Structural transformation and Unemployment in Kenya: A panel Approach

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DOI: 10.29322/IJSRP.11.01.2021.p10937
http://dx.doi.org/10.29322/IJSRP.11.01.2021.p10937

Abstract- Unemployment is a major challenge for policymakers in both developing and advanced countries, as it can lead to a negative impact on economic welfare, misery and social unrest. Structural change generates deals with reallocation resources on agriculture, manufacturing, and services esteemed in reducing unemployment rate. The aim of this study was to examine the effect of changes in employment and income on unemployment across this sectors. Success of structural transformation is measured by the contributions of agriculture, manufacturing, and the service sector to growth and reduction of unemployment problem in Kenya. Data from World Bank ranging from 2000 to 2020 was used to research the changing impacts of economic complexity an indicator of structural transformation on unemployment. The long run study findings indicated that: changes in value addition a proxy for income changes has a positive effect on unemployment in the long run sectorial employment in the short run has a positive and significant impact on the level of unemployment. These will inform policy makers by designing policy recommendation that will foster structural transformation aimed at reducing unemployment in Kenya.

Index Terms- Structural Transformation, Panel Vector Analysis Model, PVECM

I. Introduction

Unemployment is a real problem of concern according to Gyekye and Kyei (2011) it results into detrimental impact on economic welfare, crime, human capital erosion, deprivation and social problems. Likewise, unemployment can result in psychological complications of anger, hopelessness, aggression and steady drift of some identifiable unemployed people into all kinds of illegal activities.

As per Maqbool *et al.* (2013), by using all available development factors, the focus of every government is to build employment prospects through different economic transformations. In addition, chronic joblessness affects government's standing in relating other countries and leads to cruel problems with the homebased country. Long-term unemployment often leads to financial difficulties, hunger, homelessness, violence, anger, and many other concerns, such as breakdown and family stress, social alienation, loss of trust and self-esteem. They all contribute to the erosion of a stable community.

Structural transition has been a commonly used indicator of the macroeconomic efficiency of economic growth. Technology adoption is associated with employment creation (Martin & Mitra, 2001) . It is accepted that two processes must be carried out concurrently in order for this to happen, i.e. a change in GDP from agriculture into modern manufacturing and service sectors. A demographic change, resulting in a lower number of dependents and slower labor force growth, typically follows the changes in production and employment and encourages the shift in labor as the increasing modern sector can accommodate a greater proportion of new labor force entrants (Mecik & Afsar, 2014).

The change in the structure of the world economy have led to the prevalence assumption that market dynamics inevitably lead to productivity and growth through a market process that brings about market equilibrium through demand and supply market forces. Therefore, while the conditions brought about by liberty allow for the transition of resources into productive areas, optimal resource distribution comprise appropriate conditions of productivity and economic growth.

For sustainability provision in order to reduce unemployment, it is noted that the structural transition of economies has become more common, sources have shifted from less productive areas to more productive areas and the productivity of the internal sector has increased. In the realization of structural change, there is a substantial contribution of transformations on a global scale in the world economy.

II. Literature Review

Prebisch (1950), Singer (1950), Lewis (1954), and Hirschman published the first research on systemic transformation (1958). The common point underlined by all these studies is that, in the long run, countries that specialize in primary products and have a small export basket could experience trade problems.

Furthermore, these studies indicate that countries should move from conventional goods to processed products (Petralia, Balland, & Morrison, 2015). Furthermore these studies indicate that countries can move from traditional to more complex products (Balland, Petralia, , & Morrison, 2015). Research has emphasized that production growth and output will be a consequent of structural change. In addition, economic structurally changed countries are able to more readily withstand macro-economic shocks. Changing a country's manufacturing system from one of agriculture to industry and then from industry to service is commonly regarded as structural transformation (Can & Doğan, 2017).

Martin and Mitra (2001) found that technological advances in the agricultural and industrial sectors have taken place at a high

level. The findings showed that in all stages of growth, technological development was faster in agriculture than in industry. However it is evident that there has been a converging situation with regard to the relative rapid dispersion of developments in the overall productivity factor growth ratios in the agricultural sector.

Mecik and Afsar (2014) notes that the structural transition would have a positive significant impact on economic growth, given that there are some shifts in sector composition of employment and that labor force ratio of the labor force ratio of industries has been increased.

III. Methodology

Model Specification

The paper used the following multivariate model

$lnUNEMP_{it} = \beta_0 + \beta_1 lnVADD_{it} + \beta_2 lnEMP_{it} + \beta_3 lnPOP_{it} + \varepsilon_{it}$ ……..…

Where $UNEMP$ is unemployment, $VADD$ is sectorial value added, EMP is employment, β_0 is a constant variable and β_i are the coefficients to be determined.

The research aimed to investigate the impact of structural changes on changes in eunmployment in Kenya. To estimate a PVECM for the study, certain conditions must be met, which involve testing whether series is integrated of same order, so before presenting the model, first description of the PURT and the panel co-integration tests were to be done (Bardi *et al.*, 2016).

Panel unit root test

Considering AR (1) process for the following panel data:

$y_{it} = \alpha_i y_{it-1} + x_{it}\sigma_i + \varepsilon_{it}$……..……

Whereby i =1,2,…N are observed individual dimensions cross-section units, over the time period t=1,2,… T, and x_{it} is the exogenous variable in the equation.

According to Mahmoodi and Mahmoodi (2016) the null hypothesis is that the series in the panel contains the root unit against the alternative hypothesis that all individual series are stationary Levin and Lin (1993) and Levin, Lin and Chu (1979 and 1981) and Chu (2002), Hsiao, 2003. From the pooled proxy equation given below we can get the estimate of ρ coefficient;

$\Delta y_{it} = \alpha y_{it-1} - \eta_{it}$..

LLC shows under the null hypothesis, an adjusted t-statistic for the resulting ρ isnormally asymptotically distributed as shown.

$t^*_\rho = \frac{t_\rho - N\check{T}s_N\check{\sigma}^2_{\tilde{\varepsilon}}\check{\sigma}(\check{\rho})\mu^*_{mt}}{\sigma^*_{mt}} \rightarrow N(0,1)$……..

Whereby, t^*_ρ is t-statistic for $\rho = 0$, $\check{\sigma}^2$ is the variance of the error term, η_i, $\check{\sigma}$ is the estimated variance of $\check{\rho}$ $\mu^*_{mt}$and σ^*_{mt} represents the mean and standard deviation. Other test stastics that were used are Fisher-PP and Fisher-ADF recommended by Choi (2001) and Maddala and Wu (1999) (Chaiboonsri *et al.*, 2010).

Panel cointegration Test

This paper applied Fisher (combined Johansen) approaches. Pedroni (1999) which considers the following time series panel regression for testing;

$y_{i,t} = \alpha_1 + \delta_i t + \beta_{i1}x_{1i,t} + \beta_{i2}x_{2i,t} + \beta_{im}x_{mi,T} + \varepsilon_{i,t}$ …..

$For\ t = 1 \ldots T, i = 1 \ldots N$ and m are the number sof the regression variables while T refers to the number of observations over time. α_i and δ_i parameters are trend and individual effects that can be set to nil when preferred. y_i and x_i are I(1). The residuals $\varepsilon_{i,t}$ will be $I(1)$, with the null hypothesis of no cointegration (Persson, 2015).

By running the auxiliary regression below, residuals from above model and then testing whether residuals are $I(1)$,) is obtained.

$\varepsilon_{it} = \rho_i \varepsilon_{it-1} + \sum_{j=1}^{p_i} \varphi_{ij}\Delta\varepsilon_{it-1} + V_{it}$…….

In each cross-section Persson (2015), describes different approaches of collecting statistics for the testing of the null hypothesis of no-co-integration $\rho_i = 1$. We have two alternative hypotheses: the homogeneous alternative, $(\rho_i = \rho) < 1\ \forall\ all\ i$ which Pedroni defines as panel statistical test or within dimensional test) ; and heterogeneous alternative, $(\rho_i < 1) < 1\ for\ all\ i$ also known as the group statistics test or between-dimension). The seven statistics for testing the null hypothesis of no co-integration versus co-integration in panel data were presented by Pedroni.

IV. Findings

Table 1: Unit Root Test Results at Level

Variable	Levin,Lin& Chu	Prob	ADF Fisher	Prob	PP Fisher	Prob	Cross-Sections	Remarks
UEMP	-1.50	0.07	6.85	0.33	5.86	0.43	3	unit root
VADD	0.33	0.63	2.70	0.85	5.09	0.49	3	unit root
EMP	0.23	0.59	9.27	0.16	34.41	0.00	3	No unit root

The results of Table 1 shows both Levin, Lin & Chu ADF – Fisher, ADF - Fisher and PP - Fisher indicate that all series at their level are not stationary. Implying that the null hypothesis of non-stationarity cannot be rejected, or the series contains a unit root. After the first order differentiation, the test statistics show that all the series is stationary at 5 percent level of significance as shown in table two below.

Table 2: Unit Root Test Results at First Difference

Variable	Levin,Lin& Chu	Prob	ADF Fisher	Prob	PP Fisher	Prob	Cross-Sections	Remarks
UEMP	-5.43	00	34.60	0.00	35.31	00	3	No unit root
VADD	10.07	00	60.15	0.00	67.98	00	3	No unit root
EMP	-2.08	0.02	12.85	0.04	12.97	0.04	3	No unit root

Co-integration TEST

By using automatic lag selection criteria the study accepted the Null Hypothesis that there at least one co-integrating equations in both the trace and maximum statistics as indicated on table 3 below.

Table 3:Unrestricted Cointegration Rank Test (Trace and Maximum Eigenvalue)

Hypothesized No. of CE(s)	**FisherStat.* (from trace test)**	**Prob.**	**Fisher Stat.* (from max-eigen test)**	**Prob.**
None	22.72	0.0009	22.71	0.0009
At most 1	6.163	0.40525	3.139	0.7912
At most 2	14.36	0.0258	14.36	0.0258

Panel Vector Error Correction Model (PVECM)

Table 4: Summary of Statistics for Short-run Behaviors

	Coef.	Std. Err	t-Stasistic	P-value
Equation1 D(UNEMP)				
CointEq1	-0.617884	0.09315	6.63348	0.0000
D(UNEMP(-1))	0.456751	0.11102	4.11402	0.0001
D(UNEMP(-2))	0.572799	0.12682	4.11402	0.0000
D(VADD(-1))	0.013310	0.00416)	3.20213	0.0020
D(VADD(-2))	0.011268	0.00381	2.95492	0.0048
D(EMP(-1))	-0.016828	0.02082	-0.80834	0.4533
D(EMP(-2))	0.021558	0.02078	1.03728	0.3663
C	-0.003969	0.00660	-0.60120	0.3776
Equation 2 D(VADD)				
CointEq1	3.839632	3.37760	.13679	0.2576
D(UNEMP(-1))	-5.448373	4.02583	-1.35335	0.1782

D(UNEMP(-2))	0.434096	4.59877	0.09439	0.9249
D(VADD(-1))	0.013310	0.00416	3.20213	0.0020
D(VADD(-2))	0.011268	0.00381	2.95492	0.0048
D(EMP(-1))	0.322577	0.02082	0.75490)	0.6698}
D(EMP(-2))	-0.681116	0.75362	-0.90379	0.3677
C	0.193177	0.23941	0.80690	0.4211

Equation 3 D(EMP)

CointEq1	0.363826	0.67435	0.53952	0.5787
D(UNEMP(-1))	0.017173	0.80377	0.02136	0.9786
D(UNEMP(-2))	-1.146593	0.91816	-1.24879	0.2037
D(VADD(-1))	0.002895	0.03009	0.9786	0.9786
D(VADD(-2))	-0.001731	0.02761	0.06270	0.9448
D(EMP(-1))	0.926422	0.15072	6.14672	0.0000
D(EMP(-2))	-0.074383	0.15046	0.49435	0.6165
C	-0.001926	0.04780	[-0.04029	0.9738

The PVECM results in above table investigate the effects of sectorial value added (income) and employment on unemployment. Equation one is our major interest as it has unemployment as the dependent variable. From the results it was deduced that 62% speed of adjustment occurs by correcting short run disequilibrium at 5% level. The level of unemployment also depends on the previous level of unemployment, a one % change on D(UNEMP(-1)) causes 45.7% change on the current unemployment. The result is significant as the p value are less 0.05 i.e. 0.000< 0.05. Sectorial employment in the short run is significant and positively related to unemployment in the economy. This is attributed to the fact that in the short run income generated by the sectors is less than the costs incurred. Sectorial employments in both lag one and two is insignificant at 5% level of significance

Table 3 Long Run Model Co-Integrating Equation

variable	Coefficient	Std Error	t-Statistic	Prob
C	2.801560	0.062955	44.50099	0.0000
VADD(-1)	-0.012271	0.005409	-2.268755	0.0271
EMP(-1)	0.000597	0.001758	0.339646	0.7354

The long run model shows that value added which is a proxy for income is negatively and significantly related to unemployment at 5% level of significance since 0.0271 less than 0.05. the results collaborates with (Mecik & Afsar, 2014). VADD i.e. Value added in the economy a proxy for income has an inverse and statistically significant coefficient that justifies the relation between unemployment and income, from the point of view of Philips curve, when employment or labor increases disposable

amount of money circulating within the economy increases these fuels up inflation and reduces milled level of unemployment. The long run results show that sectoral employment is positively related to unemployment but the relationship is not statistically significant.

V. Conclusion

In the study, the effects of the structural transformation on the labor markets were analyzed with panel VECM . The findings indicated that the changes in value addition a proxy for income changes has a positive effect on unemployment in the long run an indication that sectorial income plays a key role in reducing unemployment in Kenya . Sectorial employment in the short run has a positive and significant impact on the level of unemployment.

The impacts of structural change on labor markets were analyzed using VECM panel. The results showed that changes in the value added indicator for income changes have a positive and significant long-term impact on unemployment, suggesting that sectoral income plays a key role in reducing Kenya's unemployment. Sectoral employment has a positive but insignificant influence on the level of unemployment in the short term.

VI. Recommendation

From the study, it is a clear indication that structural income has got a significant effect on unemployment in Kenya. Resources in the economy have been shifting from low productive sectors to more productive sectors. Value added product was inversely relate to unemployment, therefore it is imperative to for the government to put up structures on sectorial income generation like subsidies across the three sectors.

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