale from 0 to 1. Domestic consumption of local products is proxied by household final domestic consumption expenditure as used in the study of Ragkos et al. (2017). Household final domestic consumption expenditure covers households' expenditure on durable goods, non-durable goods and services. When there is a higher domestic consumption of local manufactured products. This encourages local industries to expand production. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable is measured in U.S dollars.

Infrastructure development is proxied by the level of investment in transport facilities, as used in the study of Lee and Lam (2012). Good transportation facilities help in the movement of manufactured products and raw materials enhancing the activities of industries. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable is measured in U.S dollars. Management of policies is proxied by rating on the quality of public administration, as used in the study of Dittmar (2014). The quality of public administration measures the extent to which managers of government institutions implement policies successfully with effective services delivery. Ensuring that, there is proper management will lead to the development of innovative ideas to help achieve sustainability. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable is measured on a scale from 1 to 6.

Control variables

Trade openness is proxied by trade as a percentage of GDP. This represents the sum of exports and imports of goods and services measured as a percentage of GDP. These countries ability to take advantage of trade openness to expand production and exports, will give governments revenue to finance these policies. Leading to sustainability of these industrialization policies. The variable is measured in percentage. With political stability, the variable itself is used for the analysis. It is defined as the likelihood that a government will be stabilized or not overthrown by unconstitutional or violent means. The country's ability to ensure that, there is political stability will lead to continuity in the implementation of these policies. Hence, the variable is expected to have positive effect. The variable ranges from -2.5 and 2.5. With governance effectiveness, the variable itself is used for the analysis. The variable measures the quality of public services rendered and the quality of policies implemented towards improving the livelihood of people. Ensuring good governance through effective institutions and sound laws will lead to continuous implementation of these policies. Hence, it is expected to have positive effect on sustainability of industrialization policies. The variable ranges from -2.5 and 2.5.

3.3 Variables, measurement and expected outcomes (Agricultural policies)

This section presents the variables used for the study, their proxies and expected results. All variables are collected from World Bank WDI database. These variables; management of policies, political stability, effective governance, infrastructure and trade openness are also used in this analysis. Since they have been explained already, there is no need for another explanation.

Dependent variable

The dependent variable (sustainability of agricultural policies) represents the hazard rate which is the combination of time and event, as already explained.

Independent variables

Establishment of Commodity Exchange Market is proxied by building of warehouses as used in the study of Murad et al. (2008). The work of the commodity exchange market is to connect farmers to domestic and international market, construction of warehouses, providing financial credit and others. The ability of the institution to carry out this function will boost agricultural production and the sustainability of agricultural policies. Hence, it is expected to have positive effect. The variable is measured in units.

Growth in the manufacturing sector, the variable itself is used for the analysis. The growth in the manufacturing sector will depend on the agriculture sector for raw materials. Hence, it is expected to expand the agriculture sector leading to sustainability of its policies. The variable is measured in percentage. Financial assistance for these policies is proxied by financial inflows from FAO (Food, Agricultural Organization) to

support governments' agricultural policies. Financial inflows from FAO refers to financial disbursement that comes in the form of Official Development Assistance (ODA) to support agriculture sector. The ability of the country to receive this financial assistance argument government's financial supports for these policies. Hence, it is expected to have positive effect. The variable is measured in U.S dollars.

Access to agricultural land is proxied by agricultural land as a portion of the total land area of the country. Agricultural land refers to the share of land allocated for agricultural purposes. These governments' ability to ensure that, there is land reserve for agricultural purposes will always make land available for agricultural activities. Leading to the sustainability of agricultural policies. The variable is measured in percentage. Provision of agricultural facilities is proxied by agricultural machinery of tractors. Provision of agricultural machinery of tractors refers to the number of wheel and crawler tractors provided for agricultural activities. Governments' ability to provide the needed agriculture facilities enhances agricultural production, leading to sustainability of agricultural policies. The variable is measured in the number of tractors the country acquires yearly.

3.4 Scope of the study

The study employs data on 129 countries out of 150 countries identified by International Monetary Fund (IMF)'s World Economic Outlook (WEO) database, classified as developing countries in 2018. These countries are excluded from the analysis due to a lot of missing data. These are; Channel Islands, Djibouti, Equatorial Guinea, Gilbrator, Grenada, Kazakhstan, Kiribati, Liberia, Marshall Islands, Micronesia, Montenegro, Nauru, Palau, St. Kitts and Nevis, St. Lucia, Samoa, Sao Tome and Principe, Solomon Islands, South Sudan, Timor-Leste, Tuvalu and Turkmenistan. The study covers the time period 1986 to 2016. The time period and these countries is chosen for the analysis because these countries have implemented industrialization and agricultural policies towards boosting their economies. Hence, the study is interested to find out what are the appropriate measures to ensure sustainability of these policies for the next 10 to 30 years towards development.

4. RESULTS AND DISCUSSION

This section focuses on summary statistics, correlation test, model coefficients and hazard ratios for exponential, weibull, gompertz and cox models for the analysis.

4.1 Descriptive statistics

The descriptive statistics has been displayed in table I (industrialization policies). Due to large values of these variables; protectionism, domestic consumption, infrastructure and industrial parks. They were logged to help simply the analysis. Estimate from growth in the agriculture sector indicates mean value of 13.99, minimum value of -5.68 and maximum value of 31.23. This indicates a wide difference in the growth of the agriculture sector among these countries. With respect to industrial park, the mean value is 12.49, minimum value is 1.099 and maximum value is 18.86. This does not indicate wide difference in the development of industrial parks among these countries.

Table I Descriptive statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Growth of Agriculture sector	3,745	13.99	16504.75	-5.68	31.23
Industrial Park	4,006	12.49	3.39	1.099	18.86
Protectionism Measures	1,824	22.09	3.46	3.69	31.77
Domestic Consumption	3,437	25.81	3.63	3.76	36.53
Industrialization Policy Bank	3,918	29.0047	23.57	42.94	166.50
Favourable Business Economy	4,650	7.73	14.29	0.063	55.84
Infrastructural Development	4,500	20.55	1.07	16.52	22.42
Quality of Labour Force	4,650	1.14	10.78	0.31	0.74
Political Stability	4,650	1.41	2.98	-1.12	9.43
Effectiveness of Governance	4,650	1.40	3.13	-0.94	9.84
Trade openness	3,669	75.62	37.48	0.021	347.99
Management of Policies	4,650	2.45	28.4	2	5

Source: Data Output from Stata

Favourable business economy indicates a mean value of 7.73, minimum value of 0.063 and maximum value of 55.84. This indicates wide difference in favourable business environment created among these countries. The mean, minimum and maximum values from these variables; protectionism, management, infrastructure, quality of labour force, industrialization policy bank and domestic consumption did not show a wide difference among these countries.

The descriptive statistics has been displayed in table II (agricultural policies). The estimates for

management and infrastructure have already been explained. Financing of these policies indicates mean value of $2,321,578, with a minimum value of $631,681 and maximum value of $25,537,930. This indicates wide difference in the financing of these policies among these countries.

Table II Descriptive statistics

Variables	Observations	Mean	Standard Deviation	Minimum	Maximum
Financing these Policies	4,650	2321578	325134.8	631681	25537930
Agricultural Facility	4,650	461302.3	718982.3	60322.74	2601486
Commodity Exchange Markets	4,650	16.78	0.45	15.98	17.41
Growth of Manufacturing Sector	3,329	30.98	15.79	8.74	50.29
Creation of Agricultural lands	4,398	39.54	22.13	0.45	85.49
Management of these policies	4,650	6.18	28.6	2	5
Infrastructural Development	4,500	20.55	1.07	16.52	22.42
Political Stability	4,650	1.41	2.98	-1.12	9.43
Effectiveness of Governance	4,650	1.40	3.13	-0.94	9.84
Trade openness	3,669	75.62	37.48	0.021	347.99

Source: Data Output from Stata

Agricultural facilities estimates indicate mean value of 46,302.3 tractors, with a minimum value of 60,322.74 tractors and maximum value of 2,601,486 tractors. This indicates wide difference in agricultural facilities received among these countries. Creation of agricultural lands indicates mean value of 39.54, minimum value of 0.45 and maximum value of 85.69. This creates a wide difference in lands reserved for agricultural activities among these countries. Estimates for commodity exchange market and forward linkage with manufacturing sector did not demonstrate wide difference among these countries.

4.2 Correlation test

Correlation test is carried out for the independent variables to check for multicollinearity using the Variance Inflator Factor (VIF). These results are shown in table VII and table VIII for both policies. With respect to industrialization policies, the highest VIF is 3.25 for infrastructural development whiles that of agricultural policies is 3.38 for commodity exchange market. The rule of thumb states that, for a variable to cause multicollinearity it should have a VIF greater than 5. Since none of these variables have a VIF higher than 5, there is no existence of multicollinearity among the independent variables in these two models (see Tables VII & VIII for more details).

Table VII Multicollinearity test (VIF test) Industrialization policies

Variables	VIF	1/VIF
Infrastructural Development	3.25	0.31
Favourable business economy	2.28	0.44
Protectionism measures	2.05	0.49
Domestic consumption	2.04	0.49
Quality of labour force	1.91	0.52
Trade openness	1.35	0.74
Industrial Park	1.21	0.83
Political stability	1.16	0.86
Industrialization Policy Bank	1.16	0.86
Agricultural sector growth	1.01	0.98
Infrastructural development	3.25	1.78
Effectiveness of governance	1.67	0.67
Mean VIF	1.74	

Source: Data Output from Stata

Table VIII Multicollinearity test (VIF test) Agricultural policies

Variables	**VIF**	**1/VIF**
Commodity Exchange market	3.38	0.19
Agricultural Facility	3.51	0.28
Infrastructure Development	2.58	0.39
Political stability	1.94	0.51
Management of policies	1.16	0.86
Financing of policies	1.15	0.87
Trade openness	1.00	0.99
Growth of manufacturing sector	1.26	0.86
Effectiveness of governance	1.16	0.86
Agricultural lands	1.01	0.99
Mean VIF	2.08	

Source: Data Output from Stata

4.3 Results from parametric and semi-parametric coefficients and hazard ratios

Regression coefficients and model hazard ratios for exponential, weibull, gompertz and cox regression for industrialization policies have been displayed in table III and table IV respectively. Estimates from exponential, weibull and gompertz are the parametric results whiles result from cox regression is the semi-parametric estimate. With this model, coefficients are interpreted in terms of their signs but not the magnitude. In this analysis, positive coefficient indicates positive contribution of the variable (measure) towards achieving the objective. Negative coefficient indicates that, the variable (measure) adversely affects achieving the objective.

Table III Sustainability of industrialization policies (coefficients model)

Sustainability of policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Growth of Agricultural Sector	-0.029 (0.020)	-0.023 (0.021)	-0.023 (0.021)	-0.024 (0.020)
Industrial Park	1.01e-08 (9.43e-08)	2.52** (12.1)	2.52** (12.1)	1.18 (10.3)
Protectionism Measures	7.47e-12 (1.23e-11)	4.50e-11** (1.67e-11)	4.50e-11** (1.67e-11)	2.09e-11 (1.37e-11)
Industrialization Policy bank	-0.011 (0.022)	-0.12** (0.048)	-0.12** (0.048)	-0.039 (0.032)
Domestic Consumption of Local products	2.56e-13 (4.21e-13)	9.82e-13** (5.66e-13)	9.82e-13** (5.66e-13)	5.60e-13 (4.51e-13)
Favourable Business economy	-0.12 (0.12)	-0.41 (0.26)	-0.41 (0.26)	-0.13 (0.14)
Management of policies	0.59 (0.46)	0.13** (0.68)	0.13** (0.68)	0.66 (0.49)
Infrastructure Development	4.67e-10 (4.37e-10)	1.11e-09 (5.89e-10)	1.11e-09 (5.89e-10)	6.83e-10 (4.96e-10)
Quality labour	0.019** (0.0075)	0.085*** (0.021)	0.085*** (0.021)	0.034** (0.011)
Political stability	-7.56 (20.67)	19.20 (51.70)	19.20 (51.70)	-7.21 (27.34)

Sustainability of policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Effectiveness of Governance	8.004 (19.56)	-15.62 (48.69)	-15.62 (48.69)	8.016 (25.82)
Trade openness	-0.011 (0.015)	-0.066 (0.021)	-0.066 (0.021)	-0.033* (0.017)
Constant	-0.024 (2.44)	-72.50*** (11.60)	-15.50** (4.92)	
/ ln_p		3.42*** (0.14)		
gamma			1.76*** (0.25)	
N	110	110	110	110

Standard errors in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$
Source: Data Output from Stata

Table IV Sustainability of industrialization policies (hazard ratios)

Sustainability of policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Growth of Agricultural Sector	0.97 (0.019)	0.98 (0.020)	0.98 (0.021)	0.98 (0.019)
Industrial Park	1.08 (9.43)	1.11** (1.21e-07)	1.11** (1.21e-07)	0.99 (1.03e-07)
Protectionism Measures	0.71 (1.12)	1.76** (1.67e-11)	1.76** (1.67e-11)	1.09 (1.56)
Industrialization Policy bank	0.99 (0.022)	0.88** (0.043)	0.88** (0.043)	0.96 (0.031)
Domestic Consumption of Local products	0.96 (2.38)	0.81** (5.66)	0.81** (5.66)	1.60 (2.51)
Favourable Business economy	0.89 (0.103)	0.66 (0.18)	0.66 (0.18)	0.88 (0.13)
Management of policies	1.000001 (4.57e-07)	1.89** (6.76e-07)	1.89** (6.76e-07)	1.078 (4.86e-07)
Infrastructure Development	0.99 (4.37)	1.69 (5.89e-10)	1.69 (5.89e-10)	2.43 (1.96)
Quality labour	1.019** (0.0076)	1.089*** (0.023)	1.089*** (0.023)	1.034** (0.011)
Political stability	0.00052 (0.0107)	2.18e+08 (1.12e+10)	2.18e+08 (1.12e+10)	0.00074 (0.0201)

Sustainability of policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Effectiveness of Governance	2992.4 (58521.32)	1.64e-07 (8.00e-06)	1.64e-07 (8.00e-06)	3029.36 (78220.86)
Trade openness	0.99 (0.014)	0.94 (0.02)	0.94 (0.02)	0.97** (0.017)
Constant	0.98 (2.38)	3.28e-32*** (3.80e-31)	1.85e-07** (9.11e-07)	

Source: Data Output from Stata

Model hazard ratio is interpreted in terms of the magnitude of the value, all the values are positive. For example, if the value is less than 1 (example 0.77). This value is subtracted from 1, which gives 0.23. This is interpreted as 23% reduction in hazard ratio. This implies that, there is 23% less likely that the objective will be achieved. Put differently, the result means that the probability of achieving this objective is very low. The reverse is the interpretation, when the value of hazard ratio is greater than one. Always the result of hazard ratios confirms that of the model coefficients. In such analysis, it is expected that all the four regression coefficients and hazard ratios will be similar. With respect to our estimates, only model coefficients from weibull and gompertz are similar, this is due to the sample size. In the study of Fukunari and Takamune (2003) employed 5,000 observations for the analysis. Therefore, all the interpretations are based on these two estimates (weibull and gompertz estimates).

Development of Industrial parks estimates indicate coefficient of 2.52 and hazard ratio of 1.11 for both weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. This result implies that, these countries ability to develop industrial parks will contribute positively towards achieving the objective of sustaining industrialization policies. The result is consistent with our expectation and results of these empirical studies (Gunasekaran and AlainSpalanzani, 2012; Yu and Wu, 2018; Angelakoglou and Gaidajis, 2015). However, the hazard ratio result implies that, even though the development of these parks will contribute towards achieving this objective. The probability of sustaining these policies due to the establishment of these parks is only 11%. Put differently, its contribution towards achieving the objective is low. Intuitively, this result implies that developing these parks alone will not be enough to achieve the objective. Beyond that, rules and regulations that protect these reserve parks for industries should be strictly enforced to avoid encroachment from rent-seeking activities. Anything short of this, will make the development of these industrial parks meaningless. This is because, there are a lot of reserve lands that have been taken over by real estate moguls and shopping mall developers for their business activities.

Operationalization of protectionism measures estimates indicate coefficient of 4.50 and hazard ratio of 1.76 for both weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. This result implies that, the operationalization of protectionism measures will contribute positively towards achieving the objective of sustaining industrialization policies. This result is consistent with our expectation and results of these empirical studies (Burritt and Schaltegger, 2012; Murad et al., 2008; Neri et al., 2018). The hazard ratio result implies that, when protectionism measures are effectively implemented, there is 76% probability that, this objective will be achieved. The implementation of protectionism which borders on imposition of import tariff, quotas, embargo, foreign exchange controls, higher administrative and health controls, strict usage of import license and others. These measures reduce importation of products (assuming the citizenry demand for foreign products is elastic) to protect domestic industries. This will switch the citizens' demand to locally manufactured products.

Establishment of industrialization policy bank estimates indicate coefficient of -0.12 and hazard ratio of 0.88 for both weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. This means that, the establishment of industrialization policy banks will adversely affect the objective of sustaining industrialization policies. The result is not consistent with our expectation and results of these empirical studies (Giordano, 2015; Ragkos et al., 2017). However, from the hazard ratio result its probability of adversely affecting sustainability of industrialization policies is only 12%. Establishment of policy bank for industries is not an appropriate measure for financing industries. This is because in the past, policy banks have been established to finance specific policy agenda. But later on they converted into commercial banks for example Agricultural Development Bank (ADB) due to low profitability. When industries being financed by the bank experience losses, it will affect the bank's operations. Hence, an alternative measure to financing these industries is imposition of tax designated towards establishment of industries, as done in the case of education in most countries.

Management of these policies estimates indicate coefficient of 1.29 and hazard ratio of 1.89 for both

weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. These countries ability to put in place proper management for effective and efficient running of these policies will ensure its sustainability. The result is consistent with our expectation and results of these empirical studies (Yu & Wu, 2018; Fang et al., 2007; Arbolino et al., 2018). The hazard ratio result implies that, when proper management are put in place, there is 89% probability that these policies will be sustainable. Indeed, one of the key factors that have contributed towards policies being unsustainable is ineffective management. These governments should ensure that, managers of state industries are selected by independent bodies and performance contracts are given to them to ensure good results.

Domestic consumption of local products estimates indicate coefficient of 9.82 and hazard ratio of 0.81 for both weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. This means that, the citizens' ability to patronize locally manufactured products will contribute positively towards achieving the objective of sustaining industrialization policies. This result is consistent with our expectation and results of these empirical studies (Movilla-Pateiro et al., 2021; Arbolino et al., 2018). The hazard ratio result implies that, when domestic consumption of local products is enhanced, there is 19% probability that, this objective will be achieved. This means that, this measure will contribute towards achieving the objective but its contribution is not high enough to sustain these policies. This implies that, over-reliance on domestic consumption of industrial products is not enough to sustain these policies. Enough commitment should be made towards capturing foreign market which has large number of customers. This can be achieved by producing quality products at affordable prices by investing in research and development.

Estimates for quality of labour force indicates coefficient of 0.085 and hazard ratio of 1.89 for both weibull and gompertz estimates. When you control for political stability, effectiveness of governance and trade openness. This means that, the ability of these countries to enhance the quality of labour force will contribute positively towards achieving the objective of sustainability. The result is consistent with our expectation and results of these empirical studies (Gómez-Limón & Sanchez-Fernandez, 2010; Chowdhury et al., 2019). The hazard ratio result implies that, when these countries enhance the quality of their labour force, there is 89% probability that, this objective will be achieved. Indeed, enhancing the quality of labour force will result in innovative production process and new production methods which are pre-requisite for sustaining industrialized countries. Due to fierce competition in the industrial sector, there is always the need for innovative production process and production methods to outpace the level of competition. Hence, governments should increase their expenditure on education, research and development and introduction of more practicals in tertiary education.

4.4 Results from parametric and semi-parametric coefficients and hazard ratios

Estimates for the establishment of commodity exchange market indicates coefficient of 10.24 and hazard ratio of 1.78 as shown in table V and table VI respectively. When you control for political stability, effectiveness of governance and trade openness. This means that, these countries ability to ensure the establishment of commodity exchange market will contribute positively towards achieving the objective of sustaining agricultural policies among developing countries. This outcome is consistent with our expectation and empirical study result of Jiang et al. (2016). The hazard ratio result implies that, with the establishment of commodity exchange markets, there is 78% probability that, this objective will be achieved. Commodity exchange market when established will provide ready markets for agricultural products, credit facilities and provision of warehouses to enhance agricultural activities and sustainability of these policies.

Table V Sustainability of agricultural policies (coefficients model)

Sustainability Agricultural policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Commodity Exchange market	5.083*** (1.45)	10.24*** (2.38)	10.24*** (2.38)	6.064*** (1.72)
Growth of Manufacturing sector	0.015 (0.018)	-0.011 (0.022)	-0.011 (0.022)	0.0059 (0.019)
Agricultural Lands	-0.011** (0.0062)	-0.016** (0.0068)	-0.016** (0.0068)	-0.0099 (0.0063)
Agricultural Facilities	-0.69*** (0.16)	-0.85*** (0.25)	-0.85*** (0.25)	-0.69*** (0.19)
Management of policies	0.96** (0.46)	0.12** (0.57)	0.12** (0.57)	0.92 (0.48)

Sustainability Agricultural policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Infrastructure Development	7.04e-10*	-2.72e-10	-2.72e-10	4.96e-10
	(3.25e-10)	(3.99e-10)	(3.99e-10)	(3.29e-10)
Financial of Policies	-0.13	0.61**	0.61**	0.26
	(0.12)	(0.23)	(0.23)	(0.16)
Political Stability	48.70	27.06	27.06	36.62
	(27.29)	(42.79)	(42.79)	(31.93)
Effectiveness of governance	-45.73	-24.88	-24.89	-34.19
	(25.82)	(40.49)	(40.49)	(30.21)
Trade openness	-0.000602	-0.0032	-0.0032	-0.0014
	(0.0028)	(0.0026)	(0.0026)	(0.0026)
Constant	80.66***	107.6***	139.7***	
	(22.09)	(32.33)	(33.26)	
/ ln_p		2.85***		
		(0.100)		
gamma			0.99***	
			(0.1000)	
N	197	197	197	197

Standard errors in parentheses * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Source: Data Output from Stata

Table VI Sustainability of agricultural policies (hazard ratios)

Sustainability Agricultural policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Commodity Exchange market	0.0062***	1.78***	1.78***	0.0023***
	(0.0089)	(2.38)	(2.38)	(0.0039)
Growth of Manufacturing sector	1.015	0.99	0.99	1.0059
	(0.018)	(0.021)	(0.021)	(0.019)
Agricultural Lands	0.99**	0.98**	0.98**	0.99
	(0.0062)	(0.0067)	(0.0067)	(0.0062)
Agricultural Facilities	0.99***	0.99***	0.99***	0.99***
	(1.59e-06)	(0.25)	(0.25)	(0.19)
Management of policies	1.078**	1.68**	1.68**	1.42**
	(4.59e-07)	(0.57)	(0.57)	(0.48)
Infrastructure Development	0.87**	1.02	1.02	1.06
	(3.25e-10)	(3.99e-10)	(3.99e-10)	(3.29e-10)
Financing of Policies	0.99	1.62**	1.62**	1.26
	(1.18e-06)	(0.25)	(0.25)	(0.16)
Political Stability	1.41e+21**	1.66	1.66	1.05
	(3.85e+22)	(2.42e+13)	(2.42e+13)	(2.57e+17)

Sustainability Agricultural policies	Exponential Regression	Weibull Regression	Gompertz Regression	Cox Regression
Effectiveness of governance	1.38e-20 ** (3.57e-19)	1.56 (6.32e-10)	1.56 (6.32e-10)	1.42 (4.28e-14)
Trade openness	0.99 (0.0028)	0.99 (0.0026)	0.99 (0.0026)	0.99 (0.0026)
Constant	1.07e+35*** (2.37e+36)	5.50e+46 *** (1.78e+48)	5.50e+46 *** (1.78e+48)	
/ ln_p		2.85*** (0.100)		
gamma			0.99*** (0.1000)	
N	197	197	197	197

Standard errors in parentheses $^{*}p < 0.05$, $^{**}p < 0.01$, $^{***}p < 0.001$

Source: Data Output from Stata

Management of these policies estimates indicate coefficient of 1.12 and hazard ratio of 1.68. When you control for political stability, effectiveness of governance and trade openness. This means that, these countries ability to ensure proper management will contribute positively towards achieving this objective. This result is consistent with our expectation and results of these empirical studies (Rajala et al., 2016; Murad et al., 2008). The hazard ratio result implies that, when proper management are put in place, there is 68% probability that this objective will be achieved. Indeed, reducing political interference and setting up right management will ensure; proper supervision and monitoring, capacity building programs and cost-effective strategies implemented, to achieve the objective.

Financing of policies estimates indicate coefficient of 0.61 and hazard ratio of 1.62. When you control for political stability, effectiveness of governance and trade openness. This means that, these countries ability to constantly finance these policies will contribute positively towards achieving this objective. This result is consistent with our expectation and results of these empirical studies (Angelakoglou & Gaidajis, 2015; Neri et al., 2018). The hazard ratio result implies that, with constant financing of these policies, there is 62% probability that this objective will be achieved. Governments should make financing agricultural policies a statutory payment in their budgets to ensure consistent funding. This will help towards achieving the objective.

Creation of agricultural land estimates indicate coefficient of -0.016 and hazard ratio of 0.98. When you control for political stability, effectiveness of governance and trade openness. This means that, the creation of agricultural lands will adversely affect the objective of sustaining agricultural policies. This result is not consistent with our expectation and empirical study outcome of Arbolino et al. (2018). However, from the hazard ratio result its probability of adversely affecting sustainability of agricultural policies is only 2%. In order to achieve this objective of creation of agricultural lands, it is appropriate that this should be complemented with strict laws and regulations to restrict encroachment. These governments should be prepared to lease these lands for farmers without payment of fees with their productivity monitored. This will help to achieve this objective.

Agricultural facility estimates indicate coefficient of -0.85 and hazard ratios of 0.99. When you control for political stability, effectiveness of governance and trade openness. This means that, the provision of agricultural facilities will adversely affect the objective of sustaining agricultural policies. This result is not consistent with our expectation and empirical study outcome of Ateba et al. (2019). However, from the hazard ratio result its probability of adversely affecting sustainability of agricultural policies is only 1%. Excessive importation of these machineries with foreign currency will deplete funds meant for running these policies. Hence, its adverse effect on sustainability. These countries should ensure that, these agricultural facilities are manufactured locally by given companies tax concession to manufacture them. This will help sustain the funds of these policies.

5. CONCLUSION AND POLICY IMPLICATION

Developing countries have implemented numerous industrialization and agricultural policies towards propelling economic growth. One central issue for discussion is the issue of sustainability of these policies. Whiles in developed countries, sustainability of policies is properly done. The narrative is not the same with regards to developing countries' industrialization and agricultural policies. The study contributes to existing empirical studies by examining the appropriate measures that can be operationalized. In order to achieve sustainability of industrialization and agricultural policies among developing countries. The study employs dataset from 129 developing countries with the use of cox-proportional hazard model for the analysis. Result with respect to

industrialization policies indicates that, the operationalization of protectionism measures will contribute positively towards achieving the objective of sustaining industrialization policies. This is because protectionism will reduce importation of products to protect domestic industries. This will switch the citizens' demand to locally manufactured products.

In addition, the study found out that, the establishment of industrialization policy banks will adversely affect the objective of sustaining industrialization policies. This is because, there is a probability that these banks will convert into commercial banks and lose focus on their mandate. With regards to agricultural policies, the study found out that establishment of commodity exchange market will contribute positively towards achieving the objective of sustaining agricultural policies. Hence, the study recommends that government should work towards establishment of Commodity Exchange Market (CEM) to sustain agricultural policies. In addition, there is the need to create statutory funding for industrialization policies as a best alternative to the establishment of industrialization policy bank. Future studies should focus on undertaking comparative analysis on these policies between developed countries and developing countries.

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