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SUMAR – SOMMAIRE – CONTENTS – INHALT

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MULTIDIMENSIONAL POVERTY ANALYSIS OF URBAN AND RURAL HOUSEHOLDS IN SOUTH AFRICA

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Abstract: The study profiled and compared household multidimensional poverty status and its determinants among urban and rural households in the Eastern Cape Province of South Africa, using information from a sample population of 3033 households interviewed from the Province during the General Household Survey conducted by the Statistics South Africa in 2014. Analytical techniques utilized include the recent multidimensional poverty index (MPI), descriptive statistics and Tobit regression. Findings reveal that multiple deprivations are found mostly in the rural area of the province; the multidimensional headcount is highest in the rural area, though the intensity of multidimensional poverty is almost similar in both geographical locations. The standard of living dimension is also the largest contribution to MPI in both locations. MPI has significant links with education attainment of household head, access to electricity and asset stock in both geographical locations, but is influenced by the gender of head, agriculture engagement and household monthly income in rural areas only. In order to improve households' multidimensional poverty status in both urban and rural locations, there is the need to take into account some significant variables such as education of head, increase electricity subsidy coverage during winter period, asset accumulation and increase in households' participation in agricultural activities, especially those residing in rural areas.

JEL classification: I32

Keywords: Multidimensional Poverty Index, Urban, Rural, Tobit Regression

1. Introduction and Background

Poverty is a composite phenomenon which has been examined by many scholars and development associates in diverse ways. Though there have been various versions of definitions of the term poverty (World Bank, 1990; Lipton et al., 1995; United Nations, 1998; World Bank, 2001; Chamhuri et al., 2004; Abdul-Mamin and Shamshiry, 2014) over

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the decades, there is, however, no specific generally accepted definition of poverty due to its multifacetedness. Following the definition given by Abdul-Mamin and Shamshiry (2014), poverty is defined as a diversity of deprivations a person or household experiences simultaneously or separately that stifles the person's or households' abilities to function, live a life of purpose and fulfilment, and be productive in the society. These deprivations could be economic, social, political, cultural, physical or spiritual. From this definition and various perspectives, poverty is viewed as the existence of poverty that is generally accepted as a phenomenon which goes beyond income and consumption standard but includes a state of wellbeing, which is economically, morally and socially unacceptable, caused by various dynamic interactions which make some better-off and others worse off. Hence, since poverty goes beyond income and consumption, targeting and ending it in all forms becomes appropriate. To this end, ending all forms of poverty by 2030 became a goal generally agreed on by world leaders during the United Nations Sustainable Development Summit in September 2015 as one of the Sustainable Development Goal (SDG) to be achieved.

South Africa and the Eastern Cape Province in particular have made significant progress in poverty reduction since the official end of the Apartheid government in 1994. However, despite this improvement, various studies that have been carried out still report existence of poverty among households in the country. The latest report by Stats SA (2017), where different poverty lines (upper bound poverty line, lower bound poverty line, food poverty) were used, revealed that there was a slight increase in poverty situation in the country between 2001 and 2015. For instance, in 2015 the UBPL indicates that 30.4 million South Africans live in poverty in 2015, which was an increase to 55.8% poor people from 53.2% in 2011. The Eastern Cape Province remained consistently ranked in the top most position of either first or second poverty stricken provinces in South Africa. Nevertheless, the provincial government is striving and committed to improving the welfare of its people and also achieve the Sustainable Development Goal of ending all forms of poverty, it has been achieving this through social wage and protection programmes. This is why the Eastern Cape Province is home to 2770521 people receiving social grants, the second largest after the KwaZulu-Natal Province. However, the pursuit of ending all forms of poverty by the year 2030, as indicated in the SDG and the South African NDP, cannot be achieved when the multidimensional nature of poverty in measurement and the peculiarities of geographical locations within an economy are not taken into consideration. Aside, it is well known that national level analysis does not provide a clear picture of poverty situation at the subnational level, bearing the peculiarities of geographical location in the country in mind. Considering the geographical effect of the Apartheid system of government in South Africa, it is known that the extent of effects differs across provinces and localities. As noted by Mushongera et al. (2017), racial and location imbalances persist till to date, despite government efforts in the past 20 years. These imbalances are further seen in the differences in geographical space development, and in prices of goods and services as well. Hence, the appraisal of poverty dynamics focusing at sub-national and localized level becomes appropriate. Hence, this paper assesses the multidimensional nature of poverty among urban and rural households in the Eastern Cape Province, using the most recent multidimensional poverty measure (Alkire and Foster, 2011) Multidimensional Poverty Index. Specifically, the objective of the paper is to profile and compare household multidimensional poverty status, and investigate factors influencing household multidimensional poverty among both urban and rural households in the Eastern Cape Province of South Africa.

The rest of the article is arranged as follows, section 2 provides the literature review while section 3 and 4 present the data source and analytical techniques respectively. The analytical techniques include the discussion on MPI and the Tobit regression model adopted in the study. Section 5 presents results and discussion, while conclusions and recommendations follow in Section 6. The global pursuit of reducing every form of poverty underscores the importance and relevance of this study for other regions outside Africa. Moreover, the utilization of Alkire and Foster (2011) MPI used in this study, if applied to other poverty stricken regions, could help specifically identify channels through which multidimensional poverty manifest itself in those regions. Furthermore, in trying to analyse multidimensional poverty in both urban and rural household, the study portrays the existence of non-homogeneity within an economy which is indispensable in understanding multidimensional poverty in other regions.

2. Literature Review

In South Africa, there is an abundance of empirical literature on poverty the same way it is available in global community. The majority of this research has examined poverty from a unidimensional perspective, using solely the monetary or non-monetary subjective concepts. The multidimensional nature of poverty poses several arguments among scholars against these unidimensional measures in terms of how best poverty can be better captured beyond the unidimensional measures. For instance, monetary measurement of poverty using expenditure or income has been used as main indicators in establishing poverty thresholds by these studies (Biyase and Zwane, 2018; Dunga, 2017; Maloma, 2016; Meyer and Nishimwe, 2016; Wurku and Marangu, 2015; Baiyegunhi and Fraser, 2014; Baiyegunhi, 2014; Sekhampu, 2013). Though monetary measure captures welfare (i.e. welfare opportunity and welfare realized), it is, however, argued that the approach is inadequate as it captures only a unidimensional approach of poverty. It is also argued that monetary poverty measures often ignore the non-income components of living standards (Meth and Dias 2004; Seekings 2007) like including in-kind benefits, free or subsidized primary healthcare, education, and sanitation, hence this measure, if not correlated with several other dimensions of the household's living standards, could misrepresent the extent of household. Moreover, current income can be a misleading indicator of economic status of family because earnings are susceptible to fluctuations due to transitory events (Meyer and Sullivan, 2003) and the difficulties in collecting appropriate data on income and expenditure (Posel and Rogan, 2014). Similarly, the use of non-monetary one-dimensional approach of subjective measure has also been argued against in literature. Gibson (2016) argued that welfare economics does not provide a justification for maximizing either happiness or life satisfaction, because neither corresponds to utility. Accordingly, Jansen et al. (2015) argued that subjective indicators might be less expedient for practical policy and targeting purposes as people may project themselves as poor only because they are not satisfied with their lives, which is challenging for instance, when targeting the public for welfare programmes. Subjective measure could also present false information because the relative position of household is a strong determinant of subjective poverty, as pointed out by Alem et al. (2014). For example, having some kind of employment makes a household less likely to perceive themselves as poor, even if they remain in objective poverty.

There is a gradual increase in the number of studies adopting non-monetary multidimensional approaches to poverty measure in South Africa recently. These studies have applied asset-based approaches to measure poverty based on a household's access to public and private assets (Bhorat, van der et al., 2009). Other studies have also used composite indices approach to develop national and provincial indices of multiple deprivation (Klaseen, 2000; Noble et al., 2006; Noble, Barnes, Wright, and Roberts, 2010). More recently, Finn et al., 2013; Woolard et al., 2013; Stat SA, 2014; Alkire and Santos, 2014; Ntsalaze and Ikhide, 2016; Mushongera et al., 2017; Frame et al., 2016; Rogan 2016; Pasha, 2016; OPHI, 2015; OPHI, 2017) have considered multidimensional poverty vis-a-vis gender dimension, youth dimension and cash grants at the national level using the Alkire and Foster (2011) technique and presenting mostly descriptive inferences. The Alkire and Foster MPI methodology has many advantages, which include its decompostional ability of helping to know how much each indicator and each dimension contributes to overall poverty and its ability to allow poverty comparisons across countries and regions of the world, as well as within-country comparisons between regions, ethnic groups, rural and urban areas, and other key household and community characteristics (Santos and Alkire, 2015).

Findings from empirical literatures have also found some household demographic and socioeconomic characteristics to be having influence on multidimensional poverty. The estimate of a gendered analysis carried out by Rogan (2016) showed that the incidence of multidimensional poverty is higher for female-headed households (9.4 percent) than male-headed households (6.8 percent). This indicates that female headed households are significantly more likely to be multidimensionally poor than male counterparts. A spatial analysis of MPI in the Gauteng province of South Africa by Mushongera et al. (2017) found out that low income earning households, poor accessibility to infrastructures and unemployment (as a result of low concentration of economic activities in specific locations) increases the likelihood of a household to be multidimensionally poor. Applying generalized additive model (GAM) using regression splines, Ntsalaze and Ikhide (2017) assessed the existence of critical tipping points specifically for age, government grants, education, household size and household debt service-to-income on multidimensional poverty. The study found that in household heads younger than 60 years of age, more children are associated with lower, household size of less than four and higher education attainment lowers the chances of a household to be multidimensionally poor. By applying a logistic regression, Balgi (2015), in a study carried out in Bankura district, West Bengal, found income and type of employment to be having a significant reduction effect on the chances of a household to be multidimensionally poor. In the study of Adepoju and Akinluyi (2017) where probit regression was employed, the probability of being poor was found to be decreasing in extent with increase in the level of education attained by household head. Specifically, an approximate reduction of about 1.66, 2.04 and 2.52 for household heads with primary, secondary and tertiary education was predicted respectively. Other factors found by the study to be influencing probabilities of being multidimensionally poor are household size, geopolitical location, and the gender of household head (male). For instance, being a male-headed household increased the probability of being poor by 0.15 when compared with their female counterparts. Similar findings were observed in the studies of Ele-Ojo Ataguba et al.,(2013), Mensah et al., (2014), Wu and Qi (2017), Cho, S., Kim (2017) and Maity (2018) where large family size, low level of education, employment, marital status, literacy, number of economic active member, public infrastructure were found to have significant impact on household poverty.

3. Data Source

This study used information from 3033 households sampled from the Eastern Cape Province obtained during the 2014 General Household Survey. The survey is an annual household census that is usually coordinated by Statistics South Africa. Details of the sampling procedures are explained by Statistics South Africa (Stat SA, 2015). Nevertheless, to be specific, multi-stage design with probability proportionate to size was used during the survey to select primary sampling units and dwelling units. Furthermore, the 2001 population census data were used to stratify the allocated samples by geographical and population attributes at the provincial level (Stat SA, 2015). Information obtained in the GHS include demographic characteristics of households and individuals, education, health, access to public assets, ownership of private assets, household welfare, and household livelihoods among others.

4. Analytical Techniques

In achieving the objectives of this study, three analytical techniques were employed. Alkire and Foster family of multidimensional poverty measure and descriptive analysis (frequency distribution, percentages, charts and tables) was utilized to profile, describe and compare the multidimensional poverty status of both rural and urban households. The Tobit regression analysis was used in identifying and comparing the determinants of multidimensional poverty status between urban and rural households, respectively.

Poverty Assessment: MPI

MPI is an index of poverty which aims to quantify acute poverty, understood as a person's inability to meet simultaneously minimum internationally comparable standards in indicators related to the recently adopted Sustainable Development Goals (SDGs). It reflects deprivations in very rudimentary services and core human functioning of people; it reveals a pattern of poverty other than income poverty and expenditure poverty (Alkire and Santos, 2010).

Table 1: Multidimensional Poverty Dimensions and Indicators

Dimensions	Indicators	Deprivation Cut-Off	Weight
Health	Mortality	If any child under the age of 5 years has died in the past 12 months/5 years.	1/6
	Nutrition	Household Dietary Diversity Score is less than 4	1/6
Education	Years of schooling	Households without at least one adult having at least 5 years of formal education	1/6
	School attendance	Having household children between 7 and 15 not attending school	1/6
Standard of Living	Access to electricity	If there is no access to electricity	1/27
	Fuel for lighting	If household is using paraffin, candles, others of nothing	1/27

Dimensions	Indicators	Deprivation Cut-Off	Weight
	Fuel for water heating	If household is using is using paraffin, wood, coal, dung, others or none.	1/27
	Fuel for space heating	If household is using is using paraffin, wood, coal, dung, others or none.	1/27
	Fuel for cooking	If household is using is using paraffin, wood, coal, dung, other non-clean fuel.	1/27
	Water access	If household have no access to safe water	1/27
	Sanitation type	If not a flush toilet	1/27
	Dwelling type	If household live in an informal shack, traditional, dwelling, caravan, tent or others.	1/27
	Asset ownership	If household does not own more than one of radio, television, telephone or refrigerator and does not own a car and does not own at least one of the two assets	1/27

Source: Adapted from Alkire et al., (2014) and Stats SA (2014)

MPI identifies the poor using a two stage cut-off process. The stages include a sequential use of deprivation cut-off and poverty cut-off. The deprivation cut-off is within dimension cut-off while the poverty cut-off is the across dimension cut-off. A deprivation cut-off was set for each indicator and each household was then identified as deprived or non-deprived with respect to each indicator in each dimension. Weights were then applied to each dimension such that the total weights across all dimensions add up to the number of dimensions. The weighted sum of deprivations for each person was calculated and a second cut-off which cut across all the three dimensions and sets the sum of weighted dimensions in which a household must be deprived in order to be identified as multidimensionally poor was then applied. Following Alkire and Santos (2014), the cross dimensional cut-off with aggregated weight of 0.33 was adopted in identifying multidimensionally poor households. The resulting data were censored such that non-poor households have a value of 0, while poor households have value that is continuous in nature. This study maintained the same three dimensions, but defined thirteen indicators rather than the 10 utilized in Alkire and Foster (2011), for best fit based on availability and the questions asked in the survey utilized. These dimensions and indicators are presented in Table 1. Details about MPI and can be seen in Alkire and Santos (2014). Following Santos and Alkire (2015), the weighted deprivation score (Z_i) computation is simplified following this implicit equation:

$$Z_i = w_{i1}E_{i1} + w_{i2}E_{I2} + w_{i1}H_{i1} + w_{i2}H_{i2} + w_{i1}S_{i1} + w_{i2}S_{i2} + w_{i3}S_{i3} + w_{i4}S_{i4} + w_{i5}S_{i5} + w_{i6}S_{i6} + w_{i7}S_{i7} + w_{i8}S_{i8} + w_{i9}S_{i9}$$

Where w_i is the weight relevant for each component, E_i, H_i and S_i represents the score for each component in each of the dimensions (i.e. education, health and standard of living). It takes the value of 0 or 1.

Tobit Regression

Tobit regression model was used to determine the factors that influence multidimensional poverty among households in the Province. The Tobit regression model was considered appropriate as it takes account of the continuous but truncated nature of the dependent variable (minimum = 0; maximum = 66.03). The Akaike's Information Criterion (AIC) and the Bayesian Information Criterion (BIC) were used to compare the suitability of the Tobit model compared to the Ordinary Least Squares. Following McDonald and Moffit (1980) and Adenuga (2013), a general specification on Tobit model is specified as follows;

$$Y_i = \begin{cases} y_i = \beta X_i + \varepsilon_i & if\ y_i^* > 0 \\ 0 = \beta X_i + \varepsilon_i & if\ y_i^* < 0 \end{cases}$$

Where Y_i is the dependent variable (poor) and it is continuous when household is multidimensionally poor ($it\ equal\ to\ y_i^*$), it is discrete (it equal to zero) when the household is not multidimensionally poor. The weighted MPI score for individual households was used as the regress and as a proxy for multidimensional poverty. X_i is a vector of regressors, β is a vector of unknown coefficients, and ε_i is an independently distributed error term. The regressors specified as determinants of multidimensional poverty are described in Table 2. Likewise, based on the reviewed literature, the a priori expectations/ hypothesis for the regressors in the models are included in Table 2.

Table 2: Specification of Tobit Regression Variables

Variables	Description	Hypothesis	Source
Dependent Variable			
Poor	Recoded weighted deprivation score Z	NA	
Regressors			
Gender	1 if male, 0 otherwise	-	Rogan (2016)
Age	Age of household head	-	Adepoju and Akinluyi (2017)
Education	1 if higher degree, 0 otherwise	-	Adepoju and Akinluyi (2017)
Married	1 if married, 0 otherwise	-	Wu and Qi (2017)
Employment	1 if employed, 0 otherwise	-	Mushongera et al. (2017)
Household Size	Number of people in the household	-	Adepoju and Akinluyi (2017)
Electricity	1 if having access, 0 otherwise	-	Mensah et al. (2014)
Agriculture	1 if engage in agriculture, 0 otherwise	-	Cho and Kim, (2017)
Total Income		-	Mushongera et al. (2017)
Asset Stock	Sum of asset owned	-	Mensah et al. (2014)

Source: Author

5. Result and Discussion

5.1 Socioeconomic Characteristics of Households

Table 3 shows that a higher proportion of the household heads are between ages 41 and 60 years in both rural and urban areas. Going by the distribution of gender headship across geographical location, Table 3 shows that in the rural area, the majority (55.4 %) of female headed households are recorded, which is about 10 % more than male headed households. Whereas in the urban area, majority (55.3 %) of male headed household are recorded. This is expected because most of the able-bodied men in the rural area have migrated to the cities for greener pastures; hence, the household is left for the women to head. Furthermore, the Table 3 which shows the distribution of respondents according to marital status of household head indicates that 42.7% of heads are living together in the urban area, while 35.6 % are in the rural area. It is also surprising, as shown in Table 3, that 33.3 % of the separated are located in the rural area as compared to 16.1 % of same group in the urban area. The high proportion of the separated in the rural area cannot be distinguished from the observed pattern in the country, where people avoid marriages so as to avoid marital responsibilities. It needs to be mentioned that marriage is a panacea for social problems, can improve family welfare and it is imperative for society cohesion basis (Aphofung, 2012). The results of households' educational status, as shown in Table 3, reveal that a larger proportion (43.6 %) of the household heads have education level of between grade 0 and 7 in the rural area, whereas in the rural area the majority (56.9 %) of the household heads have attained an education level between grade 8 and 12, which is secondary education, however, not all of them completed grade 12.

Table 3: Socio-economic characteristics of households

Socioeconomic Characteristics	**Urban n=1468**		**Rural n=1565**		**Pool**	
	Freq.	%	Freq.	%	Freq.	%
Age of Head						
13-40	441	30	385	24.6	27.2	826
41-60	649	44.2	566	36.2	40.1	1215
61 and Above	378	25.7	614	39.2	32.7	992
Mean	49.7		54.1		60	
Gender						
Male	812	55.3	698	44.6	49.8	1510
Female	656	44.7	857	55.4	50.2	1523
Marital Status						
Living Together	627	42.7	557	35.6	39.1	1184
Divorced	57	3.9	26	1.7	2.7	83
Widowed	39	2.7	66	4.2	3.5	105
Separated	237	16.1	521	33.3	25.0	75.8
Single	507	34.5	393	25.1	29.7	900
Educational Attainment						
No Education	83	5.7	244	15.6	327	10.8
Primary	295	20.1	682	43.6	977	32.2
Secondary	834	56.9	557	35.6	1391	45.9
Certificate and Diploma	142	9.7	54	3.5	196	6.5
Higher Degree	113	7.7	26	1.7	139	4.6

5.2 Pattern of Deprivation

One of the inferences that can be made in the process of computing MPI is the pattern of deprivation among households. Figure 1 depicts the areas where deprivations are experienced among households. It is shown that urban households are mainly deprived in the fuel used for space heating and this deprivation can only be experienced in winter period. Moreover, it shows the inability of various urban households to use clean fuel (electricity) in this period of time due to the cost related to the use of various heating devices. Regarding rural area, it is seen that deprivation is experienced across all indicators of MPI, although it is more prominent with respect to space heating fuel, toilet system, dwelling, water heating fuel and cooking fuel.

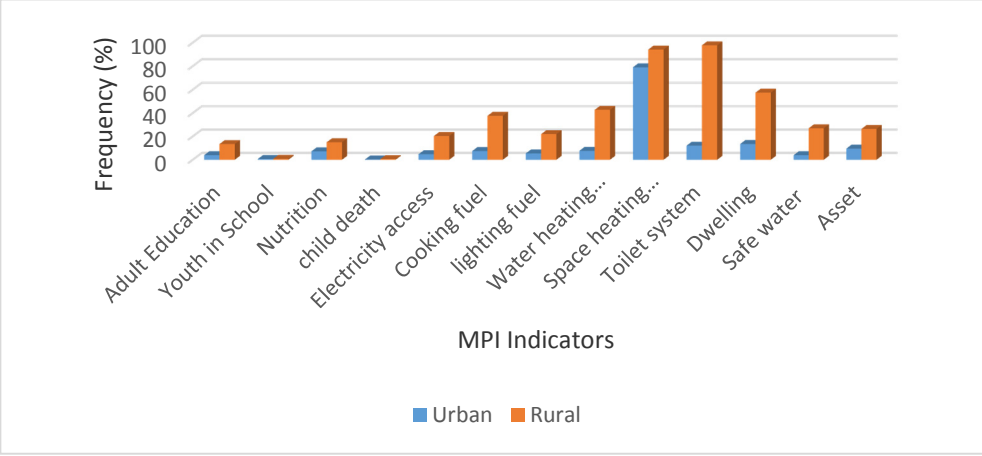

Fig. 1. Distribution of Pattern of Deprivation by Geographical Location

5.3 Multidimensional Poverty

Table 4: Multidimensional Poverty Index for Eastern Cape Province South Africa

Province	H (Incidence) k ≥ 33.3%	A (Intensity)	MPI (H x A)
Urban	0.024	0.428	0.010
Rural	0.153	0.439	0.067
Total	0.091	0.438	0.040

Source: Author's Computation

From the Table 4, 2.4% of households in the urban area are multidimensionally poor while 15.3% are multidimensionally poor in the rural area. This result does not show a severe multidimensional poverty situation in the province. The result is quite similar to the findings in the study carried out by OPHI (2017) where NIDS 2014/15 at national level was utilized. From the study, the proportion of multidimensionally poor household is 3.6% and 17.2% for both urban and rural areas, respectively. Also, the average share of deprivations of the weighted indicators poor households experience at the same time is 42.8% and 43.9% for both urban and rural household.

5.4 Decomposition of MPI by Dimensions and Indicators

As earlier mentioned, one of the benefits of MPI is the ability to decompose across groups. Table 5 shows the contributions of dimensions and indicators to MPI across urban and rural areas, respectively. From the Table 5, the dimension contributing the most to household multidimensional poverty in both urban and rural locations of the Province is the standard of living dimension, but highest in the rural area. This is similar to the finding of Alkire and Santos (2010), where the standard of living was found to be the biggest contributor to multidimensional poverty in the examined MPI of 55 countries out of 104 countries. The higher contribution of the standard of living dimension to MPI in the rural area indicates that rural households lack the most in infrastructural facilities that support welfare. Also, it could be seen that the contribution of dimensions to multidimensional poverty is relatively higher in urban area with respect to education and health domains. This could be as a result of the higher number of people in the urban area who are deprived in the two dimensions than in the rural area. These findings provide insights to the priority areas for intervention in tackling multidimensional poverty in urban and rural South Africa.

Table 5. Contribution of Dimensions and Indicators to MPI at 33% Cut-off

Indicator	Urban	Rural
Dimension 1: Education	**0.289**	**0.222**
Adult Education	0.256	0.210
Youth in School	0.033	0.011
Dimension 2: Health	**0.256**	**0.196**
Nutrition	0.245	0.188
Child Death	0.011	0.008
Dimension 3: Standard of Living	**0.455**	**0.583**
Electricity	0.052	0.050
Cooking Fuel	0.064	0.073
Lighting Fuel	0.059	0.052
Water Heating Fuel	0.064	0.071
Space Heating Fuel	0.087	0.083
Toilet System	0.030	0.084
Dwelling	0.035	0.070
Safe water access	0.005	0.039
Asset	0.059	0.060

Source: Author's Computation from GHS 2014

5.5 Tobit Regression Estimate on Determinants of Multidimensional Poverty

The AIC and BIC statistics for the Tobit regression is 2865.242 and 2929.494 respectively, whereas that of OLS is 12679.04 and 12737.94, respectively. Tobit regression is considered suitable because of the lower values of AIC and BIC, respectively. The result of the Tobit regression result is presented in Table 6. In the modelling, the existence of multicollinearity among the variables was initially investigated. The choice to include a variable was made by examining the variance inflation factor (VIF) statistics. Any variable with VIF of 10 or more is removed from

the model. The VIF statistics of variables in the regression are presented in the Table 6. While the average variance inflation factor (VIF) for the model was 1.54, none of the variables have a VIF greater than 10. This suggests the non-existence of multicollinearity problem in the model. Table 6 further revealed that factors that determine poverty among rural households are gender of head, education attainment and employment status of head, access to electricity, household engagement in agriculture, household monthly income and asset stock; whereas in urban households' multidimensional poverty determinants are only education attainment of head, household access to electricity and asset stock.

The coefficient of gender is statistically significant ($p<0.05$) and positive for rural households only. This implies that if all other factors are held constant, rural household headed by men have about 10.7% chances of becoming multidimensionaly poor. This is contrary to the notion that due to the continued presence of discrimination against women in the labour market, lower education, lower salaries (Anyanwu, 2014) and the poor access to assets and resources by women, men are likely not to fall into poverty when compared to their female counterpart. A reason for this is because the majority of households in the rural areas are headed by women, and since women are considered vulnerable in the society they have better access to government support than men, this could aid their household welfare, thereby making them less open to poverty. Moreover, having a male as the head who has control over resources of the household, the finding suggests that the utilization of resources by these male headed households does not have any significant impact on the welfare of household members.

Table 6. Tobit Regression estimates for Determinants of Multidimensional Poverty

Variables	**Urban**		**Rural**		**VIF**
	Coefficient	P-Value	Coefficient	P-Value	
Constant	-7.2067	0.825	14.3909	0.342	
Gender	3.1674	0.802	10.7123	0.042**	1.42
Age	-0.2729	0.568	-0.0714	0.662	1.56
Marital Status	4.4508	0.753	-5.5617	0.335	1.46
Education	-45.6668	0.000*	-32.521	0.000*	1.74
Employment	-2.9269	0.669	-4.07558	0.159	1.48
Access to electricity	20.0423	0.004*	16.7229	0.000*	1.22
Agriculture	-326.0059	-	-9.1406	0.075***	1.22
Monthly Income	-0.0009	0.775	-0.0029	0.039**	2.02
Household Size	2.4940	0.290	- 0.0898	0.922	1.00
Asset stock	-19.2861	0.000*	-19.3081	0.000*	2.25
Sigma	55.4398	-	53.06776	-	
Number of obs.	1467		1563		
LR chi^2	170.01		411.25		
Prob > chi2	0.0000		0.0000		
Log likelihood	-244.0731		-1420.6208		
Pseudo R^2	0.2583		0.1264		

*, **, and *** denote significance of estimated coefficients at 1, 5, 10% levels of significance respectively.

The coefficient of education variable is statistically significant ($p<0.01$) and negative to both urban and rural households. This is consistent with the expectation of this study and the findings of Adepoju and Akinluyi (2017), Oyekale et al., (2012), Anyanwu (2014) and Twerefou et al. (2014). The result indicates that households in both urban and rural areas having a head that is more educated are less likely to become multidimensionally poor. Education is an enabler; it empowers a head with skills and requirements for employment opportunities and earning a living. Specifically, education is linked to labour force participation and its relationship to poverty could be established through the labour market, labour productivity and wages (Oyekale, et al., 2012; Anyawu, 2013). Moreover, a low level of the household head's education could hinder the ability to accumulate wealth and could lead to a vicious cycle of multidimensional poverty, which can affect the head's generation. The result of this study also indicates that having access to electricity increases the chances of becoming multidimensionally poor in both urban and rural areas. This is inferred from the coefficient of access to electricity that is statistically significant ($p<0.05$) and positive. Though this is contrary to the a priori expectation of this study, it could however be as a result of the cost attached to the usage of electricity. As a component of household expenditure, electricity consumption cost could increase or decrease household expenditure, or limit the benefit of electricity access. For instance, in order to minimize cost of usage, households would be unable to use electrical gadget that consumes more, especially for space heating and water heating and most likely discourage the long period of home cooking; households would thus resort to the use of unclean fuel or stay without warmth, which could household members health. This is similar to the finding of Gounder (2012) carried out in Geutamela, where access to electricity by household was found to lower per capita consumption of households. High electricity price and subsequent high consumption cost impact consumption on other necessary goods and services.

Furthermore, engagement in agricultural activities significantly reduces the probability of being multidimensionally poor, though the expectation is consistent for rural households only. This is inferred from the coefficient of agriculture that is negative and significant at $p<0.10$. The coefficient implies that all the other factors which held constant engagement in agricultural activities reduce the probability of being multidimensionally poor by about 9.14%. This emphasizes hypothetical arguments and empirical evidences that agriculture can be used as a tool for reducing rural poverty. This is so because, unlike the urban households, most of the rural dwellers engage in agriculture and they depend on it as a key source of their livelihood (Cervantes-Godoy and Dewbre 2010; World Bank, 2008). Among the variables that were investigated, household monthly income parameter is negative and statistically significant ($p<0.05$) for rural household only. This implies that, if other variables are held constant, the probabilities of becoming poor are reduced as household income increases in the rural area of the province. The magnitude of effect is, however, minute, meaning that the rural household income is quite minute to allow household achieve desired welfare.

In addition, the coefficient of asset ownership of household is with a negative sign and significant ($p<0.05$) for both urban and rural households, as expected. This implies that, if other variables are held constant, the more assets a household owns the less likely they are to be multi-dimensionally poor. This is because asset ownership is both of economic advantage and a source of social prestige.

Accumulated assets could be sold or used as credit collateral in times of crises, shortages or distress; it could also be used to get extra income through service provision or rentage. Simply put, asset is a store of wealth. Carter and Barret (2006) mentioned that insufficient access to assets jeopardises the long-term ability of households to pull themselves out of poverty. Carner, 1998, Ellis, 2000 and DIFID, 2000 explained the indispensable role of household asset in household livelihood and welfare in their sustainable livelihood framework analysis. Accordingly Anderson (2012) buttressed that asset endowments provide a cushion against income shocks, are a source of future income and consumption streams and are generally indicative of future economic wellbeing of households.

6. Conclusion

This paper empirically assessed multidimensional poverty status and it also identified the determinants of households' multidimensional poverty in the Eastern Cape Province of South Africa. The descriptive statistics result revealed that though the multidimensional poverty is low in both geographical locations of the province, the intensity of multidimensional poverty is however high. The study further shows that the standard of living dimension is the highest contributor to multidimensional poverty in both urban and rural areas, but it is highest in the rural area. It is, however, surprising to observe that the respective contribution of education and health dimensions to multidimensional poverty is higher in the urban area than the rural area. The Tobit regression result indicates three similar poverty influencing factors (education attainment of household head, access to electricity and asset stock) in both geographical locations. The study clearly revealed the need for intensification of rural development programmes by the Provincial government. These programmes should also focus on addressing the standard of living indicators like providing access to clean fuels, affordable and improved dwelling and toilet system. Enacting policies that promote education for all, aid asset accumulation for the poor and expansion of electricity subsidies coverage, especially during winter period, could facilitate reduction of multidimensional poverty in the Province. Additionally, since reducing poverty through agriculture can be achieved in the rural area only, continual government transfers to rural households could be conditioned to household engagement in agricultural activities and this could facilitate household engagement in agricultural activities. This paper contributes to deeper understanding of poverty dynamics at the subnational level in South Africa by using Eastern Cape Province as a case study, a province that is known for a long standing and prevalent poverty incidence. Given that the standard of living dimension contributes more to multidimensional poverty and are connected to services provided by the Provincial government, this study thus argued that an incorporated approach to service delivery is key to reducing multidimensional poverty in Eastern Cape Province. This as well will eliminate social services related protests in the Province. Aside, following the submission of the World Bank (2016) that the global poor in developing countries are predominantly rural, young, poorly educated, mostly employed in the agricultural sector, and live in larger households with more children, the contribution of this study is in its advocacy for policies that could stimulate the improvement in significant factors (education, electricity access, asset accumulation and rural development)

that have influence on multidimensional poverty, both in the rural and urban sector. The poorly educated today could have been caused by poor education opportunities or poorly educated parents, and could also lead to poor education of offsprings in future; hence, leading to a generational transmission of poverty. Considering the importance of education as established in this study, developing regions outside Africa that have a higher incidence of poverty should enact policies that limit the minimum education level a child or individual must attain. This level must have been proven to be a threshold that could reduce the tendency of poverty. Aside education, access to electricity which is also a bane in developing countries, especially South Asia, stands out as a very significant factor in this study. Expanding access to electricity by providing access to off-grid non-renewable energy sources (solar) and provision of subsidy in order to own solar panels through public-private partnership and increasing the capacity of solar panels beyond lighting alone have a positive impact in the fight against poverty in the long-run in developing countries outside Africa. Also, the study significantly identifies the role of asset accumulation for multidimensional poverty reduction, which is equally important for other regions with high incidence of poverty. The study here emphasizes that sustainable public-private partnership programmes and projects could be implemented in order to assist the poor utilize various resources at their disposal for self-sufficiency and income generation, which is indispensable for asset accumulation. An approach that combines partial support from government or private agencies and any available resources from the poor to ensure the commitment of the poor could be adopted in this regard in these regions. The application of Alkire and Foster multidimensional poverty measure by researchers, development partners and governments will in no doubt aid in the global pursuit of reducing extreme poverty in all its' dimensions by the year 2030.

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THE 20 KEYS METHODOLOGY – CONTINUOUS IMPROVEMENT FOR ORGANIZATIONAL EFFICIENCY

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Abstract: Increased organizational efficiency should be one of the main strategic goals of every business. Ways of achieving it differ and one of the many choices is to improve business operations using available tools such as the "20 keys methodology". This methodology is used to achieve strategic goals through the enhanced speed of learning and innovation. The aim of this paper is to look at the potential of 20 keys methodology for the improvement of company's organizational efficiency in today's global market. This integrated set of different tools is intended to increase the company's efficiency and level of quality with synchronized cost reduction. 20 keys tend to eliminate various "wastes" in production processes to improve buyer's satisfaction and motivate employees to act towards achieving company's goals. Eventually, the methodology application should ensure a sustainable development, profitability, and integrated approach to competitiveness and long-term success of the company. The paper examines the implementation of the 20 keys methodology in Croatia and presents one case of a local production company using the methodology aiming to increase the organizational efficiency. Further research proposals are brought to confirm the potential influence of methodology on organizational efficiency.

JEL classification: D24, M29, O33

Keywords: process improvement, operations management, 20 keys methodology, cost reduction, organizational efficiency

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1. Introduction

Due to a growing complexity of businesses eco-systems, companies don't compete anymore only by prices of their products or services but also by the capability to recurrently improve their processes and products (Teece, 2007). Companies are trying to improve their organizational efficiency by improving their processes which can lead to lower prices of the final product or service. Further on, it is necessary to create and maintain a positive attitude of employees and finally to assure the top management support (Ivanova et al. 2014). To achieve these goals, certain management tools and methodologies can be (and are) used. Some of the most well-known ones include ISO standards (especially standards ISO 9000 and ISO 14000), Balanced Scorecard; Business Process Reengineering or Business Process Improvement, European Production System, Lean Manufacturing, Just in Time, Continuous Process Improvement, Single Minute Exchange of Dies, Total Quality Management, Total Productive Maintenance.

Although these approaches can help companies in the endeavor to continuously improve their processes, products, and services, some of the approaches are more common to the product-oriented companies and some are more common to the service-oriented companies. It is important to state that companies are always trying to find an approach which is the most suitable for their needs. Companies are trying to be better from inside through better operations management (of their processes). Thus, it is important for the companies to have an operational strategy of continuous incremental improvement (Gilmore, 1990).

During the first decade of the 21st century, the 20 keys methodology was introduced in Croatia and several companies implemented some of the "keys" aiming to improve their organizational efficiency. This paper aims to explore the importance of the 20 keys methodology as a way of continuous improvement and increasing organizational efficiency. After the introduction, we define continuous improvement and state its characteristics. In the next part, 20 keys methodology is defined, and all keys are presented. Fourth part gives an example of a Croatian company which has implemented 20 keys methodology and shows how this tool has influenced their organizational efficiency. Finally, in the last part, we will present the conclusion and give recommendations for further research on this important topic.

2. Continuous improvement and organizational efficiency

2.1. Continuous improvement definition and characteristics

Continuous improvement is a broadly used expression which has been used to describe different meanings in today's economy. Some people see continuous improvement as a synonym to innovation since it can be connected to the pursuit of better service, processes and products, some connect it to organizational renewal or redesign programs and for some, it relates to a quality improvement and waste reduction (Besant and Cafyn, 1997). Its roots can be found in the initiatives of several companies made in the 1800s (Bhuiyan and Baghel, 2005). These authors also stated that early continuous improvement activities were connected to different principles in relation to work improvements, while today's continuous improvement is more

connected to planned activities. Continuous improvement is a holistic concept and therefore it is not strictly limited to any precise activity, department, or function in the company (Gilmore, 1990). Improvements can be made all over the company from the production line and warehouse, maintenance to the offices and support activities. Thus, the possibilities to improve operations within the company are endless. Continuous improvement can be defined as an *integration of organizational philosophy, techniques, and structure to achieve sustained performance improvements in all activities on an interrupted basis* (Gilmore, 1990: 21). Anand et al. (2009: 444) defined continuous improvement as a *systematic effort to seek out and apply new ways of doing work i.e. actively and repeatedly making process improvements.* As the company accepts continuous improvement as organization-wide approach it results in improved quality of doing business which eventually leads to a reduction of expenditures for quality and finally to increased company's competitiveness. Bessant defined continuous improvement as a *company-wide process of focused and continuous incremental innovation* (Bessant et al, 1994: 18). This definition presents incremental innovations as continuous improvement dynamo and they are represented by small step advancements and shortchanges cycles which, if observed separately, have a small effect but as a system induce a substantial influence on overall company's performance. Some authors (Besant *et al.,* 1994; Bessant and Caffyn, 1997) have shown the need for a different approach to the implementation of continuous improvement in organizations and for further research about the continuous improvement concept and process dynamics (Gilmore, 1999). Although there had been a growing interest in the implementation of continuous improvement in organizations at the end of 20th century, Savolainen (1999) found the lack of a sound theoretical foundation for this activity. The situation has changed during the last 20 years, so the importance of continuous improvement activities gained their place not only in business practice but also in related research activities. Wu and Chen (2006) found different goals in their study of continuous improvement in organizations. (Table 1)

Table 1. Goals of continuous improvement

Goals	**Study**
Company-wide focus to improve process performance	Deming, 1986; Imai, 1986
A gradual improvement through step by step innovation	Caffyn, 1999; Berling, 2000; Brunet and New, 2003
Organizational activities with the involvement of all people in the company from top managers to workers	Imai, 1986; Bessant and Caffyn, 1997
Creating a learning and growing environment	Pervaiz, Loh, and Zairi, 1999; Delbridge and Barton, 2002

Source: adapted from Wu and Chen, 2006

Other studies relate to improvement in materials (Scutaru, 204), energy use efficiency (Oh and Hildreth, 2014), process improvements (Gijo and Scaria, 2014) and environment (Comoglio and Botta, 2012). It is important to state that in recent time and (recent) research there is more studies connected to the continuous improvement methodologies such as Lean thinking (Atkinson, 2004; Wang and Huzzard, 2011;

Erceg and Dotlić, 2013) Six Sigma (Linderman et al, 2003; Arnheiter and Maleyeff, 2005; Borror, 2008; Pepper and Spedding, 2010), Lean Six Sigma (Bendell, 2006; Snee, 2010; Anthony, 2011; Drohomeretski et al., 2014) than to continuous improvement itself. All stated researches looked at benefits companies gain from methodologies and tools and reasons for their usage.

The study conducted by Mendelbaum (2006) showed that only 11% of companies found that their continuous improvement initiatives were successful. Operations management managers understand the significance of continuous improvement processes, but they have found that handling continuous improvement is a thought-provoking mission (Pullin, 2005). The biggest challenge is to create a structure for a continuous improvement projects coordination (Choo et al., 2007). Continuous improvement is a constant motion meant at increasing the level of organization-wide performance through fixated incremental process changes (Wu and Chen, 2006). One of the most important characteristics for success and competitiveness of the business is its capacity for effective implementation of continuous improvement tools and methodologies (Salah, Carretero and Rahim, 2010) and this is even more important in times when the competition on the market is increasing. Thus, the amount of process optimization and company's advancement can be significantly important not only for company's competitiveness but also for its survival. In their study, Anand et al. (2009) stated that when properly executed, the continuous improvement helps with an operational process integration and improvement of company's capability to make consistent and rapid process changes for performance improvement. They showed how initiatives for continuous improvement can be used as dynamic capabilities for improving organizational performance. Bessant et al. (2001: 75) in their conclusion stated *that the continuous improvement is of considerable strategic importance, but that its management is often poorly understood*. They presented stages of the evolution of continuous improvement behavior in organizations. (Table 2)

Table 2. Stages in the evolution of continuous improvement

Phase	**Description**
Level 0	No continuous improvement activities
Level 1	Trying out the ideas
Level 2	Systematic CI capability
Level 3	Strategic CI capability
Level 4	Proactive CI capability
Level 5	The learning organization

Source: adapted from Bessant et al., 2001

Sanchez and Blanco (2014:986) concluded that continuous improvement importance in the business environment is motivated by *changes in the business environment, the emergence of new management systems and the importance of quality management itself*, while Khan et al. (2018) state that the continuous improvement should be looked upon as a concept for process improvement, new ideas creation and investments in technology.

2.2. Different methodologies for continuous improvement

During last several decades and due to the growing need for improvement of businesses, several continuous improvement methodologies were based on an elementary concept of process and quality improvement to simplify the production, improve quality and reduce the waste in organizations processes (Bhuiyan and Baghel, 2005). Continuous improvement researchers stated many ways for organization's processes improvement and some of them include Kaizen (Jacobson et al., 2009), Six Sigma (Anthony, Kumar and Madu, 2005), Deming Cycle (Dhafr et al., 2006), Total Quality Management (Sirinivasu et al., 2010), Balanced Score Cards (Dabhilkar and Bengtsson, 2016) and Lean Production (Deming, 2012). The most known and widely used by different industries are Lean thinking and Six Sigma. Arhneiter and Maleyeff (2005) refer to them as the-state-of-the-art methodologies and Kumar et al. (2008) state it has the biggest impact on business and processes. The third methodology Lean Six Sigma is a so-called hybrid, the result of the integration of Lean and Six Sigma (Snee, 2010). This methodology is very well accepted and known (Bhuiyan and Baghel, 2005). Continuous improvement can be achieved with the abovementioned methods in following ways: by reduction of defect rates; by reduction of response time; by products, services and operations evaluation; through the involvement of customers in product design; by productivity increasing; by quality performance improvements; by increasing employees' work commitment and by cost reduction (Khan et al. 2018).

The 20 keys methodology has been more commonly used lately. It contains 20 different tools for the continuous improvement and an increase of competitiveness. Some of the tools are part of other methods for continuous improvement activities.

3. The 20 keys methodology

The 20 keys methodology is based on Toyota production system (Kobayashi, 1995) and was developed in Japan in 1980-ties. It enables easier accomplishment of company's strategic goals development of human and organizational potentials and is an excellent start for the reorganization of the entire company. Bicheno (2004) defined 20 keys as a company-wide process of focused and continuous incremental innovation leading to a culture of sustained improvement and elimination of waste in all systems and processes. The name comes from 20 tools and different techniques which can be used in different situations and areas in the company. *The keys are an agglomerate of different tools and techniques which are already well known in the world, but they are incorporated into a common system of evaluation, visual reporting, monitoring of results, and work organization* (Dabić, Orac, Tugrul, 2016: 4). The methodology encompasses the entire company, i.e. all employees at all levels, and is focused on constant improvement. The 20 keys methodology is an integrated approach to achieving the company's strategic goals, covering all areas of business and not just individual (Gider,2004). The system encourages synergic effects within different business areas and successful and long-lasting improvements in business operations and can be an excellent introduction to lean thinking (Kobayashi, 1995). One of the goals of the 20 keys is to eliminate all the unnecessary actions, i.e. serve to direct and manage the organization about quality, delivery times and costs. (Pipunić and Grubišić, 2014) Using this method leads to increased productivity, quality enhancement,

cost reduction, increased flexibility and adaptability to market changes, increased customer satisfaction as well as suppliers, focus on efforts to improve, grow in innovation, and ultimately leads to increased profits (Primorac, 2005). Although from the keys' names it may look like this methodology is intended only for manufacturing companies, experiences from different countries are showing that this methodology is effective also in different service companies with a small adaptation of several keys (Gider 2004). It is important to state that although 20 keys methodology is accepted worldwide there are not a lot of research papers covering the influence of the methodology on the company efficiency or competitiveness in the market (Dabić, Orac, Tugrul, 2016).

Kobayashi (1995) developed Practical Program of Revolutions in Factories (PPORF) as a result of his work with companies in their pursuit of improvement. The basic principles of implementation program of PPORF are presented in his 20 keys relations diagram where all the keys are presented together with their relationship.

Every tool (key) of this methodology is contributing to the main long-term goal which is a profit. The main consideration of every key is continuous improvement and accomplishment of the company's goals and due to methods' completeness can be considered as a quality management model. Bastleer (2011) stated four basic keys which are building a block of the methodology:

- Key 1 - cleaning and organizing - everything starts with order and cleanliness
- Key 2 - rationalizing the system/management of objectives - set goals and ensure that everybody in the company knows what his/her responsibility is to achieve these goals
- Key 3 - improvement team activities - provide a culture within which team activities can be set up to organize the improvements
- Key 20 - leading technology/site technology - everything stands and falls with the speed at which an organization can successfully adopt new technology

There are 4 keys linked to the characteristics that make a production system excellent, i.e. better, faster, and cheaper. Keys 11 (quality assurance system), key 6 (manufacturing value analysis) and key 19 (conserving energy and materials) and key 4 (reducing inventory) are keys.

The main areas 20 keys are focused on can be divided into five groups. (Table 3)

Table 3. Key categories

Group	**The main goal of the keys group**	**Keys**
Costs	Reduction of costs	6 Operations Kaizen 13 Waste eliminating 14 Employees empowerment to make improvements 17 Control of efficiency 19 Energy and material conserving
Delivery	Improving the process flow/reduction of stock / faster delivery	5 Quick changeover technologies 4 Lowering work-in-process (WIP) 8 Coupled manufacturing/production 16 Scheduling of the production

Group	The main goal of the keys group	Keys
Motivation and security	Workplace energizing	1 Cleaning and organizing to facilitate work 2 Alignment of goals and rationalization of the system 3 Activities in small groups 10 Discipline at workplace
Quality	Quality improvement	7 Zero monitor manufacturing/production 9 Machinery and equipment maintenance 11 Assurance of the quality 12 Development of suppliers 15 Skill versatility and cross-training
Technology	Development of technology	18 Information systems use 20 Leading technology/site technology

Source: adapted from Deloitte, 2004

If a company wants to achieve a continuous improvement and to keep the long-term business success, all previously stated keys should be implemented. However, in practice, most of the companies that are using 20 keys methodology don't introduce all keys at once. It is important to state that this methodology uses a benchmarking for its implementation and an evaluation of success rate (Dabić, Orac, Tugrul, 2016) and this is probably one of the main reasons why the concept is gaining acceptance in manufacturing organizations (Bicheno, 2004). The key to the methodology of 20 keys is that it easily evaluates and compares companies from different countries and different industrial areas (Gider, 2004). The system includes simple evaluation schemes and steps to gradually increase ratings across all 20 business areas.

De Morny (2014) found that 20 keys methodology enables every employee at all company levels to be part of their own company benchmarking. Methodology acts as an enabler for reaching constant improvement goals and simultaneously focuses on organizational climate for employees' initiative and motivation. Main benefits of implementing 20 keys methodology are enhancing competitiveness, market share, customer satisfaction and profitability (Kobayashi, 1995; Petrarolo, 1997; Dabić, Orac, Tugrul, 2016).

The methodology is most widely spread in Japan, from where it has expanded in Europe during the last decade. With adaptations to European culture, it was introduced by German, Dutch, British, and Spanish companies.

4. Research methodology

The research presented in this paper was conducted within one Croatian company. First part of the research was done with the help of management board with whom we have done secondary research i.e. used company information for creation of analyses of different keys influence on improving company's efficiency. We have used internal checklists from production (i.e. education lists, mold change

lists, energy use data and invoices for used energy, injury reports, a suggestion for improvement data, profit-loss statements, etc.) Primary data were edited using MS Excel software. During the examination of the documents, we used basic statistics techniques to prepare graphs.

For the second part of our research, we made interviews with several employees working for the examined company. With secondary research, we have received basic information and statistical data about 20 keys methodology influence on organizational efficiency. Interviews were used to get employees own insights about what company has accomplished. Since this paper is focused on company's and employees' perception, conducting interviews helped us to get more qualitative information on changes before and after 20 keys methodology implementation.

For the interviews, we used the CAPI method. This is interviewing technique where interviewer uses a computer for answering questions and is preferred over telephone interviews. During the second part of the research, we have interviewed 8 employees (i.e. 2,2% of the total number of employees) from the different backgrounds and working in the different management levels. Since the research was done with the approval of the managing board, the sample was intentionally created by the company who gave us the list of the people with whom we did interviews. The way the sample was created and the number of the people in the sample is one of the deficiencies of our research. In our sample, we had 7 men and 1 woman since the Plamen mainly employs men. Their age was from 20-30 (3); 31-40 (3) and 41-50 (2). For most of the interviewed people, (6) Plamen was the only workplace of and for two this was the second place of employment. Out of 8 interviewed employees, 1 was a member of the board who oversaw the project implementation, 2 were middle management and remaining 5 were production workers.

The research instrument consisted of eight questions starting with demographics and position in the company. Next, we asked about their involvement in 20 keys implementation project and their opinion about it. Finally, we were interested to hear about their insights about changes 20 keys brought to the company in total, influence on their work position and to them as an individual. Each of the interviews lasted for 25 minutes and they took place in May 2017. The interview questions allowed more profound understandings of how 20 keys influenced changes in employees' behavior and improved organizational efficiency.

5. Implementation of 20 keys methodology in Plamen Požega

The 20 keys methodology was implemented in more than 40 companies in Croatia between 2004 and 2010. Croatian Ministry of Economy, Labor, and Entrepreneurship partially financed the implementation of the methodology (Ministarstvo gospodarstva, rada i poduzetništva, 2004) and Delloite was the company in charge of implementation. Dabić, Orac, and Tugrul (2016) conducted a research on companies that implemented 20 keys in Croatia in which they have been looking for changes in performance, growth in revenue and increase in employee's motivation. The research showed that companies which had implemented 20 keys produce better financial results and higher rates of growth in relation to the standard figures of Croatian companies within the same industries.

One of the companies that implemented 20 keys methodology was Plamen Požega. Company Plamen has 85 years long tradition of production of cast iron products. They are one of the largest iron foundries and biggest and only producer of household appliances in the domain of heating bodies in Croatia. The foundry produces various types of cast iron castings for own need and for sales, in accordance with quality standards EN-GJL 200 and EN-GJL 250. Annual production is about 20,000 tons. It specializes in the production of thin castings, as a component of stoves, ovens, boilers, and fireplaces. Based on the tradition of skills and knowledge and with the application of modern technology, a home appliance factory has been developed, with an annual production of 60,000 units. Most of the program refers to individual heating of rooms - stoves, fireplaces and solid fuel stoves. The company is privately owned and employs around 370 workers. Plamen is an export-oriented company and over 70% of production is exported to the EU and other European countries.

The company introduced a 20-key method to increase productivity, quality, reduce costs, increase flexibility and to adapt to market changes and more efficiently respond to customer requirements. It is important to state that the company doesn't need to implement all available keys. They worked on keys which would have had the greatest influence on the company performance when implemented and thus, they only implemented following keys: 1, 3, 4, 5, 6, 8, 10, 11, 12, 13, 15, 16 and 19. In the next part of the paper, we will discuss how the implementation of keys influenced Plamen's performance and help them in increasing their competitiveness.

5.1. Keys 1 and 10 – Cleaning & Organizing / Time Control & Commitment

Plamen continued with conduction security checks in the company. During this period 50 checks were conducted in Enamel section and they involved 230 employees. Noticed security problems were corrected either immediately by workers themselves or in agreement with maintenance and top management.

Total number work-related injuries have dropped significantly since the year 2000 when there was 53, to 10 in 2009 (start of 20 keys project) and to only 1 in 2015. Risk assessment was made for every workplace with the goal to harmonize the employment contracts with the needs of the work organization and occupational safety. The process of risk assessment included all stakeholders (different departments, employees, management) and they looked upon all possibilities (new employees starting to work in Plamen, change of the workplace, return from sick-leave, imminent threat of disability, etc.) of potential work injuries.

5.2. Key 3 – Small group activities

Every employee can contribute to the workplace advancement with their knowledge and useful suggestions. Therefore, employees are encouraged to speak honestly and openly through which they can cooperate more effectively and jointly and with that making it easier to solve the problems that have arisen. Through such a relationship a growing sense of belonging to the group and encouraging the competitive spirit. Small-group meetings are held daily with topics such as yesterday's results, today's plan, problems, achievements, information gathered by the group supervisor which could be interesting for a department. During 2015 employees made 246 suggestions for improving work process in the company out of which 123 has been

accepted. From the start of the project, employees made more than 2.200 suggestions out of which 1106 has been accepted. It is important to state that every employee whose suggestion had been accepted was rewarded financially. Most of the suggestions were given in June and December of each year.

5.3. Key 11 - Quality Assurance

The aim of Key 11 is the creation of a work environment focused on discovering the root cause of the problem and developing faultless production. Seven quality control tools help the company in finding the underlying causes of errors and preparing and introducing SOP (standard operating procedures) for removal of recognized errors. The company uses fishbone diagrams to focus efforts on finding the cause of problems that offer the greatest potential for improvement. They focus on the content of the problem, include a team that builds support for the resulting solution and it is important to focus on causes rather than symptoms. Pareto analysis is also used to identify, investigate and visually present all the possible causes associated with the problem as the major cause was discovered. This analysis helps them focus on the greatest impact of the cause, based on the principle that 20% of the source causes 80% of the problem, and visually displays the relative importance of the problem. The checklist enables the team to systematically collect and process data to clearly determine the pattern and trends. This creates intelligible data, a clearer picture of the facts, and marks the patterns inside the data. The company was looking for the satisfaction of their buyers and the average grade of buyer's rating in 2015 was 3.13 while the target set for 2015 was 3.14. This result has been increasing steadily from 2010 when the 20 keys implementation started so this change can also be related to the project.

5.4. Key 5 – Quick Changeover Technology

The company tested scoring threads with a tap for gray cast iron which can be used for scoring threads without lubricants. The test was carried out on the casting EK-87 with the Cherry basement using the M6 marked TICN M6. The usage of new taps showed improvement for 5 seconds in production time of the operation. It is important to state that these TICM M6 taps are more expensive than regular taps as they are making savings in time of drilling cast iron. For this test, the company used 1016 drip-molding with 4 threads and that is a total of 4064 threads. The total of time-saving was 1,41 hours for a tested number of pieces. This increases a work productivity and allow the company to finish the job faster and save workers time for other products, therefore, making this product cheaper.

5.5. Key 12 –Developing your Suppliers

Activities undertaken within this key contain work on intensifying communication with external suppliers to find new, more favorable, suppliers and provide new competitive bidders for more materials. Eventually, more favorable suppliers were found, and savings were made, but the quality of the equipment ordered never came in question. With a saving on supply side company was able to invest in the technology and marketing and lower the price of a final product which made them more competitive on the market.

5.6. Key 15 – Skill Versatility and Cross Training

The variety of skills, gained through planned training, contribute to the faster achievement of company's plans and goals, but also facilitates responses to customer requirements. All the groups together had set a 260-point improvement plan, out of which 213 was achieved or 81.92% of the planned. The best groups were: drilling (23 of 23 planned points), foundry 2 (22 of 24) and foundry 3 (23 of 25) and on the other side groups with the smallest achievements include: montage (3 out of 6), supply (5 out of 9) and model (4 out of 7).

5.7. Key 19 –Conserving Energy and Materials

The focus of this key is on saving energy and materials to increase a cost efficiency and continuously increase profitability.

Table 4. Cost of energy (electrical energy and gas)/kg of good products

Year	Cost (HRK/kg)
2013	1,43
2014	1,15
2015	1,10

Source: authors research, 2017

From 2013 to 2015 there has been a decline in electricity consumption per ton of melted cast from 613 kWh to 601 kWh. It is important to state that the electricity consumption in 2009 before implementation of 20 keys methodology was 641 kWh/t of the melted cast and in 2002 it was 840 kWh/t. The company has managed to decrease a use of electricity in 6 years for more 6%. Key 19 led to a significant reduction in energy consumption per ton of melted cast. Along with the increase of production during the examined period, the company saved more than 300.000 HRK in electricity consumption only.

5.8. Other keys: 4, 8, 16 – Flow keys (Reducing Work-In-Progress, Coupled Manufacturing, Production scheduling); 6/13 - Kaizen of Operations / Eliminating Waste

The company set a goal for value of Work-In-Progress (WIP) for 2015 at 5,1 million HRK. Currently, the value of WIP is around 7 million HRK so the company should do some work to lower a WIP inventory and reach set goals which will help the free the money currently frozen in the WIP inventory.

Figure 1 shows the increase in value-added activities in different departments of the company. This increase means that there is less *waste* in company's processes. This is the result of the continuous improvements company have been doing in accordance with keys 6 and 13. Results from those keys help the company in establishing and preparation of Standard operating procedures (SOP) representing currently the best possible way of doing certain tasks and activities in the company. These documents include tasks, basic steps, quality checks, protective gear and needed education. SOP is a starting point for further improvement activities and they are evaluated by the employees.

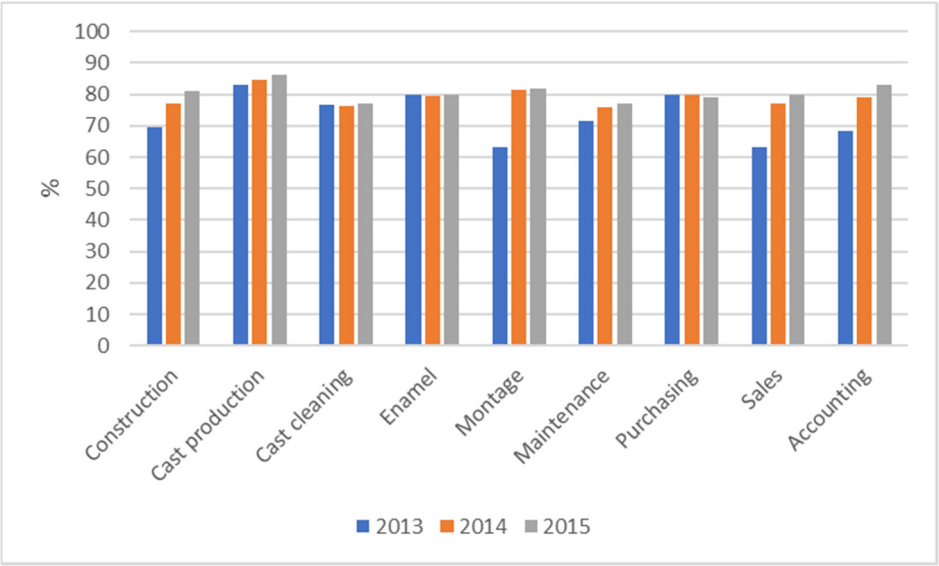

Fig. 1. Value added activities change

Source: authors research, 2017

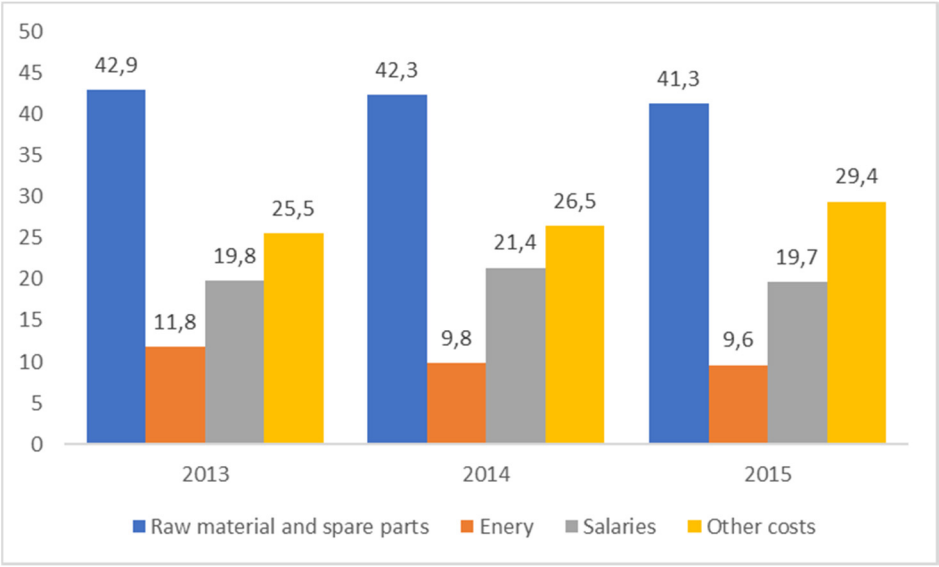

Fig. 2. Company costs

Source: authors research, 2017

Figure 2 presents company costs in Plamen from 2013 to 2015. Data presented shows a decrease of all costs despite the production growth. This indicates that the use of 20 keys is helping the company in decreasing costs of business while helping it to grow.

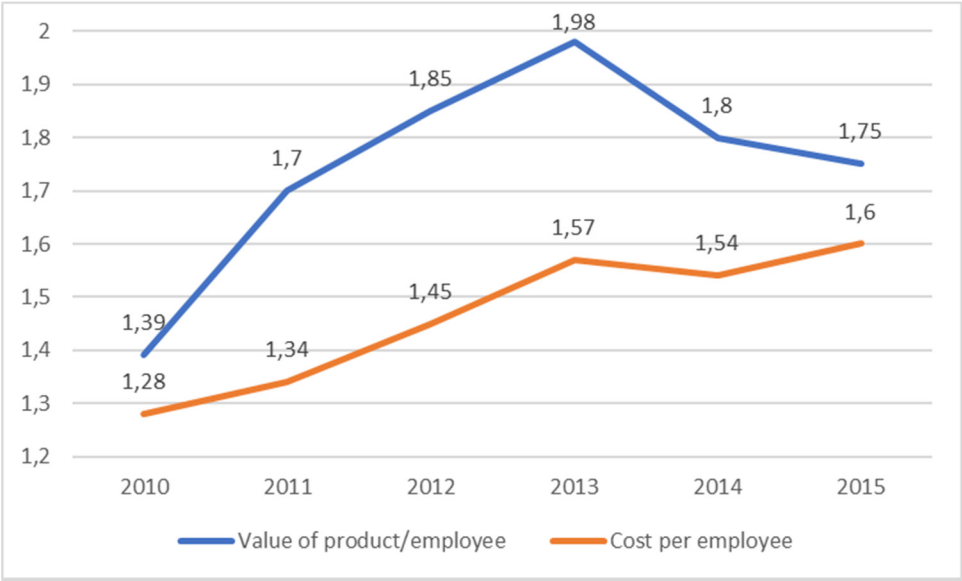

Fig. 3. Productivity indicators

Source: authors research, 2017

There is the growth of productivity indicators is present from the time company started 20 keys implementation (a difference between a value of production/employee in relation to cost/employee). This difference is lower in last year due to the project stagnation i.e. less work on some of the 20 keys.

Previous information about keys implemented by Plamen Požega shows that the company managed to increase the productivity, lower costs, increase the sales due to the increased quality of its products and in total increase the competitiveness.

5.9. Qualitative findings

During the second phase of our research, we interviewed several employees of Plamen Požega working at the different levels of the company. Most of them were workers in production, two were from middle management, and one was a member of the company's managing board.

Most of the interviewed employees are directly involved in the production and they were not enthusiastic about the project of 20 keys methodology implementation. This was mainly due to the different projects they had in the past, which did not bring any improvements to the company's results. When the project started they noticed a difference in implementation, since this project had a strong support from the company's managing board, due to its perceived potential benefits. This reluctant attitude was confirmed during the interview with one of the board members, who also stated that the implementation of the 20 keys methodology completely changed the way employees approached their jobs and work obligations. The improvement of the organizational efficiency and savings done with the implementation of the methodology were the most important benefits according to the board member.

During the implementation, there were several barriers which the project team needed to pass due to needed changes in organizational and employees' behavior. This "resistance" is present in almost every company since people don't like to change their work habits and especially if they have been working for a longer time in the same position. The workers in production appreciated the newly installed skills versatility training since it could have presented a change in their work positions. Workers training influenced the improvements in process of changing molds in production – it increased the speed of it. This has improved organizational efficiency and shortened a production time – i.e. producing more in a shorter time. The production employees saw the benefits of the project and considered the most important to be the attitude of the project manager during project implementation. They could have expressed their ideas for increasing efficiency and they were rewarded if the idea was accepted and resulted in the improvement of the business process. The changes achieved during the project influenced the changes in work behavior and increased the work security since all employees were better trained for their jobs.

Plamen management board's favorite key was work and partnership with suppliers. This key had a significant influence on possible savings in purchasing and on possible quality improvements of the final products. Cooperation with suppliers resulted in a lower stock level in Plamen and increased quality of purchased materials. According to the managing board member, the main benefits of the 20 keys project refereed to the fact that: the production cycle time was shortened, the quality of the products was improved, the total cost of production was lowered, and the organizational efficiency was increased. With all these achieved, the company was able to be more competitive on the market with the possibility to lower the prices of their products.

6. Concluding remarks and recommendations for further research

Companies can and use different management tools and methodologies for a continuous improvement to achieve strategic goals and increase organizational efficiency through the enhanced speed of learning and innovation and process and quality improvements. Although many companies are satisfied with early results of the improvement, the continuous improvement approach requires a constant and long-term engagement to reach a sustainable growth.

The implementation of the 20 keys methodology is an excellent start for the reorganization of the entire company because it is a company-wide process that creates a culture of sustained improvement. This methodology allows the company to make a systematic improvement based on organizations' strength. The 20 keys methodology strong point is its implementation as a central way of workplace management and can only be accepted through the devoted and dedicated application.

The review of the analyzed 20 keys implementation showed improvements in organizational efficiency in all observed areas – from safety, human potential development, time and money savings. This is mainly because employees saw and understood a direct connection between project activities and the project results. The support of the management board was of crucial importance for the success of this project. Results showed that a continuous improvement is the outcome of on-going activities and company needs to continue with their efforts in implementing and maintaining this methodology.

The results of this paper emphasize what the 20 keys methodology implementation can contribute to companies by increasing organizational efficiency. As it was previously stated the research about the 20 keys methodology didn't gain momentum in academic circles as some other continuous improvement methodologies. Therefore, the results of this research give contribution to the better understanding of the methodology and its influence on improvement of the companies' efficiency especially in following fields: change of employees' way of thinking, alignment of goals at all levels, more functional jobs, elimination of scrap losses, unnecessary downtime and machine failures, continuous work on improving the technological process of production and reorganizing part of the technological process. 20 keys methodology can additionally influence companies' competition due to the improvements it has made in the examined company but to confirm this statement further research should be made.

Further research is recommended to examine if the 20 keys implementation has had a similar influence in different Croatian industrial sectors; to establish a methodology impact on organizational efficiency and whether the implementation can lead to the improved competitiveness and to further monitor company Plamen and its results with implemented methodology during a next period of time.

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DIVIDEND PAYOUT, RETENTION POLICY AND FINANCIAL PERFORMANCE IN COMMERCIAL BANKS: ANY CAUSAL RELATIONSHIP?

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Abstract: Dividend policy remains one of the top ten unresolved issues in corporate finance including in the banking sector. Hence, this study explores data from 250 commercial banks in 30 Sub-Saharan African countries to establish the causal relationship between the use of two major dividend policies in the sector and financial performance for the period 2006 to 2015. The empirical results of the vector error correction block exogeneity Wald test and Pairwise Granger causality test reveal that only retention policies Granger cause performance (ROA), even though both major policies posit a positive relationship with performance (ROA) in the Vector Error Correction Model estimate. Therefore, commercial banks in Sub Saharan Africa and also in the entire world should use their free cash flows wisely by exploring all available viable investment opportunities. By doing this, not only owners' profit but wealth is fully maximised such that their survival, value creation, and future growth is fully justified.

JEL classification: G21, G35.

Keywords: Retention policy; Wald test; Granger causality; Stakeholders' interest; Creditors' right; Wealth maximisation.

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1. Introduction

Dividend policy has attracted attention following the seminal paper of Miller and Modigliani (1961) where they established that dividend policy has no effect on shareholders' wealth in a frictionless and perfect market with investment policy being held constant. This prediction has led to an ongoing debate and a dilemma as to how firms should choose a suitable and implementable policy. This dilemma is even deeper in Sub-Saharan African countries because there is no perfect market condition as proposed by Miller and Modigliani. There have been a wide number of ideas by economists and past scholars proffering solutions to this dilemma. A popular solution is the proposed signalling approach, that is, the choice of dividend policy to signal future firm performance. This solution has been initially supported empirically by scholars such as Ajanthan (2013), Karpavičius (2014), Abiola (2014), Abdella and Manual (2016), Adesina (2017), Agbatogun and Adewumi (2017) but recently, the results have been mixed such that some scholars find that dividend changes do not predict future earnings growth in firms (Datta, Ganguli, & Chaturvedi, 2014; David & Ginglinger, 2016).

The other idea for solving the dividend dilemma which has been given little or no attention, most importantly in the banking sector, is the agency approach to dividend policy, meaning that dividend policy minimises the conflict of interest that leads to agency problems in any firm operating agency relationships. According to S. Gul, Sajid, Razzaq, and Afzal (2012), agency conflicts that lead to agency cost can manifest in two ways: debt-holders versus shareholders conflict (agency cost of debt) and managers versus shareholders conflict (agency cost of equity). In the shareholders-managers' relationship, *ceteris paribus,* managers are more interested in a retention policy because of their personal pecuniary benefits and all other compensations attached. This personal interest will invariably increase a managers' flexibility, maximise the asset size and reduce the need to raise funds from the capital market to finance long-term projects, all of which are against the interests of the shareholders. Although shareholders desire managerial efficiency in viable and positive net present value (NPV) investment decisions, they prefer their managers to fund such investment from the capital market with little cash in managements' purse to avoid managers acting against the owners' sole interest. Shareholders believe the capital market performs a monitoring role regarding the activities of managers and ensures higher managerial discipline. Thus, for banks to operate fully in their desired capacity and performance, an optimal dividend policy that will minimise these costs must be implemented because both agency cost affects bank performance (Shao, Kwok, & Guedhami, 2013).

To the advocate of retention, firms' earnings should be used to finance investment in positive NPV projects, which are expected to bring about an improvement in the performance of firms. Retained earnings are considered as a better and cheaper source of finance than raising funds from external sources, which are associated with exorbitant costs. The majority of empirical studies have focused on examining the impact of dividend policy on performance or testing the relationship or correlation between dividend policy and a firm's performance (Ehikioya, 2015; Hamid, Yaqub, & Awan, 2016). Correlation/relationship does not necessarily imply causation. Akinlo and Egbetunde (2010) believed it is meaningful to test for causation as opposed to correlation as causation shows the cause and effect relationship between variables. Regarding this aspect, scholars such as Farsio, Geary, and Moser (2004), Goddard, McMillan, and

Wilson (2006) and Mougoué and Rao (2003) have tested for cointegration and causality tests of dividend payout and earnings, taking dividend payout as the only dividend policy and neglecting the retention policy of dividend even though it is not in Africa or Sub-Saharan African (SSA) region.

Apparently, payout and retention are two sides (types) of a coin (dividend policy). It is noteworthy that virtually all studies on the subject have used dividend payment or payout (not retained earnings) as a proxy for dividend policy. It can also be observed that the studies above neither consider causality between retained earnings and firms' financial performance nor were they carried out in the SSA region. It is imperative to conduct empirical studies on the direction of causality between dividend policies (both retained earnings and dividend payout) and the financial performance of banks in SSA countries. This study is an attempt in that direction.

Nnadi, Wogboroma, and Kabel (2013) posit that most African firms, banks inclusive, prefer to payout cash dividend. The choice of dividend payout as against dividend reinvestment plans is the uncertainty about how investors utilise earnings generated by managers. However, it is possible that earnings are generated from vague activities that managers dabble in to make sure dividends are paid to satisfy the desire of dividend-income oriented shareholders even though such activities cannot guarantee the future growth of the firm. The present weaknesses of SSA banks as noted by Mlachila et al. (2013), such as weak creditor's right, poor infrastructure, low bank's asset, poor financial depth calls for urgent investigation on dividend policy as this policy affects other policies in the bank. Therefore, this study finds it necessary to weigh the two policies; namely payout (a bird in the hand) and retention (a bird in the bush), because it is possible for managers to engage in dividend re-investment plans, which are well monitored such that the bird does not fly away, and to assure the investors of huge and certain capital gains. More so, investors have clientele effects while some are dividend-income oriented, others are not in need of income but are growth-oriented.

It is in this regard that Shao et al. (2013) and Byrne and O'Connor (2017) posit that both creditors and shareholders' interest should be protected in making dividend policy because dividend payment lowers owners' apprehensions about managers' expropriation but exacerbate creditors' apprehensions about owners' expropriations. Hereafter, the use of dividend payout to proxy dividend policy in most studies and lack of studies to address causality between dividend policy and bank performance despite the perpetual debate as to which policy to adopt such that banks' future growth is justified foretells our interest to investigates the causal relationship between both dividend policies (payout and retention) and banks' financial performance in the SSA. Although numerous studies focused on the feedback relationship between dividend policy and performance, this study answers the question insufficiently approached: which of the two dividend policies causes increment in bank value and performance?

The remainder of this paper is structured following the introductory section as follows: the section two focuses on the theoretical background aspect of the literature review, followed by the research method in section three. The model estimation is captured in section four and the paper is concluded with policy recommendations in section five. Conclusively, the last section shows the limitations of this study and suggests further areas of research for the would-be researchers.

2. Literature Review

This study is underpinned by the Percent payout and Percent retention theories of dividend. These theories were propounded by Rubner (1966). For percent payout theory, its basic proposition is that shareholders prefer dividend income and hence firms should adopt payout policy amidst many other dividend policies. Managers are expected to convince investors that their expected return on investment will increase their current wealth. However, for managers to ensure their job security and maintain a good reputation with shareholders, they should adopt a 100 percent payout policy. This is despite that fact that this may not be practicable if managers are pursuing maximisation of all owners' wealth. Careful evaluation will be required if the business model is faltering; if the company needs funding to undertake a specific project that will enhance its long term growth; and if the firm's growth is slowing down due to competition or other factors.

On the other hand, percent retention theory argues that, since investors fall into different categories such as income, age, tax bracket, etc, managers should adopt a 100 percent retention policy so as to avoid conflict between shareholders, minimise the burden of the high tax (double taxation) attracted by dividend income and reduce the transaction costs associated with a payout policy which have made the policy a luxury, and negative NPV transactions. Under this theory, firms should take up all viable investment opportunities as positive NPV transactions which will assist in achieving the ultimate corporate goal (maximisation of shareholders' wealth).

3. Methodology: research design, data nature and sources

This study is based on an unbalanced panel of 250 commercial banks from 30 SSA countries. Panel data was used to cater for the heterogeneity problem that the individual bank characteristics might cause (Hsiao, 2014). Not all the data required to capture the variables of interest were available for the entire SSA countries for the study period, hence it was unbalanced. Therefore, annual/ yearly data were collected from 250 commercial banks' financial profile with up-to-date data available in BankScope database by Fitch/ IBCA Bureau Van Dijk covering the period 2006 to 2015. As recently noted by Beck, Demirgüç-Kunt, and Maksimovic (2004), Houston, Lin, Lin, and Ma (2010), Akande and Kwenda (2017), when conducting research with focus on banking sector, BankScope is considered as the most reliable, comprehensive and appropriate database because it accounts for over 90% of all country's bank-level data. The fact that data was sourced from this reputable database justifies the reliability of the data used for this study. The SSA countries considered in this study excludes those regarded as outliers such as South Africa and Mauritius due to their highly competitive and sophisticated banking system (Beck & Cull, 2013). Also, countries such as such as democratic republic of Congo, Comoros, Guinea-Bissau, Sao Tome and Principle and others with lack of data due to the effect of war were excluded because of dearth and the paucity of data (Akande & Kwenda, 2017; Flamini, Schumacher, & McDonald, 2009). Succinctly, the countries used are Angola, Burkina Faso, Benin, Botswana, Cote d' Ivoire, Cameroon, Ethiopia, Gabon, Ghana, Djibouti, Equatorial Guinea, Kenya, Lesotho, Liberia, Madagascar, Mali, Mauritania, Malawi,

Mozambique, Namibia, Niger, Nigeria, Rwanda, Seychelles, Senegal, Swaziland, Togo, Tanzania, Uganda and Zambia. These countries are bank-based economies in which commercial banking constitute more than 70% of their financial system asset on the average. They are impoverished and operate under unique economic and banking conditions characteristics such as weak creditors right, underdeveloped/ critical infrastructural facilities, high inflation, poverty, external shocks, high concentration, shallow financial system and non-adherence to the global regulatory requirements in detail (Akande & Kwenda, 2017; Allen et al., 2014; Flamini et al., 2009).

The validity of the variables and data used in this study is based on the previous empirical studies on dividend policy. All the variables were used based on the fact that scholars have used them and affirmed that they are valid in proxying dividend policy (Abdella & Manual, 2016; Agyemang Badu, 2013; Ehikioya, 2015; Ibrahim, 2016). Return on asset (ROA) is used in this study as a measure of bank performance because ROA shows the overall index of profitability (Crane, 2010). Also, capital adequacy was used a control variable to avoid simultaneity bias that can be caused by bivariate causality model and the fact that adequate capital is the basis for making any policy in the banking sector (Nnadi et al., 2013).

Model Specification: To establish the causality between dividend policy and bank performance, the Percent payout and Percent retention theory of dividends are the theories underpinning this study. It has been affirmed that dividend payment can be a luxury due to high taxation and other transaction costs attracted by dividends if the life span of the firm is not considered. For the banking sector, dividend payouts have been treated as a norm, which might be the reason behind their recurrent under-development (Nnadi et al., 2013); hence, a firm if well monitored can also retain and re-invest in new investment opportunities that would protect the stakeholders' interest (shareholders, debtholders and depositors) and yield greater return with little or no transaction costs (Ashraf & Zheng, 2015).

Theories such as "a bird in the hand", the signalling hypothesis and the empirical findings of Agyei and Marfo-Yiadom (2011) and Hamid et al. (2016) have asserted the feedback relationship between dividend policy and performance.

Therefore;

$$Y = f(X) \quad \ldots\ldots(3.1)$$

That is,

Performance = f (Dividend policy)

According to Waseem, Saleh, Shukairi, and Mahmood (2011), dividend policy is unstable in the banking sector, but there are two commonly adopted dividend policies in the banking sector: namely, the dividend payout policy and the dividend re-investment plan (Retention Policy).

Hence,

Performance = f (Dividend payout ratio, Retention ratio)

To avoid omission and germane variables that can lead to simultaneity bias, capital adequacy ratio is included as a control variable. Capital adequacy ratio is considered because all the banking acts of the 30 countries considered for this study

have in their guidelines that banks should declare and pay dividends only when the minimum capital adequacy ratio has been met. Thus, in choosing a suitable and implementable dividend policy that will positively affect performance in the banking sector, the Basel capital framework laid down that capital and a conservation buffer ratio must be taken into consideration.

Performance = f (Dividend payout ratio, Retention ratio, Capital adequacy ratio)

Following the empirical literature of Crane (2010), who posited that Return on asset (ROA) is the measure of the return on a firm's assets which shows the overall index of profitability, ROA has been used to measure financial performance so as to be able to proffer solutions to the yearly debate as to which policy can actually impact on bank performance and this justifies the choice and validity of ROA in this study.

Thus, explicitly the model for this study is:

$$Y_{it} = \beta_0 + \beta_1 X'_{it} + R_{it} + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.2)$$

X'_{it} is the vector of banks dividend policy captured by the payout and retention ratio

R_{it} captures the control variable, capital adequacy ratio

$$ROA_{it} = f(DPOR_{it}, RERA_{it}, CAR_{it})$$

$$ROA_{it} = \beta_0 + \beta_1 DPOR_{it} + \beta_2 RERA_{it} + \beta_3 CAR_{it} + u_{it} \ldots\ldots\ldots\ldots\ldots\ldots (3.3)$$

All variables are in their natural form.

$\beta_1, \beta_2 and \beta_3$ are the estimated parameters of the respective explanatory variables which show the percentage change in financial performance caused by the percentage change in the explanatory variables. β_0 is the intercept/constant term.

For easy understanding and interpretation of the model, the variables used in the model are clearly defined below;

Return on Assets (ROA): This measure of performance indicates how profitable a bank is with respect to its total assets. This ratio points to how bank management is at using its total assets component to generate earnings. It was calculated as $\frac{\Pr ofitaftert\ ax}{TotalAsset} * 100$. The ratio has been used by various scholars to measure performance, including Ouma (2012), Agyei and Marfo-Yiadom (2011), Onanjiri and Korankye (2014b) and Ehikioya (2015).

Dividend Payout Ratio (DPOR): This represents the payout policy of dividends in banks. The data point is in percentage form and data are sourced from the BankScope database. The formula is $\frac{Totaldividend}{TotalEarnings} * 100$. This variable has been used by Agyei and Marfo-Yiadom (2011), Nnadi et al. (2013), Agyemang Badu (2013) and Maldajian and El Khoury (2014) because it shows the proportion of dividend paid out.

Retained Earnings Ratio (RERA): This represents the retention policy of dividends in banks. The data point is in percentage form and the data for the variables used as proxy are sourced from the BankScope database. The formula is $\frac{\text{Re}tainedearnings}{TotalEarnings}*100$. This variable has been used by previous dividend policy study conducted by Hamid et al. (2016). It is also fondly called financial slackness.

Capital Adequacy Ratio (CAR): This is the ratio of total equity to total assets. Its data point is in percentage form and the data for the variables are sourced from the BankScope database. The formula is $\frac{Totalequity}{Totalasset}*100$ It has been used in studies such as Al-Ajmi (2010) and Nnadi et al. (2013) among many others.

Estimating Technique: The panel Granger causality test is used to test the direction of causality between bank performance and dividend policy, taking a cue from the three evident studies on dividend policy causality, namely, Mougoué and Rao (2003), Farsio et al. (2004) and Goddard et al. (2006) and other studies that have used panel Granger causality (Chang, Lee, & Chang, 2014; Wolde-Rufael, 2014). The Granger causality test showed that if past values of dependent variable (Y) significantly contribute to predicting the value of an explanatory variable (X), then Y Granger causes X, and vice versa, but if the past values of both variables contribute significantly to predict each other, it leads to bi-directional causality. The rationale of Granger causality in this model is that changes in dividend policy Granger cause changes in bank performance if the changes in dividend policy improved the unbiased least square forecast of the changes in bank performance. The null hypothesis (H_0) is that dividend policy does not Granger cause bank performance and bank performance does not granger cause dividend policy. Pairwise Granger causality and the Granger causality test from vector error correction block exogeneity Wald test is used to establish both the short- and long-run uni-directional or bi-directional causality between the pairs of variables.

The Panel-VEC model is;

If $Y_{it} = \left(Y_{1it}, Y_{2it}, Y_{3it}, \ldots\ldots\ldots\ldots Y_{qit}\right)'$ is a $q \times 1$ vector of cross-sections i in time t

$$Y_{it} = \delta_i b_t + \sum_{k=1}^{m} \Phi_{ik} Y_{i(t-k)} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.4)$$

Where, $t = 1,2,3\ldots\ldots, T$; $i = 1,2,3\ldots\ldots, N$; Φ_{ik} is a $q \times q$ matrix;

ε_{it} is the $q \times 1$ vector of disturbances; and

b_t which is a vector of deterministic components is equal to 1.

That is, δ_i is a $q \times 1$ or $q \times 2$ matrix of parameters.

Therefore, $\delta_i b_t$ is a $q \times 1$ vector with the k-th element which is equal to δ_{1ik} or $\delta_{1ik} + \delta_{2ik} + \ldots . t$ denoting the model's deterministic component.

Explicitly,

$$\Delta Y_{it} = \delta_i b_t + \Pi_i Y_{i(t-1)} + \sum_{k=1}^{m-1} \Gamma_{ik} \Delta Y_{i(t-k)} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots (3.5)$$

Where, $t = 1,2,3 \ldots . t$; $i = 1,2,3 \ldots \ldots . N$;

$\Gamma_{ik} = -\sum_{w=k+1}^{m} \Phi_{iw}$ for $k = 1,2,3,\ldots\ldots, (m-1)$ and,

$\Pi_i = -\left(\mathrm{I}_j - \sum_{k=1}^{m} \Phi_{ik} \right)$. Moreover, $\Gamma_i = \left(\Gamma_{1i}, \Gamma_{2i}, \Gamma_{3i}, \ldots\ldots \Gamma_{i(m-1)} \right)$

and $X_{it} = \left(\Delta Y_{i(t-1)}{}', \Delta Y_{i(t-2)}{}', \Delta Y_{i(t-3)}{}', \ldots\ldots\ldots \ldots \Delta Y_{i,t-(m-1)}{}' \right)'$.

Equation 3.5 can be re-written as:

$$\Delta Y_{it} = \delta_i b_t + \Pi_i Y_{i(t-1)} + \Gamma_i X_{it} + \varepsilon_{it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.6)$$

For a given time-period t, model 3.6 can be stacked over the cross-section i to obtain;

$$\Delta Y_t = \delta b_t + \Pi Y_{t-1} + \Gamma X_t + \varepsilon_t \ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.7)$$

For every t ranges from $1,2,3,\ldots\ldots\ldots .., T$.

In the same manner, equation 3.7 can be expressed in a matrix form as:

$$\begin{bmatrix} \Delta Y_{1t} \\ \Delta Y_{2t} \\ . \\ . \\ \Delta Y_{Nt} \end{bmatrix} = \begin{bmatrix} \delta_1 \\ \delta_2 \\ . \\ . \\ \delta_N \end{bmatrix} b_t + \begin{bmatrix} \Pi_1 & & & & \\ & \Pi_2 & & & \\ & & . & & \\ & & & . & \\ & & & & \Pi_N \end{bmatrix} \begin{bmatrix} Y_{1(t-1)} \\ Y_{2(t-1)} \\ . \\ . \\ Y_{N(t-1)} \end{bmatrix} +$$

$$\begin{bmatrix} \Gamma_1 & & & & \\ & \Gamma_2 & & & \\ & & . & & \\ & & & . & \\ & & & & \Gamma_N \end{bmatrix} \begin{bmatrix} X_{1t} \\ X_{2t} \\ . \\ . \\ X_{Nt} \end{bmatrix} + \begin{bmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \\ . \\ . \\ \varepsilon_{Nt} \end{bmatrix}$$

Equation 3.6 is the usual VEC model.

Thus, it is assumed that ε_{it} is I.I.D with a mean value equal to zero and co variance matrix denoted as:

$\Omega = \begin{bmatrix} \Omega_{11} & . & . & \Omega_{1N} \\ . & . & & \\ . & & . & \\ \Omega_{N1} & . & . & \Omega_{NN} \end{bmatrix}$. This is $Nq \times Nq$ positive definite matrix such that $\Omega_{ik} \equiv \text{var}(\varepsilon_{it})$.

Following the study of Groen and Kleibergen (2003),

If $\prod_i$ is decomposed into $\alpha_i \beta_i^{'}$ where, α_i and β_i are of dimension $q \times r_i$ with r_i equal to rank $(\prod_i) < q$.

This denotes that the cointegration rank varies across cross-sections which is in tandem with the existing literature on panel cointegration that posits that individual cross-sections usually have the same cointegration rank, that is $r_i = r$ for all i.

When $\Pi = \alpha\beta^{'}$, then the long run coefficient matrix Π is;

$$\alpha = \begin{bmatrix} \alpha_1 & & & & \\ & \alpha_2 & & & \\ & & . & & \\ & & & . & \\ & & & & \alpha_N \end{bmatrix}, \beta = \begin{bmatrix} \beta_1 & & & & \\ & \beta_2 & & & \\ & & . & & \\ & & & . & \\ & & & & \beta_N \end{bmatrix}.$$

Conclusively, a panel-VEC model is written as

$$\Delta Y_{it} = \delta b_{it} + \alpha\beta^{'} Y_{i(t-1)} + \Gamma X_{it} + \varepsilon_{it} \quad \text{.....(3.8)}$$

From equation 3.8, the short run matrix, Γ; adjustment matrix, α and the cointegration matrix, β are expressed below respectively.

$$\Gamma = \begin{bmatrix} \Gamma_{11} & \Gamma_{12} & . & . & . & \Gamma_{1N} \\ \Gamma_{21} & \Gamma_{22} & . & . & . & \Gamma_{2N} \\ . & . & . & & & . \\ . & . & & . & & . \\ . & . & & & . & . \\ \Gamma_{N1} & \Gamma_{N2} & . & . & . & \Gamma_{NN} \end{bmatrix}, \alpha = \begin{bmatrix} \alpha_{11} & \alpha_{12} & . & . & . & \alpha_{1N} \\ \alpha_{21} & \alpha_{22} & . & . & . & \alpha_{2N} \\ . & . & . & & & . \\ . & . & & . & & . \\ . & . & & & . & . \\ \alpha_{N1} & \alpha_{N2} & . & . & . & \alpha_{NN} \end{bmatrix} \text{ and}$$

$$\beta = \begin{bmatrix} \beta_{11} & \beta_{12} & . & . & . & \beta_{1N} \\ \beta_{21} & \beta_{22} & . & . & . & \beta_{2N} \\ . & . & . & & & . \\ . & . & & . & & . \\ . & . & & & . & . \\ \beta_{N1} & \beta_{N2} & . & . & . & \beta_{NN} \end{bmatrix}.$$

The unrestricted matrices of α and β are of the dimension $Nq \times r$, where, $r \equiv r_1 + r_2 + ... + r_N < Nq.$

Therefore, following Odhiambo (2014), the ECM- based Granger causality model is written as;

$$\begin{bmatrix} \Delta ROA_{it} \\ \Delta DPOR_{it} \\ \Delta RERA_{it} \\ \Delta CAR_{it} \end{bmatrix} = \begin{bmatrix} \theta_0 \\ \beta_0 \\ \alpha_0 \\ \delta_0 \end{bmatrix} + \sum_{k=1}^{p} \begin{bmatrix} \theta_{1i} & \theta_{2i} & \theta_{3i} & \theta_{4i} \\ \beta_{1i} & \beta_{2i} & \beta_{3i} & \beta_{4i} \\ \alpha_{1i} & \alpha_{2i} & \alpha_{3i} & \alpha_{4i} \\ \delta_{1i} & \delta_{2i} & \delta_{3i} & \delta_{4i} \end{bmatrix} \begin{bmatrix} \Delta ROA_{i(t-k)} \\ \Delta DPOR_{i(t-k)} \\ \Delta RERA_{i(t-k)} \\ \Delta CAR_{i(t-k)} \end{bmatrix} + \begin{bmatrix} \theta_5 \\ \beta_5 \\ \alpha_5 \\ \delta_5 \end{bmatrix} ECT_{t-1} + \begin{bmatrix} u_{1it} \\ u_{2it} \\ u_{3it} \\ u_{4it} \end{bmatrix}$$

$$\Delta ROA_{it} = \theta_0 + \sum_{k=1}^{p} \theta_{1i} \Delta ROA_{i(t-k)} + \sum_{k=1}^{p} \theta_{2i} \Delta DPOR_{i(t-k)} + \sum_{k=1}^{p} \theta_{3i} \Delta RERA_{i(t-k)} + \sum_{k=1}^{p} \theta_{4i} \Delta CAR_{i(t-k)} + \theta_5 ECT_{t-1} + u_{1it} \quad (3.9)$$

$$\Delta DPOR_{it} = \beta_0 + \sum_{k=1}^{p} \beta_{1i} ROA_{(t-k)} + \sum_{k=1}^{p} \beta_{2i} \Delta DPOR_{i(t-k)} + \sum_{k=1}^{p} \beta_{3i} \Delta RERA_{i(t-k)} + \sum_{k=1}^{p} \beta_{4i} \Delta CAR_{i(t-k)} + \beta_5 ECT_{t-1} + u_{2it} \quad (3.10)$$

$$\Delta RERA_{it} = \alpha_0 + \sum_{k=1}^{p} \alpha_{1i} \Delta ROA_{i(t-k)} + \sum_{k=1}^{p} \alpha_{2i} \Delta DPOR_{i(t-k)} + \sum_{k=1}^{p} \alpha_{3i} \Delta RERA_{i(t-k)} + \sum_{k=1}^{p} \alpha_{4i} \Delta CAR_{i(t-k)} + \alpha_5 ECT_{t-1} + u_{3it} \quad (3.11)$$

$$\Delta CAR_{it} = \delta_0 + \sum_{k=1}^{p} \delta_{1i} \Delta ROA_{i(t-k)} + \sum_{k=1}^{p} \delta_{2i} \Delta DPOR_{i(t-k)} + \sum_{k=1}^{p} \delta_{3i} \Delta RERA_{i(t-k)} +$$

$$\sum_{k=1}^{p} \delta_{4i} \Delta CAR_{i(t-k)} + \delta_5 ECT_{t-1} + u_{4it} \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (3.12)$$

$\theta_0, \beta_0, \alpha_0, \delta_0$ are respective constants. $\theta_1 - \theta_5, \beta_1 - \beta_5, \alpha_1 - \alpha_5, \delta_1 - \delta_5$ are respective estimated coefficients. Δ denotes the first difference operator. ECT_{t-1} represents the one-year lagged error correction term. It is the cointegrating vector that acts as the speed of adjustment for the long-run association among the variables. $u_{1it} - u_{4it}$ are mutually uncorrelated stochastic (white noise) error terms with finite covariance matrix and zero mean value.

t is the time period that ranges from $1,2,\ldots\ldots 10$, i is the cross-section (banks) that ranges from $1,2,\ldots\ldots 250$ and lastly, k is the number of lags while p is the optimal lag length selected by using the sequential modified LR test statistic, final prediction error (FPE), Akaike information criterion (AIC), Schwarz Bayesian criterion (SBC) and Hannan-Quinn information criterion.

To conduct a multivariate test, CAR_{it}, which is the measure of the capital adequacy ratio was included to avoid the omission of germane variables that can cause simultaneity bias and thereby lead to a bogus relationship between the variables (Gujarati & Porter, 2003). For any commercial bank to adopt a policy it must be adequately capitalised to justify continuity of banking activities and hence, persistent future growth, since banks address risk by maintaining a high degree of capitalisation.

A priori Expectation: It is expected from this study that $\beta_1 - \beta_3$ > 0 (Agyei & Marfo-Yiadom, 2011; Hamid et al., 2016; Ibrahim, 2016). There should be either a uni-directional or bi-directional causal relationship between dividend policy and banks' return.

4. Estimation of Model

4.1 Preliminary Analysis

Panel Unit Root: Secondary data is used in this study; however, before analysing this secondary data, a stationary test has to be conducted on the data so as to detect the order of integration in case there is a cointegrating relationship between the variables and to id a spurious analysis. Empirical findings have affirmed that none of the various unit root tests is free from power properties and size shortcomings; hence, to ensure authentic evidence as to the order of integration, several panel unit root tests were conducted.

Generally, the structure of panel unit root testing is as follows:

$$\Delta m_{it} = \rho_i m_{i(t-1)} + \sum_{j=1}^{p_j} \phi_i \Delta m_{i(t-j)} + \alpha_i n_{it} + \varepsilon_{it}$$

Where, n_{it} = deterministic components. While the null hypothesis ($\rho_i = 0$) signifies that m process has a unit root for each cross-section i, the alternative hypothesis $\rho_i < 0$ means the process is stationary around the deterministic fraction.

Table 1. Levin Lin and Chu (LLC), Augmented Dickey Fuller (ADF) and Maddala and Wu (PP) Fisher-type unit root tests

Variable	Levin, Lin, Chu (None)			Levin, Lin, Chu (Individual intercept)		
	Order	t* Stat	Prob- Value	Order	t* Stat	Prob- Value
ROA	I(1)	-48.6650	0.0000***	I(1)	-36.6509	0.0000***
DPOR	I(1)	-45.7437	0.0000***	I(1)	48.8162	0.0000***
RERA	I(1)	-49.6430	0.0000***	I(1)	322.727	0.0000***
CAR	I(1)	-56.0963	0.0000***	I(1)	-46.3578	0.0000***

Source: Authors' estimation, 2018. Note that "***" represents 1% level of significance

Variables	ADF Fisher Chi-square Unit-root test (None)			ADF Fisher Chi-square Unit-root test (Individual intercept)		
	Order	t* Stat	Prob- Value	Order	t* Stat	Prob- Value
ROA	I(1)	1960.44	0.0000***	I(1)	1061.55	0.0000***
DPOR	I(1)	2118.55	0.0000***	I(1)	1152.86	0.0000***
RERA	I(1)	2138.62	0.0000***	I(1)	1147.86	0.0000***
CAR	I(1)	1944.10	0.0000***	I(1)	1122.12	0.0000***

Source: Authors' estimation, 2018. Note that "***" represents 1% level of significance

Variables	PP Fisher-type Chi Square Unit root-test (None)			PP Fisher-type Chi Square Unit root-test (Individual intercept)		
	Order	t* Stat	Prob- Value	Order	t* Stat	Prob- Value
ROA	I(1)	3188.80	0.0000***	I(1)	2352.11	0.0000***
DPOR	I(1)	3345.97	0.0000***	I(1)	2410.29	0.0000***
RERA	I(1)	3434.75	0.0000***	I(1)	2447.75	0.0000***
CAR	I(1)	3398.07	0.0000***	I(1)	2702.61	0.0000***

Source: Authors' estimation, 2018. Note that "***" represents 1% level of significance

The panel unit root test presented in the above table shows that all the variables were stationary at first differencing (order one). Return on assets, the dividend policy ratio, retention ratio and capital adequacy ratio were all stationary at order one (I (1)) at both cross-section and individual level during the period under investigation. The reason is that the probability of Levin, Lin and Chin t statistic

values: 0.000, 0.000, 0.000 and 0.000; the Augmented Dickey Fuller (ADF) test statistic and Philip Perron statistic values: 0.000, 0.000, 0.000 and 0.000 for each of the variables was less than the probability of the error margin 0.05 allowed for the estimate in this study. This implies that there is a short run equilibrium relationship between the variables under investigation. The short run stability of these variables revealed by the panel unit root test led to further description of the variables, the level of correlation between them and the estimation of cointegration to determine the long run equilibrium relationship or stability of the linear combination of the variables in the long run.

Vector Auto-Regression (VAR) Optimal Lag Selection: To be able to determine the optimal lag for the purpose of this study, different criteria are used to choose the optimal lag structure for the model. According to Hyndman and Athanasopoulos (2014), AIC criteria tend to choose larger number of lags, hence, for VAR and VEC analysis, SIC is preferable.

Table 2. Optimal Lag Selection of Series: ROA, DPOR, RERA, CAR

LAG	LOGL	LR	FPE	AIC	SIC	HQIC
0	1059.431	NA	1.46e-07	-4.388485	-4.353759	-4.374836
1	1704.240	1276.214	1.07e-08	-7.003078	-6.829446	-6.934833
2	1777.123	143.0380	8.43e-09	-7.239597	-6.927058*	-7.11675*
3	1787.682	20.54757	8.63e-09	-7.216974	-6.765529	-7.039536
4	1815.669	53.99549	8.21e-09	-7.266815	-6.676464	-7.034782
5	1836.931	40.66732*	8.03e-09*	-7.288695*	-6.559437	-7.002065
6	1846.703	18.52819	8.24e-09	-7.262799	-6.394635	-6.921572
7	1857.278	19.87432	8.43e-09	-7.240240	-6.233170	-6.844418
8	1866.838	17.80843	8.66e-09	-7.213463	-6.067487	-6.763044

Source: Authors' estimation, 2018. Note that (*) indicates lag order selected by each criterion; LR: Sequential modified LR test statistic (each at 5 Percent level of significance); FPE: final prediction error; AIC: Akaike Information Criterion; SIC: Schwarz information criterion; HQIC: Hannan-Quinn information criterion.

Table 2 shows the result of the vector error correction model of lag length to be selected for this study. A vector error correction model of lag order of four (5) is found using AIC with a value of -7.2887 while a vector error correction model of lag order of two (2) is revealed using SIC and HQIC with values given as -6.9271 and -7.1168, respectively. All these information criteria are statistically significant at 5 percent level. Based on this evidence, a vector error correction model of lag order two (2) which is the smallest lag order as revealed by SIC and HQIC is selected for this study.

Panel Cointegration Test: According to Uddin, Shahbaz, Arouri, and Teulon (2014), a cointegration test is conducted to test for the significant deviation of integrated variables from a certain relationship. Cointegration means the presence of a long-run association between economic variables such that co-integrated variables give room for the correction of short-term disturbances in the long-term. From the evidence of the unit root test that the variables are integrated at the same order I (1), there is the need to test for the existence of a long-run association between the variables.

In this study, Kao ADF residual based and Johansen Fisher panel cointegration tests were considered.

Table 3. Kao ADF Residual based Co-integration Test of Series: ROA DPOR RERA CAR

Ho: There is no Co-integration $(H_0 : \varpi = 1)$		
Trend Assumption: No deterministic Trend		
	t-Statistic	**Prob**
ADF	-14.6826	0.000***

Source: Author's estimation, 2018. Note that "***" represents rejection of null hypothesis at 5% level of significance.

Estimate from the Kao Residual ADF test in Table 3 was significant at 5 Percent with t-statistics -14.6826, hence, the null hypothesis is rejected and there is confirmed evidence that the variables are co-integrated in the long run.

Table 4. Johansen Fisher-Based Cointegration Test of Series: ROA, DPOR, RERA CAR

Ho: There is no Co-integration				
Co-integration Rank Test using Trace Statistic				
Eigen value	**Trace Statistic**	**5% Critical Value**	**Prob**	**Hypothesised No. of CE(s)**
0.155713	727.6523	47.85613	0.0001	None ***
0.101574	437.5352	29.79707	0.0001	At most 1 ***
0.075369	253.9477	15.49471	0.0001	At most 2 ***
0.067420	119.6382	3.841466	0.0000	At most 3 ***
Co-integration Rank Test using Maximum Eigen Value Statistic				
Eigen value	**Maximum Eigen Value Statistic**	**5% Critical Value**	**Prob**	**Hypothesised No. of CE(s)**
0.155713	290.1171	27.58434	0.0001	None ***
0.101574	183.5875	21.13162	0.0001	At most 1***
0.075369	134.3095	14.26460	0.0001	At most 2 ***
0.067420	119.6382	3.841466	0.0000	At most 3 ***

Source: Authors' estimation, 2018. Note that "***" represents rejection of null hypothesis at 5% level of significance.

In the Johansen Panel cointegration test, much emphasis is laid on the number of lags. Hence, optimal lag two (2) was used for all the estimations in this study including this test based on the Schwarz Information Criterion (SIC). Using the Johansen Fisher based cointegration test methodology to estimate the co-integrating

rank test; two likelihood estimators were used for the co-integrating rank: a trace test and a maximum Eigen value test. The co-integrating rank was formally tested using the trace and the maximum Eigen value statistic. These test statistics indicates four co-integrating vectors at 5 percent level of significance as presented in Table 4 above. This finding implies that a long-run equilibrium relationship exists between the variables under study.

Thus, the stability of the dividend policy captured by the dividend payout ratio, retention ratio and capital adequacy ratio will affect banking performance measured by return on assets in both the short and long run. From the above tables, the Maximum-Eigen value test indicates three normalized co-integrating equation(s) at 5 percent significance level. The details of the three normalized co-integrating equations and their adjustment coefficients are presented in Table 5 below.

Table 5. Cointegration Equations

ROA	RERA	CAR	DPOR
1.000000	0.000000	0.000000	0.00838 (0.00263)
0.000000	1.000000	0.000000	0.16749 (0.01547)
0.000000	0.000000	1.000000	0.09121 (0.01756)
Adjustment coefficients (standard error in parentheses)			
D(ROA)	-0.38154 (0.02582)	-0.00231 (0.00525)	-0.00874 (0.00556)
D(RERA)	0.09651 (0.19330)	-0.48807 (0.03932)	0.02949 (0.04164)
D(CAR)	0.46804 (0.07489)	-0.03104 (0.01523)	-0.19450 (0.01613)
D(DPOR)	-0.65272 (0.62101)	0.71888 (0.12632)	-0.34629 (0.13379)

Source: Authors' estimation, 2018

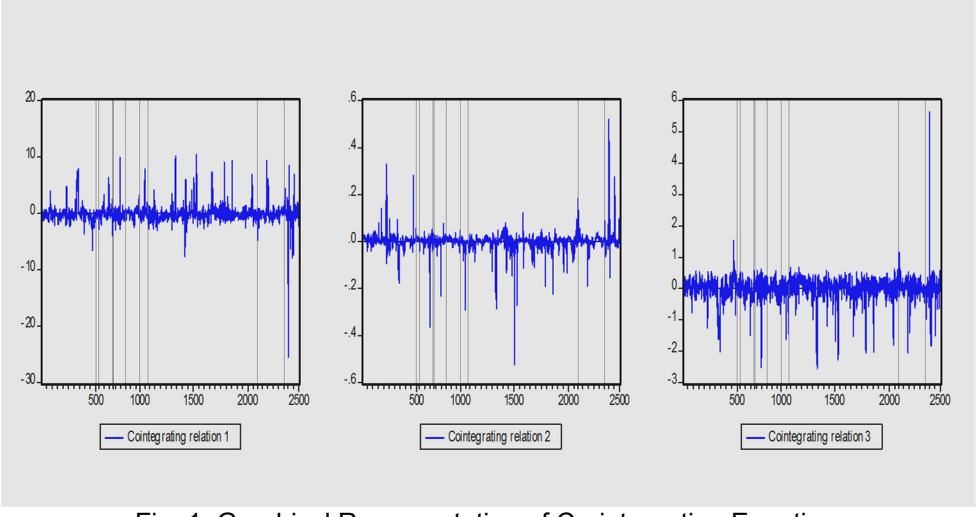

Fig. 1. Graphical Representation of Co-integrating Equations

Source: Authors' estimation, 2018

Table 5 and Figure 1 present the normalized co-integrating equation(s) coefficients with their standard error in parentheses. The normalized co-integrating coefficients only load on the DPOR with positive coefficients. Thus, the coefficients of DPOR 0.0084, 0.1675 and 0.0912 which are statistically significant based on the standard error test reveal that banking performance as shown by the co-integrating equations can be determined by future-state and the stability of ROA, the retention ratio and capital adequacy while the dividend payout ratio mainly determines the current level of banking performance to move in the right direction to bring the system back to equilibrium. The cointegration adjusted coefficients measure the long-run equilibrium or the stability of banking performance.

The ROA value of -0.382 in the first co-integrating equation reveals a discouraging level of performance and calls for improvement. The DPOR of -0.653 reveals the negative impact of dividend payout policy on the banking performance in SSA. This is similar to the findings of M'rabet and Boujjat (2016) and Farsio et al. (2004); however, the RERA and CAR values of 0.097 and 0.468, respectively contribute positively to ROA in SSA (Omran & Pointon, 2004). In the second and third co-integrating equation, the banking industry's performance improved as, while still negative, the performance level stood at -0.002 and -0.009, respectively. This result was enhanced by improvement in DPOR which contributes positively and significantly at 0.719 to ROA despite the negative impact of RERA and CAR. It implies that the more attention that is paid to satisfying shareholders through dividend payments, the better the performance of the banking industry in the long run.

4.2 Vector Error Correction Estimations

According to Mahadevan and Asafu-Adjaye (2007), the two common methods of detecting the direction of causality between co-integrated variables are VAR and VECM. VECM is used in this study to show both long and short run causality between the variables based on affirmation of the long run association between the variables. The VECM with four (4) simultaneous equations is estimated to examine the short run properties of the long run relationships between the series. A VECM is a restricted VAR that is used for non-stationary co-integrated series. VEC is of more merit than VAR because its cointegration relations are built into its specification such that the endogenous variables' long-run behaviour is restricted to cause convergence in the co-integrating relationships, enabling short-run adjustment dynamics in the series. The cointegration term built into the VECM is called the error correction term (ECT) since any deviation from the long-run equilibrium is expected to be corrected with a gradual speed of short-run adjustment. Following Asari et al. (2011) and Hyndman and Athanasopoulos (2014) studies, SIC is also used as a criterion to choose optimal lag two (2) used in this study as AIC tends to choose a larger number of lags that can render the VEC estimate insignificant.

Table 6. Vector Error Correction Estimates

Co-integrating Eq:	CointEq1	CointEq2	CointEq3	
ROA(-1)	1.000000	0.000000	0.000000	
RERA(-1)	0.000000	1.000000	0.000000	
CAR(-1)	0.000000	0.000000	1.000000	
DPOR(-1)	0.00838 (0.0026)	0.16749 (0.0155)	0.09121 (0.0176)	

Co-integrating Eq:	CointEq1	CointEq2	CointEq3	
C1	-0.013610	-0.382556	-0.049722	
Error Correction:	ΔROA	$\Delta RERA$	ΔCAR	$\Delta DPOR$
CointEq1	-0.38154 (0.0258)	0.09651 (0.1934)	0.46804 (0.0749)	-0.65272 (0.6214)
CointEq2	-0.00231 (0.0053)	-0.48807 (0.0393)	-0.03104 (0.0152)	0.71888 (0.1264)
CointEq3	-0.00874 (0.0056)	0.02949 (0.0417)	-0.19450 (0.0161)	-0.34629 (0.1339)
$\Delta ROA_{(-1)}$	-0.22603 (0.0269)	-0.09999 (0.2012)	-0.30195 (0.0780)	0.39566 (0.6465)
$\Delta ROA_{(-2)}$	-0.09791 (0.0221)	-0.00711 (0.1656)	-0.10629 (0.0642)	0.19842 (0.5320)
$\Delta RERA_{(-1)}$	0.00456 (0.0060)	-0.19517 (0.0451)	0.01171 (0.0175)	-0.40673 (0.1448)
$\Delta RERA_{(-2)}$	0.00433 (0.0048)	-0.02681 (0.0362)	0.00654 (0.0140)	-0.14503 (0.1162)
$\Delta CAR_{(-1)}$	-0.00137 (0.0073)	-0.07773 (0.0546)	-0.15587 (0.0212)	0.35449 (0.1754)
$\Delta CAR_{(-2)}$	0.00903 (0.0064)	0.01448 (0.0481)	-0.03648 (0.0186)	0.09437 (0.1544)
$\Delta DPOR_{(-1)}$	0.00265 (0.0018)	0.03276 (0.0134)	0.00957 (0.0052)	-0.45489 (0.0430)
$\Delta DPOR_{(-2)}$	0.00206 (0.0015)	0.02593 (0.0115)	0.00743 (0.0045)	-0.16638 (0.0369)
C2	-0.00047 (0.0006)	-0.00293 (0.0047)	0.00136 (0.0018)	0.00622 (0.0150)
R-squared	0.308348	0.270238	0.146439	0.179245
Adj. R-squared	0.303878	0.265522	0.140923	0.173940
Sum sq. Resids	1.138343	63.79993	9.576733	658.5193
S.E. equation	0.025862	0.193611	0.075012	0.622020
F-statistic	68.97955	57.29713	26.54541	33.79087
Log likelihood	3838.618	388.1833	2013.411	-1612.262
Akaike AIC	-4.465132	-0.438954	-2.335369	1.895288
Schwarz SC	-4.427000	-0.400821	-2.297237	1.933421
Mean dependent	-0.000533	-0.003395	0.000984	0.006297
S.D. dependent	0.030997	0.225913	0.080931	0.684382

Source: Author's estimation, 2018. Note that standard errors (S.E) are in parenthesis

The presence of cointegration between variables suggests a long-term relationship between the variables under consideration. The VECM can then be applied. The vector error correction estimate with the standard error in parenthesis for the long run relationship between dividend policy and banking performance for three co-integrating equations is presented in Table 6 above. To establish a long-run relationship, the ECT, that is, the coefficients of $\theta_5, \beta_5, \alpha_5 and\ \delta_5$ should be negative and statistically significant. A negative and significant ECT coefficient indicates that any short-term fluctuations between the regressors and the dependent variable will result in a stable long run relationship between the variables. The ECTs (ECT_{t-1}) are correctly signed and significant for the three (3) co-integrating

equations except RERA and CAR in COINTEQ1, DPOR in COINTEQ2 and RERA in COINTEQ3. This signals further that there is a possibility of causation between the variables in the models whose error terms are correctly signed. Furthermore, the C1 in the co-integrating equation is also correctly signed and it reveals that it will take 0.014, 0.383 and 0.050 percent, respectively for the maladjustment in the co-integrating equations 1, 2 and 3 to adjust to the long run equilibrium or stability. In examining the impact of the error correction of the dividend policy on banking performance, it was found from the fitted vector error correction mechanism that ROA at lag one and two and capital adequacy at lag one, have an inverse relationship with banking performance. Thus, $ROA_{(-1)}$, $ROA_{(-2)}$ and $CAR_{(-1)}$ will worsen ROA by 22.65, 9.79 and 0.14 percent, respectively.

However, $RERA_{(-1)}$ and $RERA_{(-2)}$, CAR(-2) and $DPOR_{(-1)}$ and $DPOR_{(-2)}$ have a direct relationship with ROA. This finding is in tandem with the empirical finding of Omran and Pointon (2004); Uwuigbe, Jafaru, and Ajayi (2012); Zhou and Ruland (2006); Ajanthan (2013); Ehikioya (2015) and Agyei and Marfo-Yiadom (2011) who concluded that dividend policy, be it payout or retention, has a positive relationship with and can affect value and shareholders' wealth across sectors and economies. However, our finding negates Onanjiri and Korankye (2014a) and Farsio et al. (2004) work that found that dividend policy has no moderating effect or relationship on/with performance. The results further reveal that $RERA_{(-1)}$, $RERA_{(-2)}$, $CAR_{(-2)}$, $DPOR_{(-1)}$ and $DPOR_{(-2)}$ will lead to improved performance of the banking industry by 0.46, 0.43, 0.90, 0.26 and 0.21 percent, respectively with CAR ranking the highest. CAR serves as a cushion for banking activities; thus, a bank that meets capital requirements has the capacity to adopt policies that enhance the viability, sustainability and continuity of banking activities with few challenges. Furthermore, banks that maintain a high capital ratio level have lower funding costs because they will suffer minimal prospective bankruptcy costs (Brighi & Venturelli, 2013; Magret, 2016; Odunga, Nyangweso, Carter, & Mwarumba, 2013).

Furthermore, the relationship between $RERA_{(-1)}$, $RERA_{(-2)}$ with DPOR is inverse/negative to the tune of 40.6 and 14.5 percent, respectively, and there is a direct/positive relationship between $DPOR_{(-1)}$, $DPOR_{(-2)}$ with RERA at 0.33 and 2.59 percent, respectively. This suggests a change in the channel of the relationship between these two dividend-polices in the SSA commercial banking sector. The C2 estimate of -0.00047 reveals the risk involved (0.047%) in enhancing improved bank performance through dividend policy during the period under investigation in SSA even though it is so small. The significance of the VECM is examined using the R-square statistic and it is shown that a 30.83 percent variation in the error associated with the performance of the banking industry can be explained by the dividend policy captured by the retention ratio, dividend payout ratio and capital adequacy ratio. The F- statistic value of 68.98 > $F_{0.05}(3, 1714) = 3.00$ shows that the fitted VCEM is statistically significant and hence adequate and reliable in determining the causal relationship between the dividend policy and banking performance.

4.3 Granger Causality Estimation

The fact that there is cointegration between two variables does not specifically show the direction of the causal relationship existing between the variables, if any. According to Fisher (1993), economic theory points to a causal relationship in at least

one direction in any co-integrated series. Granger causality tests (the Block Exogeneity Wald test and Pairwise) are conducted to detect the existence and direction of causation between the variables. In line with E. Gul and Ekinci (2006), the causal relationship (both short and long run causality) between variables can be established using probability and chi-square statistics under the null hypothesis of no causality. Table 7 below presents the estimate of chi-square statistics and the probability values.

Table 7. VEC Block Exogeneity Wald Test

Null hypothesis H_0 : There is no causality			
Dependent variable: ΔROA			
Excluded	Chi-sq	Df	Prob.
$\Delta RERA$	0.890986	2	0.0405
ΔCAR	2.315774	2	0.3141
$\Delta DPOR$	2.688046	2	0.2608
All	5.547671	6	0.4757
Dependent variable: $\Delta RERA$			
ΔROA	0.313638	2	0.8549
ΔCAR	2.521486	2	0.2834
$\Delta DPOR$	7.453895	2	0.0241**
All	11.31361	6	0.0792*
Dependent variable: ΔCAR			
ΔROA	15.20859	2	0.0005***
$\Delta RERA$	0.460199	2	0.7945
$\Delta DPOR$	4.170835	2	0.1243
All	23.77259	6	0.0006***
Dependent variable: $\Delta DPOR$			
ΔROA	0.378027	2	0.8278
$\Delta RERA$	8.088820	2	0.0175**
$\Delta DPOR$	4.091463	2	0.1293
All	13.30867	6	0.0384**

Source: Author's estimation, 2018. Note that *** represents rejection of H_o at 1%, ** represents rejection of H_o at 5% and * represents rejection of H_o at 10%.

The results on vector error correction Granger causality between financial performance and the dividend policy variables under consideration show the direction of the causal relationship between each pair of the variables such as ROA, retention ratio, capital adequacy ratio and dividend payout ratio. The table shows that there is uni-directional causality between RERA and ROA in SSA. This is in tandem with the findings of Omran and Pointon (2004) but contradicts those of Mougoué and Rao (2003). DPOR also has uni-directional causality with RERA. At the long run, ROA, CAR and DPOR granger cause RERA at 10 percent level of significance. ROA also has a uni-directional causality with CAR and at the long run ROA, RERA and DPOR granger cause CAR at 5 percent. There is also uni-directional

causality between RERA and DPOR which implies that there is bi-directional causality between the retention ratio and dividend policy ratio but at the long run, ROA, RERA and CAR granger cause DPOR at 5 percent level of significance.

The findings across different economies have switched in this study in the sense that RERA granger causes ROA as opposed to DPOR even though it is uni-directional. This implies that dividend payout policy is a luxury and a negative NPV transaction as posited by Allen and Michaely (2003); DeAngelo, DeAngelo, and Stulz (2006); David and Ginglinger (2016) and Karpavičius (2014); while RERA is regarded as a policy that enhances performance and promotes future growth that leads to value creation among SSA banks. This finding of uni-directional causality between RERA and ROA in SSA banks re-affirms the findings of Al□Twaijry and Powers (2007). These scholars averred that dividend payout policy has nothing to do with future income but is simply a signal of past performance. Damodaran (2009) maintained that valuation of banks via payout policy is vague s it does not show the real value of the bank. Managers strive to satisfy their shareholders' expectations due to the uncertainty, doubt and refinancing problems that might occur if they dabble in DRIPs and stop paying dividends (Acharya, Gabarro, & Volpin, 2012). When banks retain their profit, they have capacity to fund viable projects that yield more capital gain in the long run. The risk of uncertainty is minimal provided that the management team is monitored to undertake viable investments. According to Mizuno (2007), firms should only adopt payout policy that signals past performance to shareholders if they cannot identify and explore viable investment opportunities which will yield higher returns. It is high time that banks, especially those in SSA, realise that not all dividend paying banks are healthy and that healthy companies often cut dividend payments to shareholders and explore investment opportunities (see, http://www.flickrusertaxrebate.org.uk).

To re-confirm the causal relationship between these variables, the Pairwise Granger causality test is conducted following the empirical study of Dhamala, Rangarajan, and Ding (2008) who established a causal relationship between variables using F-statistics and their respective probability values.

Table 8. Pairwise Granger Causality Test

Null hypothesis	F-Statistics	P-Value	Decision	Type of Causality
DPOR does not Granger cause ROA	1.94201	0.143	Accept	No causality
ROA does not Granger cause DPOR	0.67541	0.509	Accept	No causality
RERA does not Granger cause ROA	2.86302	0.050**	Reject @5%	RERA → ROA
ROA does not Granger cause RERA	1.58319	0.205	Accept	No Causality
CAR does not Granger cause ROA	6.54151	0.002***	Reject@1%	CAR ↔ ROA
ROA does not Granger cause CAR	35.2727	9.E16***	Reject@1%	ROA ↔ CAR
RERA does not Granger cause DPOR	2.76686	0.063*	Reject@10%	RERA ↔ DPOR

Null hypothesis	F-Statistics	P-Value	Decision	Type of Causality
DPOR does not Granger cause RERA	2.33314	0.097*	Reject@10%	DPOR ↔ RERA
CAR does not Granger cause DPOR	0.17766	0.837	Accept	No causality
DPOR does not Granger cause CAR	2.78934	0.062*	Reject@10%	DPOR → CAR
CAR does not Granger cause RERA	0.81935	0.441	Accept	No causality
RERA does not Granger cause CAR	2.36086	0.095*	Reject@10%	RERA → CAR

Source: Authors estimation, 2018. *, **, *** represent 10%, 5% and 1% significance level.
→ denotes unidirectional causality and ↔ denotes bi-directional causality.

From the pairwise test in Table 8, RERA also granger cause ROA at 5 percent level of significance and this conforms to the findings generated from the VEC block exogeneity Wald test to confirm that among SSA banks, retention policy causes performance. There is also a bi-directional relationship between CAR and ROA. While it is uni-directional under the VEC Wald test, this implies that when banks adhere to the required capital conservation and buffer ratio, they will generate higher returns and if they operate with sufficient returns, they will be sufficiently liquid to finance all their activities and satisfy the requirements of the regulatory bodies, including capital adequacy.

Like the VEC Wald test, this study finds bi-directional causality between RERA and DPOR at 10 percent level of significance, which implies that when a bank explores growth opportunities, in the long run, the value created must fully maximise owners' wealth and lead to payout. Following the life cycle theory of dividend, a mature firm will need to payout dividends as much as possible because there will be limited opportunities to invest at this stage. Conclusively, this test finds that both policies, DPOR and RERA, granger cause CAR at 10 percent level. This implies that effective, suitable and implementable dividend policy results in adherence to capital requirements in the selected SSA banks for the period examined.

5. Conclusions

Having established the causal relationship between dividend policy and bank performance in order to bring to light different views on the two contesting policies in the banking sector, this study's findings reveal that both policies have a positive relationship with performance, but only retention policy (RERA) granger causes performance (ROA) in SSA banks. Banks across the world have long been known for their payout policy at the expense of viable investment opportunities that would enhance their activities (Jiraporn, Kim, & Kim, 2011). However, not all banks that are paying out are healthy.

Therefore, our findings from this study illuminates the long-existing puzzle on dividend and for the benefit of banking or other sectors of the world, the following reasons are identified as reasons for firms to cut dividend payments and start re-

investing their earnings: a) when the business model is less effective and long term growth is unlikely due to economic changes and externalities; b) the company needs to undertake a viable project or to complete the acquisition of a rival company; c) there is high degree of competition that is slowing down the growth of the company (See, www.imfultralong.org.uk).

Vividly, the final condition is indeed the situation in the banking sector in SSA. The Lerner's index of competition for SSA commercial banks is less than 0.5 which shows that they are highly competitive and have low market power. Hence, they struggle to survive and need to promote value creation by maximising all available investment opportunities to ensure that not only profit but wealth is fully maximised.

It is intensely spelt out from our findings that any firm operating agency relationship, not only banks across various economies of the world, should adopt DRIPs which is the policy this study finds causes SSA commercial banks' financial performance. It is by doing so that they can create future value and not merely signal past earnings. This thus sheds light on the puzzle of the dividend across the world, most importantly in the region's banking sector.

Just like every research do have impediments, so also does this study. The major limitation of the study is the inability to incorporate all the commercial banks in the whole 46 SSA countries (World Bank database) due to dearth of data. The lack of sufficient data is tantamount to laxity in implementation of national standards by SSA banks such that most countries are yet to adopt the international financial reporting standards (IFRS) and deposit insurance scheme. However, these limitations do not in any way affect the influence and genuineness of the findings from this study, as strong and reliable alternatives were explored. Since this study has been able to show vividly that out of the two contesting dividend policies in banking sector, retention policy is the dividend policy that causes bank performance (ROA), further research on this context should be conducted using the economic integrations or sub-regions within SSA as the case study and also, explore another measure of performance such as return on equity (ROE) or cost-to-income-ratio, this will give a room for comparison. In conclusion, further research on this subject matter in Africa and world over could extend the scope of the study by covering more than the study period examined in this study.

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FINANCIAL LITERACY AND STOCK PRICE INFORMATIVENESS: A CROSS-COUNTRY STUDY

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Abstract. This paper examines the impact of financial literacy on stock price informativeness in a sample of firms from 20 countries. Using four measures of stock price informativeness, we find a significant relationship between higher financial literacy and higher stock price informativeness. The individual investors' contribution regarding the incorporation of specific information into stock prices includes private information also and not mere specific information in the general sense. Financial knowledge is the key element that helps individual investors to incorporate specific information into stock prices.

JEL Classification: C13, G14, G15, I22

Keywords: price informativeness, financial literacy, financial knowledge, firm-specific information, private information

1. Introduction

The informativeness of prices facilitates the efficient allocation of resources. The hypothesis that managers can learn from the information in the stock price about the prospects of their own firms is supported by both theoretical models and empirical results. The basic idea is that investors incorporate specific information into stock prices about future investment and financing opportunities, thus guiding them in making corporate decisions, such as the decision on corporate investments. This theory is supported by the theoretical models proposed by Dow and Gorton (1997) and Subrahmanyam and Titman (1999) and by the empirical studies of Durnev et al. (2004), Chen et al. (2007), Bakke and Whited (2010), or Fressard (2012). See Bond et al. (2012) for an excellent survey on this topic.

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The purpose of this study is to see if higher financial literacy promotes a better incorporation of firm specific information into stock prices. Validation of such a result is important on several plans. First, financial literacy could be an important omitted variable in studies that examine cross-country differences in stock price informativeness. Second, the result would support the positive impact of individual investors in stock price formation, as debates about their contribution to the incorporation of specific information into stock prices are far from being completed in the literature. Thus, Odean (1998), Barber and Odean (2000) or Kumar (2009) have shown that individual investors are subject to fads and psychological biases, thus having a negative impact on stock prices. On the other hand, Evans (2008), Kelley and Tetlok (2013) or Wang and Zhang (2015) highlight the individual investors' positive effect on prices. Last but not least, it is highlighted that financial education improves financial outcomes, with important policy implications (see Hastings et al., 2003 for more details).

A number of studies indirectly support the hypothesis of this study, showing that financial literacy is predictive for investment behaviors of individual investors. Thus, Graham et al. (2009) have shown that financial skills are positively associated with better portfolio diversification, reduced home bias effect and more frequent stock trading. Financial literate persons tend to invest more in stock markets (Christelis et al., 2010, van Rooij et al., 2012) and choose a low fee investment portfolio (Choi et al., 2011).

2. Measurement of variables and model specification

2.1. *Measurement of stock price informativeness*

The endogenous variable of the study is stock price informativeness, which is quantified by two measures known in the literature: price synchronicity introduced by Mork et al. (2000) and the information measure of Llorente et al. (2002).

Price synchronicity, R^2, is the most popular and most commonly used measure of stock price informativeness. To distinguish firm-specific stock price variations from market-wide variations we estimate annually the model proposed by Jin and Myers (2006):

$$r_{i,j,t} = \alpha_{i,j} + \beta_{1,i} r_{L,j,t-2} + \beta_{2,i} r_{L,j,t-1} + \beta_{3,i} r_{L,j,t} + \beta_{4,i} r_{L,j,t+1} + \beta_{5,i} r_{L,j,t+2} + \beta_{6,i} r_{W,t-2} + +\beta_{7,i} r_{W,t-1} + +\beta_{8,i} r_{W,t} + +\beta_{9,i} r_{W,t+1} + \beta_{10,i} r_{W,t+2} + \varepsilon_{i,j,t} \quad (1)$$

where $r_{i,j,t}$ is the weekly return of stock i of country j in week t of year , $r_{L,j,t}$ is the weekly local market return of country j in week t, and $r_{W,t}$ is the weekly global market return in week t. Lead and lag terms are included to correct for nonsynchronous trading, phenomenon encountered in low-liquid stocks. Price synchronicity ($R^2_{i,j}$) is the coefficient of determination from model (1). It measures the relative amount of market-wide information versus firm-specific information impounded into stock price in a year, thus being an inverse measure of stock price informativeness. Given the cross-country nature of this study, we use an equally weighted average of the $R^2_{i,j}$s of the individual stocks in country j, denoted with R^2_j. We apply a logistic transformation to this variable in order to get a direct measure of stock price informativeness, accounting for the limitation within the interval [0, 1]:

$$\Psi_j = log\left(\frac{1-R_j^2}{R_j^2}\right) \quad (2)$$

Price synchronicity is a debated measure in literature, and it is not clear whether it reflects informativeness or noise traders (Teoh et al., 2009, Chan and Chan, 2014) or whether it is a direct or inverse measure (Dasgupta et al. 2010; Kan and Gong 2017). In addition, through construction, it captures all the specific information and not the mere private information that is really useful to companies' managers in their decisions.

For these reasons, the second measure used in this study is the information measure of Llorente et al. (2002). Annual amount of private trading information γ_{ij} is estimated for each firm-year from the time-series regression:

$$r_{i,j,t} = a_{i,j} + b_{i,j}r_{i,j,t-1} + \gamma_{i,j}\left(r_{i,j,t-1} \times V_{i,j,t-1}\right) + \varepsilon_{i,j,t} \quad (3)$$

where $r_{i,j,t}$ is the return of stock i of country j and $V_{i,j,t-1}$is log daily turnover of stock i detrended by substracting a 200 trading day moving average. Higher values of $\gamma_{i,j}$ denote more information-based trading incorporated in stock prices. The intuition behind this interpretation is that in periods of high volume, stocks with a a high degree of information-based trading tend to display positive return autocorrelation. Our dependent variable γ_j is an equally weighted average of the $\gamma_{i,j}$ of the individual stocks in country j.

2.2. *Financial literacy measures*

The exogenous variable of interest in this study is the financial literacy index. Various international institutions have conducted surveys on groups of countries, most notable being those conducted by Standard and Poor[1] in collaboration with several institutions, Mastercard[2] for Asian and European countries, and recently by the OECD. Of these, we chose in our study the OECD's survey, the main argument being the complexity of the administered questionnaires and the sample size of individuals. The full report of this inquiry can be found at: http://www.oecd.org/finance/oecd-infe-survey-adult-financial-literacy-competencies.htm.

The survey is conducted on 30 countries, of which 17 are OECD members. The sample consists of 51,650 adults aged 18 to 79, the questions in the questionnaires being focused on relevant aspects of financial knowledge, financial behavior and attitudes to longer-term financial planning. The financial literacy index is the highest for France (14.9p) and the lowest for Poland (11.6p). It is also noticed that the score of OECD member countries is significantly higher than that of non-member countries. For robustness, we will use the Financial Knowledge Index built on a set of 7 questions. Somewhat expected taking into account other measurements in literature, it takes the highest value for Hong Kong / China (5,8p) and the lowest for Malaysia and Belarus (3,8).

[1] For details, see http://gflec.org/initiatives/sp-global-finlit-survey/.
[2] For details, see https://www1.mastercard.com/content/intelligence/en/search.Report.html.

2.3. *Controls variables*

Based on the arguments and findings of previous studies (Mork et al., 2000, Chan and Hameed, 2006, Fernandes and Ferreira, 2009, Eun et al., 2015) we use the same control variables. Following Jin and Myers (2006), we construct an opaqueness measure, the diversity of analyst forecasts, as follows:

$$Diversity = \frac{\hat{\sigma}/\hat{\mu}}{\sqrt{N}} \quad (4)$$

where: $\hat{\sigma}$ is the standard deviation of the company's earnings forecasted by analysts in the following year, $\hat{\mu}$ is the mean forecast and *N* is the number of analysts following that company. The necessary data, with an annual frequency, are extracted from I/B/E/S International, taking into account only the constituents of stock market indexes. The second variable, Good Governement Index, is the sum of percentile ranks of government effectiveness and control of corruption. The two dimensions are constructed by Kaufmann et al. (2010) and come from Worldwide Governance Indicators. These data, along with GDP per capita, GDP growth volatility, the number of stocks and country geographic size are extracted from the World Bank database. Other control variables are industrial and firm Herfindahl indices determined on the basis of all quoted stocks on the markets in our sample. The last control variable is the cultural dimension – individualism/collectivism – obtained from Hofstede et al. (2010).

3. The data and descriptive statistics

Of the 30 countries in the OECD report, we have retained 20 – the ones which have developed or emerging stock markets according to MSCI, respectively 11 and 9. From the Thomson Eikon database, we extracted for the period 2004-2016 the weekly and daily closing prices in order to build the two measures of price informativeness, and the daily trading volumes. We applied a stock selection filter by retaining in sample only those stocks that were traded in at least 80% of the stock market sessions each year. Thus, a sample of 11,413 stocks was obtained. At the same time, we have extracted the equity weekly prices for each local stock market index and the MSCI World Index. All this data is denominated in dollars. Table 1 provides a summary of our sample.

The values of R^2 in Table 1 are not similar to those of Mork et al. (2000), which state that in developed markets price synchronicity is lower, therefore more specific information is incorporated into stock prices. They confirm the results of Eun et al. (2015) and makes us believe that financial literacy could be an explanatory variable in this respect. In the case of measure γ_j it is observed that the developed markets incorporate more private information than the emerging ones, the average γ_j being 0.015 and 0.0031, respectively. This, corroborated with the observation that the most financially literate nations are those with developed capital markets, makes us believe that financial literacy contributes to better incorporation of private information into stock prices.

Table 1. Summary statistics of the sample

Country	Stock index	Number of stocks	R^2	γ_j	*FL*	*FK*
Austria	ATX	68	0,3772	-0,0049	14.2	4.9
Belgium	BEL20	329	0,3557	0,0108	14.3	4.9
Brazil	BOVESPA	266	0,3372	0,0206	12.1	4.3
Canada	TSX60	745	0,3868	0,0481	14.6	4.9
Czech republic	PX	17	0,2964	-0,0027	12.6	4.4
Finland	OMXH25	141	0,4054	0,0203	14.8	5.2
France	CAC40	820	0,3269	-0,00008	14.9	4.9
Hong Kong	HSI	1352	0,2866	0,00043	14.4	5.8
Hungary	BUX	44	0,2208	0,0200	12.4	4.7
Korea (South)	KS11	2195	0,3713	-0,0027	14.4	5.4
Malaysia	KLSE	918	0,2895	0,0014	12.3	3.6
Netherlands	AEX	104	0,4173	-0,0042	13.4	4.9
New Zeeland	NZ50	146	0,3737	0,0318	14.4	5
Norway	OBX	172	0,3741	0,00259	14.6	5.2
Poland	WIG20	856	0,2123	0,0081	11.6	4.4
Portugal	PSI20	57	0,4051	-0,0258	14	4.8
Russian Federation	RTS	658	0,2669	-0,0056	12.2	4.1
Thailand	SET50	726	0,3750	-0,0018	12.8	3.9
Turkey	BIST30	417	0,4990	-0,0087	12.5	4.6
UK	FTSE100	1382	0,3325	0,0369	13.1	4.2

Note. The R^2 and γ_j are averages of annually values of synchronicity and information measure of Llorente. *FL* and *FK* are financial literacy index and financial knowledge index from OECD.
Source: author's calculations

4. Basic empirical results

To test the relation between the financial literacy and stock price informativeness, we estimate several specifications of the following model:

$$StocPriceInform_{j,t} = \alpha_0 + \alpha_1 FIN_j + \sum_k \beta_k Controls_{k,j,t} + \varepsilon_{j,t} \quad (5)$$

where $StocPriceInform_{j,t}$ is each of the two measures proposed for the stock price informativeness of country j in year t, FIN_j is financial literacy index respectively financial knowledge index, $Controls$ is a set of control variables and $\varepsilon_{j,t}$ is an error term.

Table 2. Regressions results

	Dependent variable					
	Ψ_j	γ_j	Ψ_j	γ_j	Ψ_j	γ_j
	(1)	(2)	(3)	(4)	(5)	(6)
FIN	0,0608*	0.0024*	0.065***	0.006***	0.135*	0.026***
	(1.67)	(1.78)	(3.57)	(4.23)	(1.86)	(3.56)
Analyst diversity rank	-	-	0.0055	0.030***	0.079**	0.032***
			(1.35)	(6.24)	(2.26)	(6.90)
Good Government Index	-	-	0.001	0.002***	0.0001	0.001***
			(0.36)	(6.96)	(0.15)	(5.51)
Ln(GDP per capita)	-	-	-0.173*	-0.031***	-0.216*	-0.04***
			(-1.95)	(-3.55)	(-2.08)	(-3.80)
GDP growth volatility	-	-	-1.417	0.094	-1.796	0.059
			(-0.59)	(0.22)	(-0.67)	(0.15)
Ln(number of stocks)	-	-	0.019	0.004**	0.001	-0.001
			(1.59)	(3.09)	(0.07)	(-0.04)
Ln(country size)	-	-	-0.038**	0.003*	-0.036*	0.001
			(-2.58)	(1.83)	(-2.10)	(0.88)
Ind. Herfindahl index	-	-	-0.517*	0.116**	-0.901*	0.015
			(-2.15)	(3.18)	(-2.14)	(0.25)
Firm Herfindahl index	-	-	0.251	-0.030	0.567	0.057
			(0.74)	(-0.72)	(1.31)	(0.91)
Individualism	-	-	0.004**	0.0001	0.006*	0.001*
			(2.88)	(0.26)	(1.92)	(1.93)
Constant	1.110***	-0.027	1.077	-0.180**	1.947**	0.028
	(2.93)	(-0.66)	(1.61)	(-2.83)	(2.51)	(-0.29)
R-squared	0.076	0.081	0.260	0.621	0.278	0.632

Note: Robust standard errors adjusted with country level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: author's calculations

We present the estimation results in Table 2. In models (1) and (2) we first consider a univariate model in which we regress Ψ_j and γ_j on the financial literacy index. In both cases the parameters are significant at 10% significance level indicating a direct link between stock price informativeness and the financial literacy index. With the introduction of control variables, the marginal effect of financial literacy on stock price informativeness increases from 0.0608 to 0.065 in model (3) and from 0.0024 to 0.006 in model (4). Both parameters are this time significant at 1% significance level. In the case of control variables, for the Governement Index and Individualism the signs of the coefficients are in line with those obtained by Fernandes and Ferreira (2009) and Eun et al. (2015), but for the Analyst diversity rank and GDP per capita variables the situation is different.

Financial education is the main component of the financial literacy index. A direct link between it and stock price informativeness measures is confirmed in Models 5 and 6 and supports the need to implement public policies that will lead to improved financial education.

Another interesting aspect is given by R^2 values. It is noticeable that it is higher when we use γ_j as a proxy for stock price informativeness than Ψ_j. The result is remarkable given that γ_j, by its construction, has the potential to capture more accurately the incorporation of private information into stock prices than Ψ_j.

In addition, we studied whether the other two components of the financial literacy index – financial behavior and attitudes to long-term financial planning – have an impact on price informativeness. Unreported results show that their parameters are not significant, indicating that financial knowledge is the main component of financial literacy with an impact on stock price informativeness.

5. Robustness tests

In Table 5 we present the results of several robustness tests. In models (1) – (4) price informativeness is measured using idiosyncratic volatility and illiquidity measure proposed by Amihud (2002). In models (5) and (6) we employ an alternative measure for financial knowledge from Executive Opinion Survey – the IMD World Competitiveness Yearbook (WCY).

Table 3. Robustness tests

	Dependent variable					
	$\log(\sigma^2_{\varepsilon,j})$	Illiq	$\log(\sigma^2_{\varepsilon,j})$	Illiq	Ψ_j	γ_j
	(1)	(2)	(3)	(4)	(5)	(6)
FIN	0.086***	0.002***	0.134*	0.003*	0.006**	0.031*
	(4.67)	(4.52)	(1.77)	(1.76)	(2.21)	(1.78)
Analyst diversity rank	-0.287***	-0.001**	-0.256***	-0.0002	0.032***	0.075**
	(-5.81)	(-2.69)	(-5.31)	(-1.35)	(7.43)	(2.41)
Good Government Index	-0.014***	-0.001***	-0.014***	-0.001*	0.00***	0.006
	(-5.51)	(-3.28)	(-3.56)	(-2.05)	(4.17)	(1.45)
Ln(GDP per capita)	0.266***	-0.0004	0.229**	-0.001	-0.034***	-0.136
	(3.90)	(-1.02)	(2.44)	(-1,65)	(-3.30)	(-1.61)
GDP growth volatility	2.478	-0.0012	1.963	-0.011	0.091	-2.029
	(0.32)	(-0.08)	(0.25)	(-0.55)	(0.23)	(-0.96)
Ln(number of stocks)	0.096**	0.0005	0.081	-0.0003	0.003**	0.031
	(2.25)	(0.43)	(1.40)	(1.38)	(2.22)	(1.40)
Ln(country size)	-0.032	-0.0001	-0.023	0.0001	0.003	-0.010
	(-0.83)	(-0.36)	(-0.48)	(0.26)	(1.67)	(-0.57)
Ind. Herfindahl index	-0.496	-0.003	-0.783	-0.0109	0.070	0.124
	(-0.56)	(-0.65)	(-0.66)	(-1.45)	(1.06)	(0.28)
Firm Herfindahl index	0.613	-0.002	0.832	0.003	-0.005	-0.296
	(0.60)	(-0.59)	(0.62)	(0.60)	(-0.08)	(-0.65)
Individualism	-0.001	0.0003*	0.0001	0.0003	0.0001	0.003*
	(-0.34)	(1.98)	(0.12)	(1.55)	(0.27)	(1.74)
Constant	-3.918***	0.0003	-2.988**	0.021**	-0.034	0.662
	(-4.63)	(0.10)	(-2.30)	(2.32)	(-0.27)	(0.68)
R-squared	0.390	0.549	0.376	0.421	0.622	0.242

Note: Robust standard errors adjusted with country level clustering are reported in parentheses. *, **, and *** indicate statistical significance at the 10%, 5%, and 1% levels, respectively.
Source: author's calculations

Idiosyncratic volatility is the residual variance from model (1). In fact, Ψ_j can be decomposed into firm-specific variation and market-wide variation:

$$\Psi_j = \log\left(\frac{\sigma^2_{\varepsilon,j}}{\sigma^2_{m,j}}\right) = \log\left(\sigma^2_{\varepsilon,j}\right) - \log\left(\sigma^2_{m,j}\right) \quad (6)$$

The variable $\log\left(\sigma^2_{\varepsilon,j}\right)$ is the logarithm of average residual sum of squares and $\log\left(\sigma^2_{m,j}\right)$ is the logarithm of average explained sum of squares from Eq. (1). Intuitively, a higher Ψ_j indicates the power of firm-specific variation ($\sigma^2_{\varepsilon,j}$) relative to market-wide variation ($\sigma^2_{m,j}$) in explaining the stock price movements of firms in country j. The central argument underlying this measure is that price synchronicity and idiosyncratic volatility are not equivalent in measuring the incorporation of specific information into stock prices. Li et al. (2014) show that the two may lead to contradictory inferences, especially if there is a correlation between systematic risk and the variable of interest, such as financial literacy or financial knowledge. We use $\log\left(\sigma^2_{\varepsilon,j}\right)$ as an endogenous variable in models (1) and (3) of Table 3. The positive parameters of FIN variable indicate a direct relationship between the financial literacy index/ financial knowledge index and the incorporation of specific information into stock prices.

The illiquidity ratio of Amihud (2002) was employed in the literature as measure of stock price informativeness by Ferreira et al. (2011), Fresard (2012) or De Cesari et al. (2015). For each stock, we calculated this measure annually using the relation:

$$Illiq_{i,t} = \frac{1}{D_{i,t}} \sum_{\tau=1}^{D_{i,t}} \frac{|R_{i,\tau}|}{Volume_{i,\tau}} \quad (7)$$

where $D_{i,t}$ is the number of valid observation days for firm *i* in year *t*, $R_{i,\tau}$ is firm *i*'s daily return and $Volume_{i,\tau}$ is the dollar volume of firm *i* on day τ. $Illiq_{i,t}$ is a price impact measure. According to Kyle (1985), the magnitude of the price impact should be a positive function of the perceived amount of informed trading on stock prices. The endogenous variable used in models (2) and (4) of Table 3 is an equally weighted average calculated for each market and each year. The positive and significant parameters indicate that financial literacy (model (2)) and financial knowledge (model (4)) have a positive impact on the incorporation of private information.

In models (5) and (6) of Table 3 we used an alternative measure of financial knowledge from the Executive Opinion Survey – the IMD World Competitiveness Yearbook (WCY). This was recently used by Giofre (2017), which shows that it is a significant factor explaining foreign portfolio investment. In this case also, the positive parameters of the FIN variable indicate a positive relationship between financial knowledge and the incorporation of specific information into stock prices, regardless of whether the measure used is price synchronicity or that of Llorente (2002).

6. Conclusions

In this study we have formulated and validated the hypothesis that the stock prices are more informative on the stock markets of more financial literate nations.

Cross-country results are obtained for 20 stock markets for the period 2004-2016. Four price informativeness measures have been used, taking into account all listed stocks in these markets. Price synchronicity and idiosyncratic volatility measure the incorporation of specific information into stock prices, while the measures of Llorente (2002) and Amihud (2002) particularly capture the incorporation of private information into stock prices. It can be seen that the contribution of individual investors regarding the incorporation of specific information into stock prices also includes private information and not only the specific information in the general sense. In addition, we have found that financial knowledge is the main component of financial literacy that contributes to better incorporation of specific/private information into stock prices.

Our results have implications in several directions. First, the study suggests that financial literacy is an important omitted variable in studies that examine cross-country differences in stock price informativeness. This variable should be included alongside with the traditional ones from literature when researchers draw cross-country inferences from stock markets. Second, on the assumption that institutional investors have higher capacities and knowledge that are not measured by the financial literacy index, our study supports the positive impact of individual investors in the process of stock price formation. Third, the results of our study join the rich literature that demonstrates the need to adopt public policies aimed to increase the nations' financial knowledge.

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WHAT MONGOLIA PRODUCES THAT THE WORLD SHOULD KNOW ABOUT? CONSUMERS' INFORMATION PROCESSING MECHANISMS

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Abstract: The present study attempts to understand the use of three information processing mechanisms – cognitive, affective, and normative – to assess the quality of cashmere products made in Mongolia. For attaining the above aims, semi-structured interviews were conducted to test a framework that resulted from literature reviewed on country of origin (COO) effect and information processing mechanisms. Results demonstrate that for Business-to-Business (B2B) clients, the COO is an extremely relevant cue to evaluate the quality of cashmere. Conversely, most of the consumers do not seem to include the COO effect on their information processing and base their evaluation on four distinct product-related attributes: quality, brand, social status, and price. Results are relevant for the Mongolian cashmere industry, as well as for marketers interested in understanding what drives consumers of cashmere in their buying decisions. We also understand these findings to assist in improving the image of Mongolia as one of the world's best manufacturers of cashmere.

JEL classification: M31, M38

Keywords: Information Processing Mechanisms, COO effect, Cashmere products, Mongolia, Product-related attributes.

1. Introduction

Mongolia is considered the second most prominent Manufacturer of raw cashmere and according to the National Statistics Office of Mongolia, in 2016 Mongolia's production of raw cashmere reached 8,900 tons, and was responsible for 30 to 35% of the world's supply of this commodity. However, the Mongolian Ministry of Foreign

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Affairs and Trade and United Nations Development Program Trade Policy and Human Development (2009) stated that only 10 to 15% of its fibre is used by domestic companies to manufacture products made of this material, while the rest is mainly transformed in semi-processed cashmere that is mostly exported to China, Italy, Japan, and the UK. As a result, there seems to be value in the cashmere production that has been passed to other countries. Hence, there seems to be an overall positive perception on the cashmere 'Made in' Mongolia, which is probably being neglected by its manufacturers. Moreover, even though Mongolian cashmere is one of the most desirable fibres in international markets due to its superior length and thickness (Tuvshintugs, Bumchimeg & Erdenebulgan, 2015), the lack of products labelled as being made with Mongolian cashmere tends to hinder them from benefiting from the Country of Origin (COO) effect, which could positively affect consumers' perception about the quality of these goods (Lee, Lo, & Enkhtuvshin, 2010). In studies, notwithstanding that the concept of COO has been extensively researched by academics (Dinnie, 2008), few scholars have focused their investigations on the impact that COO may have on products made in less developed countries like Mongolia; hence, this study investigates the COO effect on consumers' information processing mechanisms (i.e. cognitive, affective, and normative), as well as the factors that have stronger impact on consumers' perception and evaluation of cashmere products made in Mongolia. We will examine the relevance of the COO effect on consumer's information processing mechanisms; and the significance of product-related attributes in the process.

2. Theoretical background and model development

2.1. Country of Origin: An overall perspective

At the beginning of the 1960s, Dichter's (1962) research revealed that consumers seem to be influenced by the country where a certain product is made, leading them to accept or refuse to purchase the good depending on its origin. The first empirical study that was able to find the effect of Country of Origin (COO) on consumers' evaluation of products was developed three years later by Schooler (1965) who discovered that consumers tend to associate products with their country of origin. Moreover, the investigation showed that consumers' opinion about a product is influenced by the COO effect, which seems to have an impact on their buying behaviour (Schooler, 1965). Similarly, Nagashima's (1970) research findings revealed that the image, reputation, and sometimes the stereotypes that businessmen and consumers develop about a certain country tend to be attached to the products manufactured by that nation. Furthermore, the generalizations and perceptions that seem to be rooted in consumers' minds, which Nagashima (1970) associates with the concept of country image, have an impact not only on consumers' product evaluation, but also on their decision-making process (Hunjra, 2015).

Therefore, the COO effect can be defined as the influence – positive or negative – that the country of manufacture may have on consumers' information processing that involves their choices (Samiee, 2016), as well as their subsequent behaviour (Rezvani, 2012).

However, authors like Papadopoulos (1993) considered the concept of COO to be substantially narrow, especially regarding the global production system, where products may have different provenances depending on the place where they were designed, manufactured, or even assembled. Consequently, Papadopoulos (1993) introduced a broader construct: Product-Country Image that associates the image of a given nation to the role played by the origin of the product, which acts as an extrinsic cue, and becomes part of the good's overall image.

On the other hand, depending on a country's political, economic, technological, and social environment, consumers may develop a particular attitude towards its products and brands (Ammi, 2013); thus, consumers' perception of the quality of a given product tends to be closely associated with their knowledge about the country where the product was made, and in certain cases, with the nation's level of economic development (Bertoli, 2013). Consequently, products from more developed countries generally tend to have a more positive image than those manufactured in less developed nations, which will influence consumers' perception about the quality of the goods (Apetrei, 2010). Products from less developed countries, As a result, may face some barriers and constraints regarding their entry and positioning in the international arena (Došen & Previšić, 2001).

The COO effect on Consumers' Information Processing Mechanisms

Research regarding the way consumers perceive and evaluate a product revealed that when consumers are processing products' COO information they tend to rely on three mechanisms: cognitive, affective, and normative (Table 1) (Johansson, 1989; Obermiller & Spangenberg, 1989). As a result, these three processes seem to influence consumers' perception about the overall evaluation of the products (Johansson, 1989; Obermiller & Spangenberg, 1989; Fischer, 2017).

Table 1. Examples of Consumers' Information Processing Mechanisms

Mechanism	Description	Major findings
Cognitive	COO is a cue for product quality	Country of origin is used as a "signal" for overall product quality and quality attributes, such as reliability and durability (Li & Wyer, 1994; Steenkamp, 1989).
Affective	COO has symbolic and emotional value to consumers	Country of origin is an image attribute that links the product to symbolic and emotional benefits, including social status and national pride (Askegaard & Ger 1998; Batra et al., 1998).
Normative	Consumers hold social and personal norms related to COO	Purchasing domestic products may be regarded as a ``right way of conduct'', because it supports the domestic economy (Shimp & Sharma, 1987). By the same token, consumers may refrain from buying goods from countries with objectionable activities or regimes (Smith, 1990; Klein, Ettenson & Morris, 1998)).

In the case of cognitive process, scholars argue that it is used as a cue, a signal, of the quality of the products (Bloemer, Brijs, & Kasper, 2009; Fischer, 2017), even though this mechanism may also be associated with emotions, pride, status, authenticity, as well as identity or other attributes related to consumers' self-expression (Fischer, 2017). Hence, apart from the intrinsic cues that are associated with the physical characteristics of the products, consumers may also use extrinsic cues like COO during their information processing (Veale, 2006).

Similarly, the affective mechanism seems to be closely related to consumers' emotional feeling towards a product's COO, which can involve not only their memories about a given country, but also consumers' national and ethnic identities (Fischer, 2017). Therefore, the affective process does not tend to be based on consumers' knowledge about the products, but on their personal perception of the product's COO image (Askegaard & Ger, 1998). Consequently, depending on the item's COO, the affective mechanism may alter consumers' information processing in a positive or negative manner (Fischer, 2017). The normative process tends to be connected to consumers' intentions towards the purchase of a product, which seem to be driven by the notion of ethnocentrism and the moral reflections that result from the cues associated with COO (Bloemer, Brijs, & Kasper, 2009). Hence, this mechanism is closely related to consumers' norms and personal beliefs regarding the purchase of national or foreign products, and the moral issues associated with such action (Shimp & Sharma, 1987).

In sum, the cognitive mechanism is related to consumers' knowledge about a product's COO, the affective process is associated with the emotional value that consumers attribute to the country where the item was made, while the normative mechanism exposes consumers' norms and beliefs towards the purchase of a product from a given nation (Roth, 2008). It is important, nevertheless, to stress that apart from the COO effect, consumers' knowledge about a specific product may act as an important factor, which can affect consumers' purchasing decisions (Veale, 2006; Lee, 2009). At the same time, the characteristics of a product, such as its price, brand, physical attributes, as well as the manufacturer's guarantee can also influence consumers' decisions towards the purchase of the product (Agrawal & Kamakura, 1999).

The COO effect on consumers' evaluation of product-related attributes

The perceived quality of a product seems to be closely associated with consumers' perception of the item's overall quality or superiority in comparison to similar products, and it is also connected to the product's main usage (Olson & Jacoby, 1972). Moreover, consumers tend to assess the quality of a product based on its intrinsic and extrinsic cues, where the former (i.e. intrinsic) are usually associated with the physical attributes of the item, such as its design, colour, texture, and the materials used in its composition (Olson & Jacoby, 1972). In turn, extrinsic cues are more subjective characteristics of the product like brand, price, guarantee, COO, social status (Table 2).

Research findings revealed that COO can become an important extrinsic cue for consumers when assessing the quality of a specific product, especially when they are unfamiliar with the item (Ammi, 2013), even though consumers may also use

other extrinsic cues like price to evaluate the product's quality (Ammi, 2013). Furthermore, apart from the fact that COO apparently influences consumers' perception regarding the quality of a product, it may also have an impact on their attitudes, behaviours, and purchasing decision process (Ammi, 2013; Baker & Ballington, 2002).

Table 2. Products' Extrinsic and Intrinsic Cues

Extrinsic cues - External Characteristics	Intrinsic cues – Physical characteristics
— Country of Origin	— Quality
— Brand Name	— Style / Design
— Price	— Texture / Material
— Social Status	— Product Color
— Advertisement	— Packaging
— Warranty	

2.2. Model Development

Based on the literature review, and especially on consumers' information processing involving cognitive, affective, and normative mechanisms, we developed a model (Figure 1) that seeks to explain the COO effect on the way consumers process the information about a specific type of products: cashmere goods made in Mongolia. In order to test this framework, and at the same time to understand which factors have a stronger effect on consumers' perceptions and evaluation of cashmere products manufactured in Mongolia, we chose to approach three distinct groups of respondents: products, distributors, and consumers.

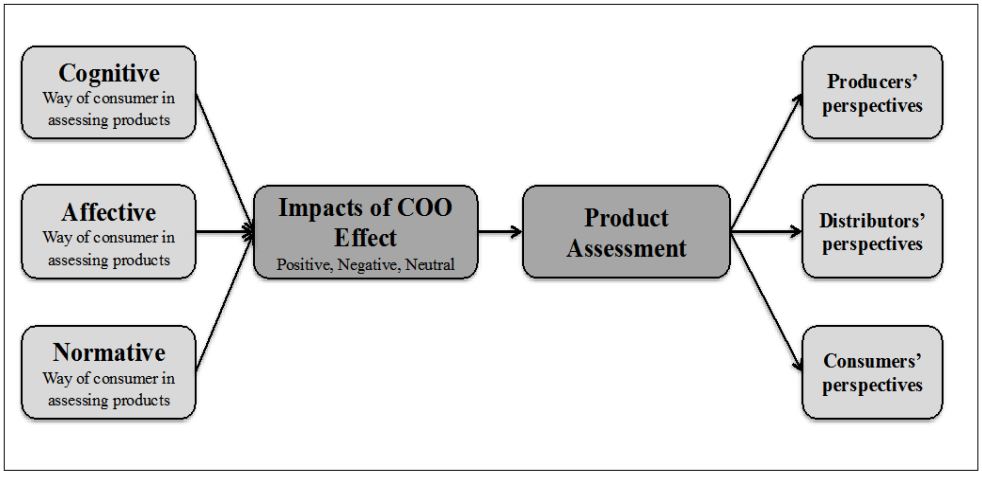

Fig. 1. Consumers' information processing mechanisms and the COO effect.

3. Research method

Based on the model presented in the previous section (Figure 1), we use a case study methodology to explore the impacts of the COO effect on consumers' perception regarding cashmere products made in Mongolia. Moreover, we aimed to identify and comprehend what are the important product characteristics that may influence the consumers' information processing, along with their evaluation of this specific type of products (i.e. cashmere goods manufactured in Mongolia). Therefore, this study followed the exploratory case study method that seeks to investigate a contemporary phenomenon in depth, and within its real-life context (Yin, 2009). Using this approach, we will create multiple sources of evidence regarding to consumer's perception and evaluation of product, which would provide significant knowledge on how consumers act in response to the cashmere industry's practices in Mongolia, and develop some guidelines to improve this sector. The present exploratory case study used semi-structured interviews, as suggested by Saunders (2017), considering that these permit researchers to explore perspectives and perceptions (Ritchie, 2013), and also considering that, that these provide rich and complex information about the topic (Cavana, Delahaye, & Sekaran, 2001). At the same time, through the use of semi-structured interviews, respondents are able to explore their own reasoning in a less restrict manner, and simultaneously to interpret their experiences, as well as to express their opinions (Ritchie, 2013). The use of the semi-structured interviewees for this study comprises both structured and unstructured characteristics with a frame of open-ended questions based on each groups of respondents and the key issues are explored and clarified by additional questions during the interviews. Hence, the semi-structured interviews were designed to test the model, and to identify which of the three mechanisms (i.e. cognitive, affective, or normative) are mostly used by consumers when processing information about cashmere products made in Mongolia.

Moreover, using their model as a theoretical framework, we chose to employ the open coding method to manually identify the original phenomenon, which allowed the production of a list of themes that were considered important for data analysis.

Data collection and sample

The use of a non-probabilistic sample technique does not intend to retrieve generalizations that can be applied to the overall population, but to develop an in-depth exploration of the general phenomenon that is being studied (Creswell, 2013), where participants are chosen through a purposive sampling procedure based on their knowledge about the topic under research. The purposive sampling procedure allows authors to select participants based on their anticipated richness and relevance of information to the objectives of study (Yin, 2015). By employing the exploratory case study, the researchers are able to closely examine the data within a specific context, selecting a very limited number of respondents to be the subjects of the study (Zainal, 2007).

In this research, data was collected from semi-structured interviews of 11 key participants from three distinct groups of respondents: manufacturers, distributors, and consumers (Table 3), where the former (i.e. manufacturers and distributors) were chosen due to their knowledge, experience, and expertise in the cashmere industry,

as well as their involvement in the different stages of the supply chain. A sample of representatives of manufacturers and distributors was to demonstrate specifications of data which from the information that consumers holding in the mind may be used to identify their position regarding to COO effect.

Table 3. List of Respondents

Interviewee	Age	Gender	Nationality	Position	Duration of employment	No. employees
Manufacturers						
Manufacturer 1	54	Female	Mongolia	CEO	10 years	1200
Manufacturer 2	30	Male	Mongolia	Marketing	7 years	800
Manufacturer 3	29	Female	Mongolia	Sales Manager	8 years	120
Distributors						
Distributor 1	32	Male	Sweden	Salesman	4 years	-
Distributor 2	45	Male	Portugal	Distributer	15 years	-
Distributor 3	38	Female	Mongolia	Manager	10 years	-
Consumers						
Consumer 1	27	Female	Spain	-	-	-
Consumer 2	34	Female	Russia	-	-	-
Consumer 3	24	Female	China	-	-	-
Consumer 4	44	Male	Italy	-	-	-
Consumer 5	54	Male	Portugal	-	-	-

Due to geographical constraints, the interviews for three respondents were conducted via Skype, four were in person, one by email, and three by telephone. Afterwards, the data from the recorded and transcribed interviews was analysed using the open coding method, as suggested by (Saldãna, 2015), in order to manually identify the initial phenomenon following the model previously developed. After the coding, data was rearranged and categorized into different sections, which allowed the identification of similarities and differences across individual information in order to create more specific data; at the end, generalization was completed to understand the different interpretations, behaviours, and needs, and so on, that exist within interviewees (Fischer, 2017).

4. Data analysis

The study determined the impact of COO effects on product assessment and other product related attributes under cognitive, affective and normative mechanisms. The analysis of the data retrieved from the semi-structured interviews has led us to divide the results according to each group of respondents: manufacturers, distributors, and consumers.

Manufacturers' perspectives regarding consumers' information processing mechanisms

According to the three respondents from the manufacturers' group, there are some differences between business to business (B2B) clients and consumers, especially regarding the effect of COO as a quality indicator in terms of cognitive mechanism. In fact, importers of cashmere goods seem to consider the COO of these products extremely relevant, particularly if they are originally from China or Mongolia, where the latter is perceived as a manufacturer of good quality cashmere products.

As mentioned earlier, there are two countries that supply 90 to 95% of the world's raw cashmere: China and Mongolia. Since the COO effect seems to play an important role for B2B clients when assessing the quality of cashmere products, the overall image of the country apparently affects their decision to engage in a fruitful business relationship with a more reliable partner (i.e. Mongolia).

> *"Many of our foreign clients choose our company not only because we meet the Western standards, but also due to the fact that we always send a sample of the semi-processed cashmere to the Cashmere and Camel Hair Manufacturers Institute, so it can be tested for its quality." (Manufacturer 2)*

However, in the specific case of labelling, while some clients require that the items are tagged as being made in Mongolia, others prefer that the products do not carry "Made in Mongolia" in their label. In fact, some intervenient in this process seems to understand that the effect is neutral, as final clients, in their opinion, have no product recognition, and in this case they do not believe that carrying the "made in" label will provide a special value to the product. In this case, the lack of information seems to affect the consumer's information processing mechanism. Other cases are in which the absence of an attitude towards the country leads to a preference for the "made in" absence.

> "*Even though some of our products are exported with the label 'Made in Mongolia', several of our clients from Canada, South Korea, and the U.S. request that the products only bear their own labels."* (Manufacturer 3)

In turn, the affective process seems to be mainly related to B2B clients' perception of the prestige / reputation of the manufacturing company, as well as its national image. As a result, these clients tend to positively associate Mongolia to a country with natural resources that contribute to the breeding of excellent cashmere goats. Conversely, consumers do not seem to be emotionally attached to the product's COO. On the other hand, manufacturers apparently do not find the normative process a relevant part of consumers and B2B clients' information processing regarding the COO effect, since both segments do not tend to be driven by personal norms or beliefs concerning the purchase of national or foreign products.

Main players in this sector provided useful information and new insights on consumer information processing. Figures 2, 3 and 4 summarize information concerning insights from manufacturer, distributor and consumer's points of view.

Cognitive	Affective	Normative
✓ COO is an important cue indicator for quality among B2B clients ✓ Product labeled as "Made in Mongolia" is irrelevant for majority of B2B clients ✓ Cashmere-made final products are of same quality as those made in Europe. ✓ Technological competence of company is a substantial indicator for B2B clients ✓ For consumers, quality is main preference to indicate quality. ✓ Consumers who know quality and superiority of cashmere give minimal consideration on price ✓ Majority of consumer cannot indicate if the cashmere-made final goods are 100 % pure or not	✓ Social status of company is an important information cue for B2B ✓ B2B clients have a positive image of Mongolia. They look at Mongolia as a country of cashmere. ✓ Majority of consumers are emotionally appealed to appearance of product's design, color, and brand name. ✓ Brand represents personal identity and social status of consumer	✓ Many local companies are against Chinese-invested companies because they are the biggest competitor ✓ China's investments in semi-processing companies are still increasing in Mongolia ✓ Increasing public awareness and promoting domestic products

Fig. 2. Relevant insights from manufacturer's point of view

Distributors' perspectives regarding consumers' information processing mechanisms

Respondents from the distributors' group seem to perceive that most consumers are not well-informed about cashmere products' COO, which leads them not to consider it a relevant part of their information processing regarding this type of goods. This way, when product COO is absent or cannot be detected, consumers redirect their attention to the brand to evaluate product's quality. Besides the COO, consumers direct their attention to the exam of other product related characteristics that might be considered in the attempt to perceive the value of the different types of cashmere made goods.

> "*In Europe, cashmere is associated with very timeless products, so country of origin is not a priority for consumers to evaluate this type of products."* (Distributor 2, Portugal)

> "*In the last four years I've been working as a retailer in Sweden, and I can't recall one single case when consumers gave any attention to the cashmere products' country of origin.*" (Distributor 1, Sweden)

As regards the affective mechanism, only the Mongolian distributor (Distributor 3) recognized that after visiting Mongolia, consumers seem to develop an emotional bond to cashmere products made in this country. The previous knowledge seems then to be important in the ascertainment of a positive effect to cashmere made in Mongolia. There is room to think that this positive attitude, when existent, drives consumers to pay attention to other product related attributes.

> "*When foreign consumers visit our country, mostly in the Summer, and they are in contact with cashmere goods, they seem to develop some awareness of the quality of these products, which tends to lead them to perceive cashmere as being part of the identity of Mongolia*." (Distributor 3, Mongolia)

Moreover, in the specific case of the Swedish distributor, the normative process may influence consumers' information processing regarding the product's COO. In fact, even though this country supports local industries in an attempt to increase awareness and promote the products that are manufactured in Sweden, local consumers do not seem to have developed any sort of negative beliefs about cashmere products' COO. In the next figure (Figure 3) we can see that, in distributor's opinion, the second element to use when setting consumer's preferences is brand and not COO.

Cognitive	Affective	Normative
✓ COO is not a quality indicator for consumers in general ✓ Majority of consumers indicates quality based on the brand ✓ For knowledgeable consumers, they first appreciate quality and then brand. ✓ In Europe, consumers associate cashmere with very timeless items, almost eternal.	✓Cashmere-made garments are associated with luxury and products of excellence that offer symbolic value to consumers ✓Attractiveness of cashmere includes qualities such as warm, soft, long-lasting, and ecological ✓Majority of consumers are aged above 40 that means cashmere-made final products are noted by a very particular market range	✓In Europe, there is no negative awareness about cashmere-made final goods ✓Consumers who have less knowledge about cashmere-made final goods often judge their prices as very expensive

Fig. 3. Relevant insights from distributor's point of view

Consumers' perspectives regarding the information processing mechanisms

Aside from the consumer from Russia, the rest of the respondents do not seem to be aware that Mongolia is one of the leading countries that produces and manufactures cashmere products. Most of the participants tend to associate these goods' provenance with distinct parts of the globe, such as India, Australia, and the Middle East. As a result, except the Russian consumer to whom COO is a signal of cashmere products' quality, COO does not seem to play an important role on

consumers' cognitive evaluation of this type of goods. In this case, we identified that, product COO - considered as a cognitive component to evaluate products – is not relevant in the decision making process. Consumers are much more concerned with the quality of the product, as we can see by the following comments.

> "*For me country of origin is not an important factor to evaluate the quality of cashmere products, because most of these products are made by international brands like Hermes."* (Consumer 1, Spain)
>
> "*I'm not really concerned about country of origin or where cashmere products are made.*" (Consumer 5, Portugal)

Similarly, the one from Portugal – revealed that the affective mechanism might alter his information processing regarding cashmere products, even though in this case the respondent associated these goods with the memories of a specific purchase in Italy. In this case, results seem to indicate that consumer's product familiarity influences the way in which information is processed and stored: familiarity with the product seems to be related to product COO.

> "*I bought my first overcoat in Italy 15 years ago and I still have it.*" (Consumer 5, Portugal)

Interestingly, the Chinese consumer's statements showed that the normative mechanism may be an important part of her information processing, since the negative image that the interviewee holds of her home country seems to lead her to purchase cashmere products made in other nations.

> "*I prefer to buy cashmere products that are made in other countries, instead of those that are produced in China, even if the price is higher, because I feel more satisfied with products manufactured in European countries.*" (Consumer 5, China)

In Figure 4 we can find the most relevant insights from consumer's point of view.

Cognitive	Affective	Normative
✓ Majority of consumers have no idea about countries that produce cashmere ✓ COO is not a quality indicator among consumers. ✓ Some consumers indicate quality based on the brand ✓ All the consumers agreed that final decision on purchasing cashmere garment depend on both extrinsic and intrinsic information cues	✓Consumers have different emotional values relating to cashmere-made final goods • More positive feeling about brand than product COO • Emotionally attached to the design • Admire cashmere-made final goods due to durability of product • Warm and soft ✓Cashmere is luxury good that represents social status	✓Chinese consumer has negative image of her own country. ✓Personal morality is very strong for some consumers. As long as consumers are satisfied with product, COO and brand are useless information cues. ✓ Nowadays, trusting brand is more than trusting product COO.

Fig. 4. Relevant insights from distributor's point of view

5. Discussion

Apart from studying the COO effect on consumers' information processing, and based on the literature review, we decided to include in this research consumers' perception and evaluation of products that seem to go beyond the COO effect. Moreover, by conducting semi-structured interviews to three distinct groups, the investigators were able to recognize that B2B clients and consumers have two different perspectives about the perception and evaluation of cashmere products.

B2B clients' perception and evaluation of cashmere products

The interviews conducted with manufacturers showed that brand and design do not seem to influence B2B clients' evaluation of cashmere products, which is more than understandable in the B2B context where clients use Mongolian companies to manufacture their previously designed items. However, the reputation / prestige of the company is apparently a relevant cue for B2B clients, which tends to be associated with the firm's technological capability and product quality. Therefore, as a direct consequence of B2B clients' concern for product quality, the manufacturers' technological capabilities tend to be pointed as an important factor that may affect the supply chain, since the technological competencies of the firms have a direct impact on their clients' confidence, the quality of products, the lead-times, and profitability.

Consumers' perception and evaluation of cashmere products

According to the data analysis of the interviews with distributors and consumers, we found that the COO of cashmere products does not seem to be considered an important cue for consumers when they evaluate the goods. In fact, consumers tend to mainly base their evaluation of this kind of products on four distinct signals: quality, brand, social status, and price. Moreover, based on their expectations and personal identities, consumers apparently are not emotionally attached to the product's COO.

Interestingly, respondents from the distributors' group seem to perceive that consumers of cashmere products attribute more relevance to the quality of these goods, placing less importance on extrinsic cues like brand, the origin of the products, the design, or even the price.

> "*Consumers who purchase cashmere products are usually well-informed people that base their evaluation of these products mainly on the quality of the garments.*" (Distributor 2, Portugal)

Hence, the quality of a cashmere product seems to be a primary cue for consumers to evaluate the item, while COO as a quality indicator tends to represent a minor consideration for them. On the other hand, the brand is apparently also an important hint, since consumers tend to assess the quality of the item using its brand as a cue.

> "*I believe that the brand is a symbol that represents everything about the product, especially its quality.*" (Consumer 4, Italy)

"*For me the brand is a quality indicator and it represents everything about the product.*" (Consumer 1, Spain)

However, when in the presence of the product, consumers tend to judge its quality through touch because they can feel the material and its texture. In turn, consumers who are considered as well-informed regarding cashmere products and know about the superiority of cashmere as a warm, soft, long lasting, and ecologic material apparently evaluate those items in accordance to their quality and brand, while disregarding the price. Therefore, apart from quality *per se*, brand is perceived as an important indicator of the quality of the good.

At the same time, Western and Mongolian consumers tend to associate cashmere products with the idea of luxury and excellence, which seem to offer a symbolic value to consumers and a way for them to show their social status.

"*For Mongolian consumers, cashmere garments represent somehow their social class, and so they are willing to buy these products especially to wear in distinctive occasions like New Year's Eve or the Lunar New Year.*" (Distributor 3, Mongolia)

Additionally, while some consumers seem to be more concerned about the prestige of the retailer that sells high quality cashmere products, the Russian consumer claimed that design plays a very important role in her evaluation of this kind of items.

6. Conclusions

This research was based on a theoretical framework developed by we, which attempted to understand the COO effect on the three information processing mechanisms: cognitive, affective, and normative. The analysis of the data obtained through semi-structured interviews of three distinct groups – manufacturers, distributors, and consumers – revealed that most consumers do not seem to be able to identify the main countries that produce and manufacture cashmere products. This finding showed that apparently COO is not the main indicator of the product's quality, and consequently does not seem to have an impact on consumers' information processing. In fact, even within the segment of well-informed consumers who seem to know about cashmere and its properties (viz. warmth, softness, durability) the COO effect does not influence their information processing nor their overall evaluation of the product, which is in line with Veale, (2006) and Lee, (2009) research findings. Moreover, when consumers evaluate cashmere products, they tend to rely on four specific cues: quality, brand, social status, and price.

On the other hand, research findings concerning the use of the cognitive mechanism among B2B clients revealed that they tend to consider the products' COO as an important cue to evaluate cashmere goods' quality, which is in line with previous results from Bloemer, Brijs, & Kasper, (2009) and Fischer, (2017). In turn, the affective process regarding B2B clients' information processing seems to be mainly influenced by the positive image that these consumers have of Mongolia, which is similar to the findings from Hunjra (2015), Ammi (2013), Lee (2009), Veale (2006), Nagashima (1970) and Papadopoulos (1993). Interestingly, the normative mechanism does not seem to be important for B2B clients neither for most consumers' information processing.

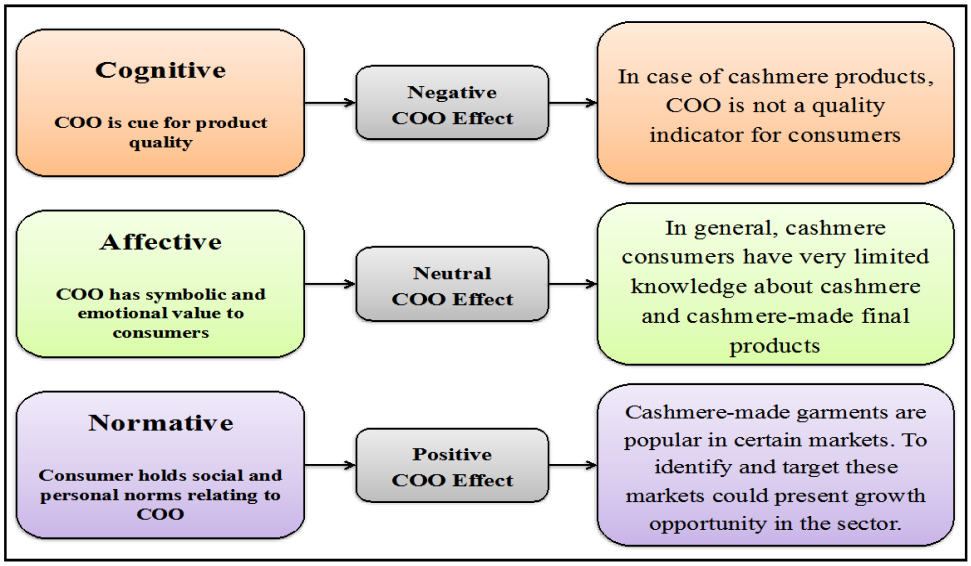

Fig. 5. Results of COO Effects on Consumer Information Processing Methods

Managerial implications

In recent years, there has been an increasing demand for cashmere goods, which can be considered an important opportunity for the cashmere industry in countries like Mongolia – the second largest supplier of raw cashmere – to increase consumers' awareness in international markets about the uniqueness of Mongolian cashmere and the goods produced with this fibre. Moreover, according to the results of this study, it seems that the Mongolian cashmere sector may also benefit from the COO effect, and the rising criticisms and negative feelings of consumers who perceive Chinese products in general to be of lower quality. Nevertheless, despite B2B clients' positive image of Mongolia and the quality of its cashmere products, most of them do not wish to label their products as "Made in Mongolia". As a result, by accepting this requirement most Mongolian cashmere manufacturers do not seem to be contributing to the future prosperity of this industry.

At the same time, since many consumers are unaware of the origin of cashmere, the existing Mongolian players within this industry, as well as government agencies, should develop business and marketing strategies to promote the country as one of the best manufacturers of cashmere. This will improve the image of Mongolia in international markets, especially among consumers from other countries.

This study also revealed that consumers and B2B clients evaluate cashmere products based on the quality of its material, which stresses the need for Mongolian manufacturing companies to enhance their technological competencies in order to achieve a competitive advantage that will distinguish them from their foreign competitors. Therefore, through the support of Mongolian Wool and Cashmere Association, as well as government agencies, other business associations, and home and host investors, local companies would be able to better compete in the international arena.

On the other hand, the research findings showed that brands are becoming increasingly relevant for consumers, mainly because they tend to represent consumers' personal identity and social status, while at the same time they are used as a cue to classify the quality of the products. However, consumers do not seem to be informed about the existence of Mongolian brands specialized in the production of cashmere goods. The Mongolian cashmere industry, therefore, should develop a branding project or embrace the 'Mongolia Noble Fibre' project to successfully market and implement their brands in specific target markets, mainly in those where consumers perceive cashmere products as luxury goods because of the excellence of the material.

Limitations and further research

This study was focused on the effect of COO on consumers' information processing mechanisms, as well as on their perception and evaluation of cashmere products. However, in order to collect in-depth information from respondents of two main players involved in the Mongolian cashmere industry (i.e. manufacturers and distributors), as well as consumers, the size of the sample became limited, hindering the researchers from reaching theoretical saturation. At the same time, it is important to stress that the model developed in this study has not been validated in different countries, a situation that can be considered a limitation but also as an avenue for further research. In fact, one may argue that based on the interviews conducted to consumers from distinct nations, a cross-cultural study using this framework may reveal different results.

Consequently, we strongly recommend that further research shall be conducted in distinct and disparate countries, which will permit scholars to better assess the impact of national identity, norms, and beliefs in consumers' information processing regarding a specific product from a very particular country: cashmere goods made in Mongolia. Moreover, further investigation may also be focused on the effect that country image can have on cashmere products, and develop some hypotheses that could be tested using a quantitative method. Finally, future research might centre its focus on intrinsic and extrinsic information cues in order to better comprehend the main product-related attributes used by well-informed consumers when evaluating cashmere goods.

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