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AN ECONOMETRIC RELATIONSHIP BETWEEN MATERNAL EDUCATION, INTERVENING MECHANISMS AND LOW BIRTH WEIGHT OF NEWBORNS: EVIDENCE FROM PAKISTAN

Abstract

Although medical achievements have increased the survival of newborns with low birth weight (LBW) even in developing countries, the higher rate of LBW is still a risk for newborns in Pakistan. Therefore, this study proposes the relative contribution of socioeconomic, behavioral and demographic risk factors to LBW newborns in order to format impressive policy measures for them. Multivariate logistic regression model is built to calculate net impact of risk factors on LBW using a sample of 1794 married women who have birth cards containing birth weight (BW), retrieved from Pakistan demographic and health survey 2012-13. The average recorded BW of newborns is 2.95 kg. Out of total, approximately 25% have LBW, while 75% are with normal BW. The empirical outcomes exhibit that poor maternal education raises the likelihood of newborns' LBW relative to higher education of mother. Mothers with poor and middle economic rank and with poor and moderate environmental settings are more likely to give births with LBW relative to rich mothers and good environment, respectively. BW is significantly lower among less empowered mothers relative to empowered ones. Among all predictors, environment and wealth status has strong mediating impact between maternal poor education and

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LBW of newborns. Thus, mother education should be added in the measures of public health arrangement for better newborns' health.

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KEYWORDS: MOTHER EDUCATION; LOW BIRTH WEIGHT; LOGISTIC REGRESSION.

1. Introduction

Low birth weight (LBW) is widely accepted as a factor of infant and neonatal mortality and morbidity, and as a determinant of a child's psychological and physical development (Wardlaw et al., 2004). Past studies have revealed that newborns with LBW have 40 times more chances of dying than those with normal weight and newborns having very LBW (1500 g) have 200 times higher risk of death (Marcdante & Kliegman, 2014). Its adverse impact on the economy of Pakistan appears in the form of reduction in human capital as low birth weight infants face disability in their adult age. Chronic diseases, neurological disability, suppressed growth are very common in LBW infants, resulting in more repeated outpatient visits and hospitalizations for newborns (Bernstein et al., 2000). The former outcomes require LBW of newborns to be a variable of interest. According to UNICEF's (2011) and WHO's (1992) reports, about 96% babies with LBW are born in developing nations and the rate of LBW in developing regions (17%) is higher than in developed nations (7%) (Wardlaw et al., 2004). Pakistan has recorded the third highest burden of newborn expiries (194,000 in 2010) in the world. Pakistan is considered among those countries showing the highest percentage of newborns with LBW (25%) in (UNICEF, 2011). Various humanitarian disasters destabilized political system and the higher poverty level were main national challenges in the past decade, which largely influenced health and development. The severe earthquake in 2005, domestic displacement in 2008 and floods in 2010 affected maternal, newborns and child health (MNCH) because of limited human capital, shifting political choice and donor loyalty to response efforts. In such crisis, newborns were mainly vulnerable although a concentration on maternal and infant survival, and provision of basic health services at the local level existed. Newborns' health was given little focus until 2000. Newborn health

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policies at national level were firstly launched in 2001 (Hafeez et al., 2011). A national report, State of the World's Newborns: Pakistan, was presented in 2001 based on the worldwide report to give more priority to newborns' survival on national policy and political agendas (Saving Newborn Lives, 2001). The National Maternal and Child Health Policy and Strategic Framework (2005–10) got more grip for newborn survival by launching national Program of MNCH in 2005 (Bhutta et al., 2011). The launch of the 'Opportunities for Newborn Survival in Pakistan' in 2009 and 'EVERY ONE Newborn and Child Survival Campaign in 2010' got extra political promise to raise budget for MNCH health facilities (Khan et al., 2012).

Despite the prior efforts, the picture of LBW (almost 25%) in Pakistan is worse than the developed (7%) and developing (17%) regions (National Institute of Population Studies, 2013). Globally, although the chances of foetal survival have greatly increased on the behalf of earlier newborn's health programs and latest medical technologies, but they don't straightforwardly help much to decrease the rate of LBW because of the prior crisis and several socio-demographic and behavioral factors. Among these factors, maternal education has long lasting influence on BW because child health is shaped within the household and is commonly attained with the help of mothers. Therefore, mothers' ability contributes a lot to achieve better health outcome for their babies. In this mechanism, the primary factor to promote infant health is mothers' literacy level and knowledge of the hygienic measures (Caldwell, 1979). Unfortunately, mother literacy level with 53 % of no education and 22 % of primary education (National Institute of Population Studies, 2013) may produce lower health knowledge, poor health seeking attitude, bad socio-economic status, poor reproductive response and less empowerment among them. Hence it is widely accepted as a key predictor of LBW of newborns.

2. Literature review

The following literature is highly supportive to justify this socio-demographic and behavioral study. The most interesting idea based on the discussion is that the earlier factors may be entwined with education because they are directly influenced by education. For instance, education produces and raises economic resources, awareness about healthy environment and

family nutrition, easy access to health centers, health knowledge and decision making will, including reproductive decision (Abuya et al., 2012; Caldwell & Caldwell, 1991; and Taywade & Pisudde, 2017). Therefore, where poor literacy rate of mothers badly affects newborn survival, lower level of the education-oriented linkages may result in a worse situation of LBW of newborns. Thus, this study is different from many past studies because a) it preferably focuses on these linkages causing LBW of newborns against past studies which mostly missed these mechanisms or generally discussed the multiple determinants of LBW of newborns without underlining the depth of mechanisms (Islam & Elsayed, 2015; Jafari et al., 2010; Kandhasamy & Singh, 2015; Khatun & Rahman, 2008; and Mahumud et al., 2017). In other words, this study also measures mediating impact of socioeconomic and behavioral factors linking maternal education to LBW of newborns as well as checks robustness of the relationship between mother education and newborns' LBW by estimating ten models, using logistical regression framework. In this framework, wealth index, knowledge about Hepatitis, getting assistance from a lady doctor, mother decision to visit relatives, environment index, and birth order are used as proxies for economic status, health knowledge, behavior of health seeking, mother empowerment, environment conditions and reproductive behavior, respectively by following (Frost et al., 2005; and National Institute of Population Studies, 2013) because data on direct measures are not available in the given source. Thus, introduction of these linkages is compulsory because they are also improved with an improvement of mother literacy level. Where the contribution of maternal education improves child health, the mediating impact of the following linkages may foster the prior impact. Therefore, it is imperative to recognize the influence of maternal education and intervening linkages on newborns' LBW in order to establish policy measures aiming at promoting newborns' survival. b) It also analyzes mother education and intervening linkages LBW of newborns gradient in the context of residence because an access to the medical facilities plays an important role for infants' health while socioeconomic conditions are also varied within rural-urban territories. For instance, 68% of births in urban regions took place in a health facility relative to 40% in rural areas. Moreover, urban mothers are more likely to be literate than rural mothers. Like, 32 % of ever-married urban females did not go to school anytime relative to 70 % of rural ones. Conversely, 39 % of urban mothers got at least secondary level of education comparing with only 10 % of rural mothers enriched with

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secondary education (National Institute of Population Studies, 2013). Well educated women have a greater attention on residing in urban location to enjoy advance medical services relative to rural location. Furthermore, large coverage disparities exist between urban and rural residents and are especially pronounced for care at the time of birth, a critical time for newborns. For instance, 88% urban mothers received prenatal care from a skilled health providers (SHP) relative to 67 % of rural mothers. Urban mothers visited medical clinics 4 or more than 4 times by 62 % relative to rural ones (26%). Urban mothers are almost double as likely as rural mothers to avail ANC in the 1st trimester (65% and 33%, respectively). Births in urban regions are mostly assisted by a SHP (71%) than births in rural regions (44 %). Urban women are more likely to take part in all 3 decisions (health care, major household purchases and visits to relatives) (46 %) than rural women (35 %). (National Institute of Population Studies, 2013). Therefore, socio-demographic and behavioral determinants of LBW of urban-rural newborns are estimated taking into account of multiple inequalities between these two stratums. It is also different from all prior researches.

Different risk factors causing BW may have similar pattern among populations, but the comparative contribution of these factors may be varied from one setting to another (Trivedi et al., 1992; Dawodu et al., 1996; Wardlaw et al., 2004). Therefore, it is empirically important to recognize population-specific factors influencing BW using Pakistan Demographic and Health Survey (PDHS 2012-13) in order to formulate key policy interventions to focus on better child health.

3.Data and methods

3.1 Data specification

In this study, LBW of newborn aged 0-4 months (categorical variable) is taken as regress and. Among socioeconomic factors, mother literacy level, wealth and environment indexes are categorical variables. Environment index is built by three items, toilet facility, quality of drinking water and shared toilet facility via sum method (Barasa et al., 2017) that is the most

suitable indexing method rather than Principal Component Analysis (PCA) (Frost, Forste, & Haas, 2005; Anwar et al., 2013) that is statistically not appropriate to index categorical variables. Later, it is classified as "poor environment condition=0 if there is no environmental facility in a household, moderate environment condition=1 in case of availing only one environmental facility, and better environment condition=2 in case of receiving 2 or more than 2 environment services". The behavioral factors are health knowledge, attitude for health care, birth order (reproductive attitude) and mother empowerment indexed by four items; mother's decision to visit the relatives, to buy big products, to utilize health care facilities and to consume different goods via sum method (Barasa et al., 2017). However, mother decision to visit the relatives (mother needs permission to visits her relatives=0, otherwise=1) is taken as a proxy for empowerment due to lower Cronbach's Alpha value of empowerment index in reliability analysis. The demographic factors are child age and residence. The data source for all dependent and independent variables is Demographic Health Survey 2012-13 of Pakistan.

3.2 Methods

The consistency between recalled birth size and noted BW is measured by comparing the perceived birth size (small, normal and large size) with BW classified as LBW (<2.5 kg) and normal (>2.5 kg) to justify the preference of recorder BW (response variable) to mother perceived birth size. When small/normal/larger than normal birth size reported by the mother exactly coincides to low/normal BW respectively, her subjective report about BW is accurate. Hence, both (birth weight and size) can be used in place of each other. If mother subjective report is inaccurate, recorded birth weight will be preferred because it is weighed and recorded in medical centers. Chi-square statistics is proved helpful to measure consistency between perceived size of newborns and recorded birth weight. The extent of LBW across the classifications of the selected independent variables is calculate to measure the gross impact of an independent variable on LBW without controlling the impacts of remaining explanatory variables. Statistically, the significance of the bivariate association is tested by a Chi-square test for categorical data (Islam & Elsayed, 2015). This analysis is restricted to 1794 births because the exactness of mother subjective assessment of BW can be evaluated only for births for which the record of

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real birth weight is available (Boerma et al., 1998)**.** To calculate the adjusted odd ratios, logistic regression model is built to find out the connection between LBW and mother literacy level while controlling for all confounding factors. A minimum P <0.1 probability value is used to highlight statistically significance level of the predictors. The reliability of mother empowerment and environment index is assessed by reliability statistics. All analyses are performed on SPSS 21. Empirical analysis is approved by my supervisor and supervisory committee.

4. Empirical results and discussion

Empirical outcomes supporting the objective of this study i.e. maternal education and LBW of Newborns association controlling and without controlling for the significant confounding factors are discussed in detail in the following sections. Firstly, the appropriateness of LBW as dependent variable is confirmed by the consistency analysis.

Table 1. Average birth weight and percentage of LBW (n=1794)

	Birth Weight		
Perceived Birth Size	Mean (SD)	% <2.5 kg	% >2.5 kg
Small	1.96 (0.75)	75.30%	24.70%
Normal	2.99 (0.81)	16.80%	83.20%
Bigger than Normal	3.9 (0.99)	5.30%	94.70%
Total	2.95 (0.98)	24.40%	75.60%

4.1 Consistency analysis

Table 1 reveals average birth weight, LBW and normal weight babies in percentage term. Mother recalled birth size is consistent with the documented BW on an aggregate level and average BW increases with recalled birth size class. Infants with small birth size have the lowest average BW and those with bigger than normal size have the highest mean BW. The average BW of small size babies is 1.96 kg, and 75% among them are with LBW (<2.5 kg), highlighting a considerable amount of misclassification (25%) of BW across the birth size groups on individual level. It means that a

normal weight baby (a lower weight baby (<2.5 kg)) is described as small (normal). When mother subjective report is inaccurate, recorded birth weight is preferred because it is weighed and recorded in medical centers. The amount of misclassification is little less for normal size reported babies as 83 % of them have normal weight**.** This misclassification is very less for larger than normal babies as almost 95% bigger than normal newborns are describes as normal. The value of Kappa statistic (K=0.31) also significantly displays less than moderate connection between birth size and recorded BW. Following above misclassification outcome between birth size and LBW, mother's recorded BW is justified as more appropriate factor to present newborn baby health than birth size. Cronbach's Alpha = 0.89 confirm the reliability of environment index.

Table 2. Descriptive and bivariate analysis

Variables	Newborn Babies (%)	Low Birth Weight	
		Number (%)	P-value
Normal Birth Weight	1357 (75.6 %)		
Low Birth Weight	437 (24.4 %)		
Mother Educational Status			0.00***
Illiterate Mother (1)	374 (20.8%)	121 (27.7%)	
Mothers with Primary Education (2)	330 (18.4%)	116 (26.5%)	
Mothers with Secondary/Higher Education (3)	1090 (60.8%)	200 (45.8%)	
Family Economic Status			0.00***
Poor Class	235 (13.1%)	88 (20%)	
Middle Class	183 (10.2%)	58 (13%)	
Rich Class	1376 (76.7%)	291 (67%)	
Health Care Information			0.10*
Did not heard about Hepatitis	140 (7.8%)	42 (9.6%)	

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variables	LBW	Mean (SD)	P-Value
Heard Hepatitis	1654 (92.2%)	395 (90.4%)	
Mother Empowerment			0.01***
Mother Needs Permission to visit the Relatives	1622 (91%)	384 (88%)	
No Need any Permission	159 (9%)	52 (12%)	
Mother Attitude for Health Seeking			0.05**
Gets no assistance for Prenatal Care	901 (50.2%)	237 (54.2%)	
Gets Assistance	893 (49.8%)	200 (45.8%)	
Residence Location			0.00***
Urban	1261 (70.3%)	272 (62.2 %)	
Rural	533 (29.7%)	165 (37.8%)	
Environment Condition			0.00***
Poor Environment Condition	141 (7.9%)	52 (11.9%)	
Moderate Environment Condition	120 (6.7%)	40 (9.2%)	
Rich Environment Condition	1533 (85.5%)	345 (78.9%)	
variables	LBW	Mean (SD)	P-Value
Child Age	436	1.69 (1.32)	0.00***
Birth Order	437	2.68 (1.90)	0.00***

1*** as p<0.01, ** as p<0.05 and * as p<0.10

4.2 Descriptive and bivariate analysis

In Table 2, a sample size of 1794 infants is selected to elaborate the distribution of their specific background characteristics. This explanation is necessary to interpret the study results and to examine cause effect link among the selected variables. 21% infants are born to mothers having no education. About 18% and 61% infants are born to mothers possessing

primary and secondary/higher education, respectively. 13% and 10% infants are born in poor and middle-class households respectively, while 77% are born in the household owning rich status. The majority of infants (70%) live in urban areas, with mothers owning no empowerment in family affairs (91%), having enough health knowledge (92%), who belong to rich environment settings (85.5%) and who get assistance of nurse for prenatal care (50%). Recorded BW retained from health card shows that the average BW of the 1794 newborn babies is 2.95 kg (SD=0.98). Out of 1794 births, almost 25% have LBW (below 2.5 kg) while 75% are with normal BW.

Tables 2 also describes the differentials of LBW across various behavioral and socio-demographic characteristics of mothers, without controlling for confounding variables as well as explains the % of newborns with the specific characteristic among LBW of newborns. Mother education has a positive and consistent pattern (P=0.00) of connection with LBW and 28%, 26% and 46% babies have undesired BW as maternal education is zero, primary and secondary/higher, respectively. Maternal health knowledge displays a linear association with LBW at P=0.10 and surprisingly, 90% babies are with LBW as their mothers have health knowledge. Birth order has a significant (P=0.00) negative link with LBW and 437 babies are with LBW for whom birth order is about 3. The prevalence of LBW significantly (P=0.00) declines as age of babies increases. Moreover, newborns with LBW are 436 with a mean age of 1.7 (SD=1.32). Household location has positive and significant (P=00) impact on LBW and infants born to urban and rural mothers are 62% and 38% with LBW, respectively. In short, maternal attitude toward medical care amenities (P=0.05), empowerment (P=0.01), family economic level (P=00) and environment condition (P=0.00) have also a significant effect on LBW. Furthermore, about 54%, 88%, 20 % and 12 % LBW babies are linked with mothers who don't seek for medical facilities, are less empowered, belong to poor economic class and are with poor environment setting, respectively.

**Table 3. Binary logistic regression analysis of LBW
with adjusted odds ratio**

Variables	B	Sig.	OR[3]	95% C.I for EXP(B)	
				LB[2]	UB[2]
Birth Order	-0.02	0.54	0.98	0.92	1.04
Mother Higher Education		0***	1		
No Education	0.59	0***	1.80	1.30	2.48
Primary Education	0.83	0****	2.30	1.73	3.06
Rich Economic Status		0.07*	1		
Poor Economic Status	0.38	0.05**	1.46	0.99	2.16
Middle Economic Status	0.34	0.05**	1.41	0.98	2.03
Empowerment (1)	-0.49	0.01***	0.61	0.42	0.88
Health Knowledge (1)	-0.18	0.40	0.83	0.54	1.28
Behavior of Health Seeking (1)	0.14	0.21	1.15	0.92	1.44
Child Age	-0.11	0.01***	0.90	0.82	0.97
Rich Environment Condition		0.02**	1		
Poor Environment Condition	0.50	0.01***	1.64	1.11	2.43
Moderate	0.35	0.10*	1.42	0.94	2.14

Environment Condition					
Residence (1)	-0.12	0.38	0.89	0.68	1.16
Constant	-0.89	0.00	0.41		

1*** as p<0.01, ** as p<0.05 and * as p<0.10, [2] Upper bound and Lower bound, [3]Odd Ratio

4.3 Determinants of LBW

Table 3 reveals the results of binary logistic regression analysis indicating the net impacts of the prior explanatory variables on LBW in Pakistan. The net impact of a factor is estimated by controlling for the influences of all remaining predictors at a significant level of 1%, 5% and 10%. The empirical outcomes exhibit that mother literacy level, her economic status, empowerment and environment conditions are significant regressors of LBW. Infants of primary passed, and illiterate mothers have 2.3 and 1.8 (OR=2.3 and 1.8; P<0.01) times more likelihood of LBW infants as compare to babies of mothers possessing secondary/higher education. Infants of mothers belonging to poor and middle-class family are more likely to have LBW with the odds of 1.46 and 1.41 (OR=1.46 and 1.41; P<0.05) respectively comparing with infants of rich mothers. Babies born in households having poor and moderate environment setting have 1.64 and 1.42 times (OR=1.64 and 1.42; P<0.01 & <0.1) more chances LBW relative to those born in households enriched with better environment. Infant's LBW is significantly lower among mothers who are less empowered in household affairs by 39% (OR=0.61; P<0.01) relative to mothers having full authority in such affairs. Birth order of newborns displays an insignificant negative impact on LBW of infants. Infant age is also considerably and negatively (OR=0.90; P<0.01) impacting LBW of infants. Maternal health related information, behavior toward latest medication seeking and residence have inconsistent pattern of connection with LBW of newborn babies.

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Table 4. Binary logistic regression analysis of LBW of urban-rural newborns with adjusted odds ratio

Variables in the Equation	Region	B	Sig.	OR[3]	95% C.I for EXP(B)	
					LB[2]	UB[2]
Mother Higher Education	Urban		0***	1.00		
	Rural		0***	1.00		
No Education	Urban	0.74	0***	2.1	1.39	3.18
	Rural	0.59	0.03**	1.81	1.06	3.09
Primary Education	Urban	0.97	0***	2.64	1.85	3.76
	Rural	0.60	0.02**	1.83	1.11	3.01
Family Rich Economic Status	Urban		0.65	1.00		
	Rural		0 ***	1.00		
Poor Economic Status	Urban	-0.12	0.72	0.89	0.45	1.73
	Rural	0.74	0.01***	2.10	1.24	3.57
Middle Economic Status	Urban	-0.16	0.58	0.86	0.50	1.48
	Rural	0.87	0***	2.39	1.41	4.06
Birth Order	Urban	0.00	0.95	1.00	0.92	1.08
	Rural	-0.07	0.18	0.93	0.84	1.03
Health Knowledge (1)	Urban	-0.38	0.24	0.68	0.36	1.29
	Rural	0.03	0.93	1.03	0.55	1.91
Behavior of Health Seeking (1)	Urban	0.09	0.55	1.09	0.83	1.44
	Rural	0.23	0.25	1.26	0.85	1.87
Empowerment (1)	Urban	-0.68	0***	0.50	0.33	0.78
	Rural	-0.15	0.66	0.86	0.45	1.67
Child Age	Urban	-0.09	0.07*	0.91	0.82	1.01
	Rural	-0.15	0.04**	0.86	0.74	0.99
Better Environment Condition	Urban		0.01**	1.00		
	Rural		0.3	1.00		

Poor Environment Condition	Urban	0.63	0.01***	1.88	1.10	3.22
	Rural	0.27	0.37	1.31	0.73	2.35
Moderate Environment Condition	Urban	0.49	0.09*	1.63	0.93	2.85
	Rural	0.35	0.28	1.42	0.76	2.65
Constant	Urban	-0.89	0.00	0.41		
	Rural	-1.21	0.01	0.30		

1*** as p<0.01, ** as p<0.05 and * as p<0.10, 2 Upper bound and Lower bound, 3Odd Ratio

4.4 Comparative contribution of socio-economic, behavioral and demographic predictors into LBW of urban-rural newborns

The table 4 differently makes a comparison between urban-rural newborns with LBW in the context of socioeconomic, behavioral and demographic predictors. Among empirical outcomes, urban mothers without and with primary education are more likely to have newborns with LBW with the odds of 2.1 and 2.64 respectively (OR=2.1 and 2.64; P<0.01) than rural mothers (OR=1.81 and 1.83; P<0.05) relative to mothers possessing higher education. Only urban mothers living in poor and moderate environment settings are more in the trouble of LBW for their newborns with the odds of 1.88 and 1.63 (OR=1.88 and 1.63; P<0.01 & P<0.1) relative to those mothers populated in better environment condition. In case of rural region, the same impact has been calculated, but insignificant. Similarly, newborns of urban mothers are less likelihood to face LBW problem by 50% (OR=0.50; P<0.05) as they are not empowered in household affairs relative to their counter parts (highly empowered mothers). Rural mothers with poor and moderate family economic status are paying the higher cost of LBW with the odds of 2.1 and 2.39 (OR=2.1 and 2.39; P<0.01) comparing with rich mothers. The same but insignificant influence is also estimated for urban region. Rural newborns are 14% (OR=0.86; P<0.01) less likely to face LBW trouble than urban infants by 9 % (OR=0.91; P<0.01) as they grow up. Birth order, the mother behavior for health care and health knowledge are insignificant predictor of LBW of newborns aged 0-4 months.

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4.5 Discussion

The aim of our research is to investigate the impact of maternal education and intervening mechanisms on LBW of newborns by logistic regression setting. The average BW is 2.95 kg which is less than that of the newborns of United States of America (USA) by 500 g, which is introduced by WHO as reference standard for average birth weight (WHO, 1992). The birth weight of newborn babies in USA is between 2.454 and 4.442 kg with an average of 3.45 kg (Donahue et al., 2010; WHO, 1992). However, this average birth weight is greater than 2500g (cut off point for normal birth weight) defined by WHO (Islam & Elsayed, 2015). The LBW newborns are almost 25% in the given sample, which is greater than 17% and 7% average LBW of the developing and developed nations, respectively (Boerma et al., 1998).

In similar to many other studies, our research also explains that mothers' poor education causes more chances of LBW (Cutler & Lleras-Muney, 2006). In the regional context, lower education of urban mothers is likely to result in more newborns with LBW than that of rural mothers. A justification of positive connection between mothers' literacy level and newborns' LBW is that mothers with poor literacy level are likely to be unaware about health care, be less empowered and less self-reliant and offer poor sanitary environments for their kids. Therefore, they fail to scale up their infants' health status, especially, in the rural areas where female literacy rate is lower than the urban areas (National Institute of Population Studies, 2013). Caldwell (1979) and Frost et al. (2005) also evidenced that promoting mother education indeed improved neonatal health. This outcome is also supported by Braveman and Barclay (2009) and Jafari et al. (2010) while some studies contradict to our outcome exhibiting a negative impact of mother education on child mortality (Melo et al., 2013; Islam and Elsayed, 2015).

Results of our study declare that economic status of poor and middle-class households significantly causes higher risk of LBW. Furthermore, only rural mothers with poor and moderate economic ranking are paying the higher cost of LBW comparing with rich mothers because they hardly meet with necessities with limited resources for higher inflation in Pakistan. For instance, mothers related to poor and middle class specifically in rural

context hardly receive sufficient antenatal care and therefore, they experience nutritional deficiency which badly impact foetal growth (Kramer, 1987; Karim & Mascie-Taylor, 1997; Malik et al., 1997; National Institute of Population Studies, 2013). Thus, this scenario may cause many unfavorable conditions to promote infant health. This conclusion is also consistent to (Bisai et al., 2006; Pal, 2017). Because of missing data on nutritional status of responding mothers in the survey, we are unable to examine this remarkable hypothesis.

Mother empowerment has a significant negative impact on LBW. Similarly, in the regional setting, only urban mothers are significantly facing fewer risk of LBW for newborns as they are not empowered relative to empowered ones. The less risk of LBW within households where mothers are not empowered points out that in such household, males are empowered and male empowerment is much more effective for newborns' health because they have ability, experience and confidence to deal with key issues of households, including health issues efficiently relative to females. Additionally, majority of the households in Pakistan are headed by males rather than females and thus, major family decisions are also made by males (National Institute of Population Studies, 2013). This result is also favored by Hong and White-Means (1993) and contradicted by Gupta (1990) who underlines that mothers with strong decision making will have healthier babies.

Poor and moderate environment conditions significantly cause more likelihood of LBW comparing with good environment. Similarly only urban mothers with such conditions are more in the trouble of LBW of newborns relative to mothers with better environment conditions because lower environment conditions are insufficient to save children from environmental borne diseases even in the urban setting of developing regions where water and sanitation facilities do not meet better living standard comparing with developed countries (Smith, 2005). Ultimately, these conditions cause poor health outcomes for residents including LBW of newborns. This positive relationship may be entwined with mother education because communities with more educated females are more likely to get better medical and sanitation services and promote their babies health (Ngure et al., 2014). Anwar et al. (2013) also support our finding.

The empirical results of this research also predict that rising trend of newborn babies' age even in the rural-urban context considerably decreases the risk of LBW because of incorporating complementary diet along with

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breastfeeding with the passage of time. This conclusion is also aligned with (Karim and Mascie-Taylor, 1997).

Our findings reveal that mothers getting no lady doctor assistance for prenatal care even in the regional aspect have more chances to give births with LBW. However, this pattern of relationship is inconsistent. This outcome is contradicted to Karim and Mascie-Taylor (1997) who conclude that timely prenatal care visits significantly reduce the risk of pregnancy complications. This study observes an insignificant less risk of LBW babies as birth order increases. This finding is contradicted to (Kandhasamy & Singh, 2015) who conclude the greater threat of babies' LBW with increasing number of children in a household, but it is aligned with (Mondal, 2000). Our study shows an insignificant and unexpected outcome of less risk of LBW infants as the corresponding mothers don't have health-oriented knowledge. Due to lack of direct measures in the database, reproductive behavior, health seeking and knowledge are insignificant predictors of LBW of newborns. The validity of this study is that it is supported by PDHS 2012-13 data on BW and other variables which are collected by a trustworthy source of National Institute of Population Studies, Islamabad, Pakistan. However, there are some limitations in our study. Firstly, only a selected sample of newborn babies whose mothers could record their BW on health card during the survey, were considered. Secondly, many important variables like maternal nutrition level, life style and their diet could not be controlled in the study due to lack of these variables in the survey data. Thirdly, several proxy variables, for instance mother empowerment, economic status, reproductive attitude, environment, knowledge and health seeking attitude are incorporated due to missing their direct measures in the data source.

5. Concluding remarks and policy implications

Binary logistic regression analysis highlights that mother education, her empowerment, economic level, and environment condition are significant regressors of LBW. Among them, the negative impact of mother economic level, environment setting is tied with her higher literacy level because her education upgrades family income level and produces healthy environment

condition in the household. In the regional context, urban mothers without and with primary education are less likely to have newborns with LBW than rural mothers relative to mothers possessing higher education because urban mother are more educated than rural ones (National Institute of Population Studies, 2013). As a result, they are more caring to their babies than rural mothers. Only urban mothers with poor and moderate environment settings and rural mothers with poor and moderate family economic status are paying the higher cost of LBW relative to those owning good environment and rich economic rank respectively. Similarly, newborns of less empowered urban mothers are less likelihood to face LBW problem relative to empowered ones.

The outcomes from ten models noted in Appendix 1 indicate that mother education LBW of newborns gradient is robust and reliable. Model 1 shows that the relationship between mothers' poor education (zero and primary) and LBW of newborns is highly significant with the odds of 2.13 and 2.41, respectively. The top row in Table 5 displays the effect of changing maternal education as mechanisms are discussed in each analysis. The odds of maternal poor education ranges from an increased likelihood of LBW newborns by 2.13 and 2.41 while controlling for all variables in model 1, to 1.71 and 2.26 in the model 7 controlling for six variables. As urban/rural location of the country in model 2 is controlled, the odds of mother poor education are reduced from 2.13 and 2.41 to 1.96 and 2.28, respectively. It implies that impact of mother literacy level on LBW gets weaker while controlling for demographic factor in model 2. This recommends a selection of living location based on education rank. In model 3 and 4, the likelihood of LBW newborns are significantly higher with lower literacy level of mothers while controlling for newborn age at and environment status, but less than that of the prior models. Therefore, newborns with decreasing age and with poor and moderate environmental setting have had more likelihood of LBW with the odds of 0.89, and 1.81 and 1.52, respectively. Thus, environment factor is appeared as mediating factor linking maternal education to newborns LBW because educated mothers are more conscious about environmental setting. Household income level and maternal empowerment are also recorded significant predictors of LBW babies from model 5 to 9. They are also highlighting the mediating impact between maternal education and LBW newborns as appeared in the reduced odd ratios within 5-9 models. Among behavioral factors, health awareness, reproductive and health seeking behavior have inconsistent

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association with LBW as appeared in the models from 7 to 9 because their proxies are used in the absence of actual data in the data source. Results of this research also reveal that poor literacy level still remains significant once controlling for demographic (residence and child age), socioeconomic and behavioral factors, suggesting that these factors elucidate a portion of the maternal education impact as well. Among socioeconomic predictors, empowerment, economic and environment status has greater mediating impact between maternal poor education and LBW newborns as shown in the final model.

Meaningful policy format can be established from the earlier outcomes. Present findings suggest a focus on particular groups of females having higher risk of LBW of newborns. Women with poor education especially rural mothers should be targeted by health-sensitive policies as it produces more information about health care, develops health seeking mind set, generates economic resources, grants better environment and thus builds healthy dietary pattern and birth-spacing attitude. In this respect, government financing to LHWs program is highly efficient to generate education awareness among mothers because lady health workers have easy access to mothers.

Among public health policies, education subsidies should be given to mothers for education only to the degree of possible market failure. Possible logic behind the education subsidies is that individuals are more likely to be unaware about health benefits of education while making education decisions, that they may be credit constrained, that some individuals are not familiar about or are deprived from higher education. Subsidies for education would be successful to improve the individuals' health because it really causes health.

References

Abuya, B. A., Ciera, J., Kimani-Murage, E. (2012), *Effect of mother's education on child's nutritional status in the slums of Nairobi. BMC Pediatrics*, 12(1), 80.

Anwar, S., Nasreen, S., Batool, Z., Husain, Z. (2013), *Maternal Education and Child Nutritional Status in Bangladesh: Evidence from Demographic and Health Survey Data,* Pakistan Journal of Life and Social Sciences (Pakistan), 11(1), 77–84.

Barker, D. J. P. (1997), *The long-term outcome of retarded fetal growth* Clinical Obstetrics and Gynecology, 40(4), 853–863.

Bernstein, I. M., Horbar, J. D., Badger, G. J., Ohlsson, A., Golan, A., Network, V. O. (2000), *Morbidity and mortality among very-low-birth-weight neonates with intrauterine growth restriction,* American Journal of Obstetrics and Gynecology, 182(1), 198–206.

Bhutta, Z. A., Soofi, S., Cousens, S., Mohammad, S., Memon, Z. A., Ali, I., Wall, S. (2011), *Improvement of perinatal and newborn care in rural Pakistan through community-based strategies: a cluster-randomised effectiveness trial*, The Lancet, 377(9763), 403–412.

Bicego, G. T., Ties Boerma, J. (1993), *Maternal education and child survival: A comparative study of survey data from 17 countries*, Social Science & Medicine, 36(9), 1207–1227. https://doi.org/https://doi.org/10.1016/0277-9536(93)90241-U

Bisai, S., Sen, A., Mahalanabis, D., Datta, N., Bose, K. (2006), *The effect of maternal age and parity on birth weight among Bengalees of Kolkata, India,* Human Ecology, 14, 139–143.

Boerma, J. T., Weinstein, K. I., Rutstein, S. O., Sommerfelt, A. E. (1998), *Data on birth weight in developing countries: can surveys help*, Revista Panamericana de Salud Pública, 3(2), 88–95.

Braveman, P., Barclay, C. (2009), *Health disparities beginning in childhood: a life-course perspective,* Pediatrics, 124(Supplement 3), S163–S175.

Caldwell, J. C. (1979), *Education as a factor in mortality decline an examination of Nigerian data,* Population Studies, 33(3), 395–413. https://doi.org/10.2307/2173888

Caldwell, J., Caldwell, P. (1991), *What have we learnt about the cultural, social and behavioural determinants of health? From selected readings to the first Health Transition Workshop,* Health Transition Review, 3–19.

Cutler, D. M., Lleras-Muney, A. (2006), *Education and health: evaluating theories and evidence*. National bureau of economic research.

Das Gupta, M. (1990), *Death clustering, mothers' education and the determinants of child mortality in rural Punjab, India,* Population Studies, 44(3), 489–505.

Dawodu, A., Abdulrazzaq, Y. M., Bener, A., Kappel, I., Liddle, L., Varghese, M. (1996), *Biologic risk factors for low birthweight in Al Ain, United Arab Emirates*, American Journal of Human Biology, 8(3), 341–345.

Defo, B. K., Partin, M. (1993), *Determinants of low birthweight: a*

comparative study, Journal of Biosocial Science, 25(1), 87–100.

Donahue, S. M. A., Kleinman, K. P., Gillman, M. W., Oken, E. (2010), *Trends in birth weight and gestational length among singleton term births in the United States: 1990–2005*, Obstetrics and Gynecology, 115(2 Pt 1), 357.

Frost, M. B., Forste, R., Haas, D. W. (2005), *Maternal education and child nutritional status in Bolivia: finding the links,* Social Science & Medicine, 60(2), 395–407. https://doi.org/https://doi.org/10.1016/j.socscimed.2004.05.010

Hafeez, A., Mohamud, B. K., Shiekh, M. R., Shah, S. A. I., Jooma, R. (2011), *Lady health workers programme in Pakistan: challenges, achievements and the way forward*, JPMA: Journal of the Pakistan Medical Association, 61(3), 210.

Hong, G.-S., White-Means, S. I. (1993), *Do working mothers have healthy children?* Journal of Family and Economic Issues, 14(2), 163–186.

Islam, M. M., Elsayed, M. K. (2015), *Pattern and determinants of birth weight in Oman,* Public Health, 129(12), 1618–1626. https://doi.org/10.1016/j.puhe.2015.07.011

Jafari, F., Eftekhar, H., Pourreza, A., Mousavi, J. (2010), *Socio-economic and medical determinants of low birth weight in Iran: 20 years after establishment of a primary healthcare network,* Public Health, 124(3), 153–158. https://doi.org/10.1016/j.puhe.2010.02.003

Kandhasamy, K., Singh, Z. (2015), *Determinants of low birth weight in a rural area of Tamil Nadu, India: a case-control study,* International Journal of Medical Science and Public Health, 4(3), 376, https://doi.org/10.5455/ijmsph.2015.0311201475

Karim, E., Mascie-Taylor, C. G. N. (1997), *The association between birthweight, sociodemographic variables and maternal anthropometry in an urban sample from Dhaka, Bangladesh*, Annals of Human Biology, 24(5), 387–401.

Khan, A., Kinney, M. V, Hazir, T., Hafeez, A., Wall, S. N., Ali, N., Uzma, Q. (2012), *Newborn survival in Pakistan: a decade of change and future implications,* Health Policy and Planning, 27(suppl_3), iii72-iii87.

Khatun, S., Rahman, M. (2008), *Socio-economic determinants of low birth weight in Bangladesh: a multivariate approach,* Bangladesh Medical Research Council Bulletin, 34(3), 81–86.

Kliegman, R. M., Rottman, C. J., Behrman, R. E. (1990), *Strategies for*

the prevention of low birth weight, American Journal of Obstetrics and Gynecology, 162(4), 1073–1083.

Kramer, M. S. (1987), *Determinants of low birth weight: methodological assessment and meta-analysis*, Bulletin of the World Health Organization, 65(5), 663.

Lives, S. N. (2001), *State of the World's Newborns*, Washington DC: Save the Children.

Mahumud, R. A., Sultana, M., Sarker, A. R. (2017), *Distribution and determinants of low birth weight in developing countries*, Journal of Preventive Medicine and Public Health, 50(1), 18–28. https://doi.org/10.3961/jpmph.16.087

Malik, S., Ghidiyal, R. G., Udani, R., Waingankar, P. (1997), *Maternal biosocial factors affecting low birth weight,* The Indian Journal of Pediatrics, 64(3), 373–377.

Marcdante, K., Kliegman, R. M. (2014), *Nelson Essentials of Pediatrics E-Book,* Elsevier Health Sciences.

Mavalankar, D. V, Gray, R. H., Trivedi, C. R. (1992), *Risk factors for preterm and term low birthweight in Ahmedabad, India,* International Journal of Epidemiology, 21(2), 263–272.

Mondal, B. (2000), *Risk factors for low birth weight in Nepali infants*, The Indian Journal of Pediatrics, 67(7), 477–482.

National Institute of Population Studies, Islamabad, P. (2013), *Pakistan Demographic and Health Survey 2012-13*, Islamabad, Pakistan.

Pal, A., Pari, A. K., Sinha, A., Dhara, P. C. (2017), *Prevalence of undernutrition and associated factors: A cross-sectional study among rural adolescents in West Bengal, India,* International Journal of Pediatrics and Adolescent Medicine, 4(1), 9–18. https://doi.org/https://doi.org/10.1016/j.ijpam.2016.08.009

Smith, L. C., Ruel, M. T., Ndiaye, A. (2005), *Why is child malnutrition lower in urban than in rural areas? Evidence from 36 developing countries*, World Development, 33(8), 1285–1305. https://doi.org/10.1016/j.worlddev.2005.03.002

Taywade, M. L., Pisudde, P. M. (2017), *Study of sociodemographic determinants of low birth weight in Wardha district, India,* Clinical Epidemiology and Global Health, 5(1), 14–20. https://doi.org/10.1016/j.cegh.2016.07.001

UNICEF (2011), *The State of the World's Children 2011: Adolescence-an Age of Opportunity*, UNICEF.

Wardlaw, T., Blanc, A., Zupan, J., Ahman, E. (2004), *Low Birthweight - Country Regional and Global Estimates*, Who & Unicef (Vol. 36). Unicef. https://doi.org/ISBN: 92-806-3832-7

WHO (1992), *Low Birth Weight: A tabulation of available informatio,* WHO/MCH/92.2.

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THE COTTAGE WEAVING INDUSTRY OWNERS ACCESS TO BANK FINANCING IN VILLAGE ISLAMPUR, SWAT, KHYBER PAKHTUNKHWA, PAKISTAN

Abstract

This paper empirically examines the determinants of access to bank financing. The demand side approach was applied to the cottage industry in Islampur, a village in the district of Swat Khyber Pakhtunkhwa. A sample of 208 family firms was analyzed using ordered logistic regression technique. Our findings show that cottage industry business owners' access to bank financing is negatively associated with collateral, complexity in the application process, bank interest rate, business owner gender and ownership of the firm. On the contrary, business owner education level, firm size and age of the business owner has a positive association with bank financing. The study has taken a new approach to assess cottage business owners' access to bank finance and is different from conventional studies which normally focus on large scale businesses. The findings have policy implications for financial institutions in Pakistan. The policy is advised to

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devise strategies to remove the negative constraints identified by the current study to increase cottage industry access to bank finance and hence to uplift socioeconomic conditions vis-à-vis expand the scale of the small businesses.

JEL CLASSIFICATION: G20, G21, G28.
KEYWORDS: BANK FINANCING; LOGISTIC REGRESSION; DISTRICT SWAT; COTTAGE INDUSTRY.

1. Introduction

Since the financial crisis of 2007-08, the regulators, policy makers and governments across the world have put greater emphasis on the promotion of formal financing i.e. financing through banks rather than trust companies, insurance firms, leasing companies, pawnbrokers and other informal lenders. Because these are subject to minimal regulations. The regulators are aware of the fact that formal financing system is associated with faster firm growth whereas fund raising from informal sources doesn't have that much substantial effect (Ayyagari et al., 2007). Therefore, in the post recessionary period report like John Vickers recommendation, Dodd-Frank Act and Basel III regulations all have demanded stringent rules for informal financing as it paves the way for cyclical recession as a result of firms taking excessive financial risks. Nevertheless, access to formal financing is being made highly difficult across the world that prevents adequate development of Small and Medium Enterprises (SMEs) across South Asian countries in particular (CIEM, 2007) as often stringent conditions are being attached while extending formal financing that compel SMEs to seek informal channels. International Finance Commission (2011) report for 177 economies of the world, the data suggest that only 15% of the SME"s in the world have access to financing, followed by 25% of the SMEs considered financing as a major constraint, 10% of them are underserved and 40% of them are unserved. Looking to the statistics, situation of SMEs around the globe is not that much satisfactory in terms of access to finance. According to the Asian Development Bank Report (2013), there are several barriers which hinders SMEs to access financing in case of China, India, Malaysia and Republic of Korea. The key barriers to SMEs financing in these four mentioned countries are divided into two sides, one is supply side and the

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other is demand side. The supply and demand side barriers include supply side barriers complex procedure of taking financing; high lending rates; collateral; short term loans; and extensive lending attitude of financial institutions. Demand side barriers include lack of knowledge; insufficient management; and no demand on SMEs. In case of Pakistan, SME constitute over 93 percent of the 3.2 million business enterprises in the country which has a contribution of around 30 percent to the national GDP and around 25 percent to total export earnings. Still these find it difficult to get access to formal financing (Ahmad & Alam 2015). According to State Bank of Pakistan (SBP), the share of SMEs in banks' total financing slipped from 5.99 percent in 2013 to 5.61 percent in FY 2014 (Dawn, 2015). This is an evidence that SMEs financing is not being taken seriously in Pakistan in spite of the fact that it has enormous contribution to economic growth. The negligence of the SMEs in Pakistan can be judged from the worsening condition of Islampur cottage weaving industry. Although the Islampur cottage weaving industry is as old as the state of Swat itself but still due to poor infrastructure majority of weaving work are being done through handlooms rather than power looms. Similarly, the local craftsmen still rely on natural water streams to complete the production cycle which has led to considerable water related issues for the local inhabitants. These issues are the result of inaccessibility to bank financing that leave the weavers with no adequate option to uplift their industry but instead resort to working on daily wages. The major source of financing for these cottage industry in the study area include National Bank of Pakistan (NBP). The analysis of this study show that 8.7% of the owners get loans from this bank. While 10.6% of the owners get loans from Khyber Bank, 3.8% get loan from Zarai Taraqiati Bank (ZTBL) and only 1.4 % gets loan from United Bank Limited (UBL). These banks are indeed playing a vital role in promoting this industry but besides financing provide by these banks there are certain factors which still abstain most of the firms to finance their businesses from banks. In order to dig deep into the issue of formal financing this study attempts to measure those determinants of bank financing in the context of Islampur cottage industry which abstain them from taking bank financing. The study is organized by providing literature review in the next section followed by methodology and discussion and analysis in the second and third sections respectively. The last section provides a comprehensive conclusion of the underlying study. The cottage weaving Industry owners access to bank financing in Islampur, Swat, Khyber Pakhtunkhwa. Various studies analyzed

the determinants of bank financing in case of other developed and developing countries. Extensive literature exist on the current study, which mainly includes Carthy et al. (2015), Abor & Biekpe (2007), Galli & Rossi (2016), González et al. (2007), Ahmad & Khalil (2016), Raza et al. (2013), Öztürk & Mrkaic (2014), Zarook et al. (2013), Hussain (2011), Mullei & Bokea (2000), Osano & Languitone (2016), Isaac et al. (2001), Calice et al. (2012), Khurana et al. (2008), Demirgue-Kunt (2006) and Kung'u (2011). In the previous as indicated above studies only size of the firm, age of the firm, profitability, education, collateral and cost of financing have been considered in studies conducted in in case of Australia, United Sates, European Countries, China, and Pakistan. While most of the studies conducted on access to finance in Pakistan have worked on textile industry. According to our survey research on the cottage industry and access to finance is scanty. Previous work on the cottage industry in Islampur have focused on aspects other than considered in this study. This study analyzes the role of variables which have not been analyzed in the previous studies. This study attempts to fill the existing gap in the literature by investigating the role of those factors which have not been studied previously. The paper is organized into six sections. In section one, the problem of access to finance and the associated problem has been elaborated. Section two outlines the relevant literature on the aspect. In section three, light has been shed on various theoretical views. Section four explain the data and methodology used for the study. While in section five, the results have been discussed. The last section presents the conclusion and policy recommendations.

2. Literature review

Research has been conducted by researcher and academia in this area both the developed and developing countries. Some of the influencing studies are reviewed as under. A study by Carthy et al. (2015) in case of Australia show that there exist significant relationship among gender of the owner of the firm, size, business plan and more importantly the age of the firm. The study further shows that firms owned by male owners have more access to bank financing as compared to those owned by female. In another study, Abor & Biekpe (2007) studied in Ghana small business reliance on bank financing. The results of the study suggest that bank financing accounts for almost less than quarters of SMEs total financing. Further, there exist positive relationship of bank financing with the size and age of the firm. In a study

Galli & Rossi (2016) studied bank credit access and gender discrimination considering the case of 11 European countries. It was found that there is high tendency of rejection of applications submitted by females to acquire bank loans as compare male applicants. This points to gender discrimination in terms of bank financing. González et al. (2007) investigated the determinants of bank financing in Spain. The author argued that the cost of financing and collateral affect both the cost bank and non-bank financing in general which is external financing. The results showed that collateral is a key factor which affects the long-term financing of the firm. In a study by Calice et al. (2012) showed that the lack of proactive government attitudes towards SMEs, business regulations, macroeconomic factors, legal and contractual environment and some of the bank specific factors hinders banks-SMEs relation. While a study by Demirgue-Kunt (2006), and Kung'u (2011) suggest that size of the firm does matter to access financing, firms with small size find it hard to access financing. In Pakistan a study was conducted by Ahmad & Khalil (2016) which indicated that the relationship of the firm with the bank played a key role in acquiring bank financing for the non-financial firms in case of Pakistan. In a similar study in Pakistan by Raza et al. (2013) suggest that profitability, size and the growth of the firm effect the leverage of the firm. A similar study by Öztürk & Mrkaic (2014), and Zarook et al. (2013) indicated that size of the firm and age of the firm have positive relationship with formal financing. Hussain (2011) in study found that growth, profitability, risk, collateral and efficiency without size of the firm effect the financial leverage of the firm in case of Pakistan textile industry. Similarly, Mullei & Bokea (2000), Osano & Languitone (2016) finds that collateral is a barrier to formal financing. Another study by Isaac et al. (2001) in case of Zimbabwe concludes that formal firms have more access to loans in comparison with informal firms. Moreover, a study by Khurana et al. (2008) conducted a study in the United States which showed those firms having cross-listed themselves, they usually get external financing at a lower cost.

3. Theoretical review

3.1 Information asymmetry theory

Information asymmetry theory or it can be called finance gap theory suggest that lack financing to SME's is mainly caused by the lack of

information or in other words asymmetric information causes shortage of financing to Small and Medium Enterprises (SMEs) (Ed Vos et al., 2007; Berger & Udell, 1998). It is believed through focus group discussions (FGDs) conducted in Islampor cottage industry that there is acuteness of information asymmetry amongst the entrepreneurs and the banks which causes lack of financing to SMEs in this Industry. For banks side they always need reliable information about the SMEs or specific business performance before demanding bank loans. Due to the existence of low information or information asymmetry specially to the bankers. Another key factor such as the size of the firm also do matter in this regards as small firms are provided with low capital as compare to large firms by the banks. Having Information Asymmetry, collateral then plays an important role as it improves the expected estimated return of the lender. However, on the other hand collateral does create problems for the SMEs as they don't have much of the fixed asset to use it as guarantor for financing from banks. Keeping in mind the Information asymmetry theory the following hypothesis has been designed.

H1: Collateral effect SME's decision to acquire bank financings.

3.2 Human capital theory and SME's financing

This theory is based on efficiency of human capital, what skills such as competencies, skills, knowledge, talents and experience possessed which can enhance the value of the firm, achieve firm's success and also by achieving firm's targeted goals (Becker, 1975; Davenport, 1991). Education and experience is also considered as one of the integral component which helps firms to acquire external financing (Coleman & Cohn, 2000). Similarly, in case of Islampor Cottage Industry, most of the SMEs owned by the individuals having no or low level of education (Goldmark & Nichter, 2009). Keeping in mind the Human Capital theory the following hypothesis has been designed.

H2: Education level of the firm's owner in Islampor cottage Industry likely to affect firm's decision to take financing from banks.

3.3 Theory of the firm and SME's financing

According to this Theory, firm size is also one of the key factors which is considered mostly by the banks while advancing loans to SMEs (Cassar,

2004). Firm size can be measured either through the number of labor possessed by the firm or by the amount of capital investment by the firm. According to Miguel (2010) firm size haven't been analyzed that much empirically specially considering simultaneity and symmetry hypothesis as the variances in size reflect differences in size as well. Keeping in mind this theory the following hypothesis has been designed.

H3: Size of the firm's in Islampor cottage Industry likely to affect firm's decision to acquire financing from banks.

H4: Age of the firm's in Islampor cottage Industry likely to affect firm's decision to acquire financing from banks.

3.4 SME's financing and interest rate or Riba religious factor

According to the teaching of Islam Interest or Riba is prohibited in Islam. Riba or interest is considered as one of the key factors hindering banks financing to SME's as SME's don't finance from banks due to interest which is prohibited in Islam (Almhrog, 2003). According to Surah Al-Imran (Verse No.130-2) "O-Believers don't take doubled and redouble Riba and fear Allah so that you may succeed. Fear the fire which has been set for those who discard faith. Obey Allah and Prophet Muhammad (SAW) so that you may obtain mercy.

H5: Interest rate from the bank side likely to affect firm's decision to take loans from banks.

4. Methodology and data

In order to empirically evaluate accesstobank financing, it is imperative to have a strong methodological background which support the available data and more importantly provide us efficient results by tackling each and every econometric problem and which is in accord with the data on hand.

4.1 Theory of the Firm and SME's financing

This study will use primary data in order to find access to bank financing in case of cottage weaving Industry Islampor, District Swat, and Khyber Pakhtunkhwa, Pakistan. Data for empirical analysis has been collected from two sources which include focus group discussions (FGDs) and

Questionnaires. In order to analyze the determinants of bank financing this study obtained data from 208 firms for the year 2015. This study follows simple random sampling techniques by using Yamane (1967) sample selection formula for known population with 5% margin of error, (elementary sampling theory by Yamane, 1967).

Model specification and more specifically putting right variables in the model is one of the key issues in econometrics, having miss-specified model with irrelevant variables can provide inefficient results. Keeping in mind the importance of Model Specification, this study has thoroughly and carefully designed the following econometric model including important variables which may affect acquisition of bank financing in case of Islampur cottage industry:

$$BF_i = f\ (E_i,\ C_i,\ AC_i,\ I_i,\ OF_i,\ SF_i,\ G_i,\ AF_i,\ \mu_i) \qquad (i)$$

Since this study deals with binary dependent variable ordered logistic regression model will be employed to identify access to bank financing in case of cottage weaving Industry Islampor, District Swat, KP, Pakistan. The reason behind using ordered logistic regression model over linear probability model (LPM) is that LPM considered that the probability values of 0-1 will always lie between 0 and 1 but this is not the case it might exceed 1 sometimes causing problems. Further, the error term may not be normal and heteroscedasticity problem may also exist while having binary dependent variable. Moreover, in addition to the above mentioned assumption, this study also deals with categorical variables on the right side and for that purpose ordered logistic regression is the best choice (Gujarati, 2011):

$$BF_i = \alpha + \beta_1 E_i + \beta_2 C_i + \beta_3 AC_i + \beta_4 I_i + \beta_5 OF_i + \beta_6 SF_i + \beta_7 G_i + \beta_8 AF_i + \mu_i)\ (ii)$$

Whereas: "*i*" indicates the number of cross sections (firms) in this study.
Bank financing (BF_i) indicate bank financing which is a binary variable. It takes the value "1" if bank financing and "0" otherwise. Similarly, gender of the firm owner (G_i), which indicates the gender of owner of the firm; this study also analyzes the role of gender in acquiring bank loans, to check whether bank advances more loans to male entrepreneurs or female

entrepreneurs. It takes the value "1" if bank financing and "0" otherwise. The variable age of the firm (AF_i) which indicates the Indicate the age of the firm since its inception; it has been measured through the number of years a firm is operating since. It takes the value "1" if 5 years (new firm) and value "2" if 10 years and value "3" if 15 or above years (old firms). The variable education of the owner (E_i) takes the value "1" if illiterate "2" if primary level, and "3" if secondary education while "4" if intermediate level or 12 years of education or above. The variable collateral (C_i) which is collateral demanded by the banks while advancing loans. It tales the value "1" if yes collateral demanded and "0" otherwise. The variable Interest (I_i) is the interest charged by banks while obtaining loans. It takes the value "1" if yes and "0" otherwise. The variable ownership of the firm (OF_i) indicates the ownership of the firm that whether proprietor or partnership level of firm obtain bank financing or not? It takes the value "1" and "0" otherwise. Similarly, the size of the firm is represented by (SF_i) it indicates the size of the firm. It is measured though the number of labors in the firm Whether large, medium or small firms focus more on obtaining formal financing. It takes the value "1" if the firm is small sized (1-5 Labors), while it takes "2" if it is medium size (6-10 Labors) and "3" if the firm is large size (11-15 laborers or more). The variable complex application process is represented by (AC_i). Sometimes complex application process refrain firms from taking loans from the formal sources of financing which mainly includes banks and other financial institutions. It takes "1" if the application process is complex and "0" otherwise.

5. Results and discussions

This section presents the results of the analysis. The results have been obtainedfrom three different methods: ordered logistic regression analysis, average marginal effect of the regression and odds ratio of logistic regression.

Table 1. Ordered logistic regression results (dependent variable: bank financing).

Variables	Coefficients with Standard Error
Collateral	-4.502***(1.072)
Complex Application Process	-0.0564(0.456)
High Interest Rate	-0.424(0.432)
Medium Sized Firms	-0.284(0.630)
Large Sized Firms	0.636(0.629)
Age (5 Years)	0.347(1.428)
Age (15 Years or Above)	0.423(1.357)
Education of the Owner	0.159(0.238)
Gender of the Owner	-4.473***(1.289)
Ownership of the Firm	-1.075**(0.487)
Constant	4.074**(1.981)
Log likelihood = -69.265975, LR chi2(10) = 88.57	
Pseudo R2 = 0.3900, Prob > chi2 = 0.0000	

Figures in parenthesis are standard errors p<0.01***, p<0.05**,p<0.1*shows significance level.

The results in Table 1 show that keeping all other things constant, the negative coefficient for collateral indicates that if the bank demands collateral, the ordered log-odds of getting bank financing over non-bank financing decreases by -4.502 units. Similarly, complex application process and interest rate also hold negative relationship with bank financing. But this relationship is statistically insignificant. In contrast, gender of the owner (male), ownership of the firm (sole proprietorship), and medium sized firms shows negative and statistically significant relationship with the bank financing. However, large sized firms, education level of the owner, and age of the firm show positive relationship with bank financing. These findings are in conformity with the studies of Öztürk & Mrkaic (2014), Zarook et al. (2013), and Abor & Biekpe (2007).

Table 2. Average marginal effects results

   dy/dx w.r.t.: collateral, complex application process, high interest rate, medium sized firms, large sized firms, age (5 years), age (15 years or above), education of the owner, gender of the owner, ownership of the firm.

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Variables	dy/dx	Delta Method Std. Error	Z	P>|z|
Collateral	-.4977013	.1037231	-4.80	0.000
Complex Application Process	-.0062386	.0503995	-0.12	0.901
High Interest Rate	-.0468727	.04708	-1.00	0.319
Medium Sized Firms	-.0294194	.0662887	-0.44	0.657
Large Sized Firms	.0745348	.0712757	1.05	0.296
Age (5 Years)	.0363211	.143002	0.25	0.800
Age (15 Years or Above)	.044695	.1349941	0.33	0.741
Education of the Owner	.0175498	.0261759	0.67	0.503
Gender of the Owner	-.4944828	.129608	-3.82	0.000
Ownership of the Firm	-.1187995	.0498141	-2.38	0.017

Note: dy/dx for factor levels is the discrete change from the base level.

   Table 2 represent the marginal effect of explanatory variables on the probability of bank financing, holding other variables constant. The results show that keeping other variables constant, the probability of bank financing decreases with a marginal change in collateral demand. Similarly, if there occur a unit change in complex application process, interest rate, medium sized firms; gender of the owner (female) and ownership of the firm (sole proprietorship) the probability of taking bank finance decreases. However, if there occur a unit change in large sized firm, education and age of the firm the probability of taking bank financing increases.

Table 3. Odds ratio of logistic regression

Variables	Odds Ratio	Std. Error	Z	P>|z|
Collateral	.0110843	.011884	-4.20	0.000
Complex Application Process	.9451283	.4309306	-0.12	0.901
High Interest Rate	.6544159	.282752	-0.98	0.326
Medium Sized Firms	.7528356	.4746417	-0.45	0.652
Large Sized Firms	1.888716	1.187339	1.01	0.312
Age (5 Years)	1.415378	2.02109	0.24	0.808
Age (15 Years or Above)	1.526709	2.072004	0.31	0.755
Education of the Owner	1.172052	.2793942	0.67	0.505
Gender of the Owner	.0114118	.0147122	-3.47	0.001
Ownership of the Firm	.341412	.1664215	-2.20	0.027

The odds ratio for the explanatory variables of this study. The results depict the success to failure ratio or taking bank financing over non-bank financing. The result for education shows that if there occurs an increase in the education level of the owner says by a year the odds in favor of getting bank financing over non-bank financing is greater than 1. Further, an increase in the demand for collateral by banks, the odds ratio in favor of getting bank financing over non-bank financing is lower than 1 which indicate collateral as barrier to bank financing and support the findings of Mullei & Bokea (2000), Osano & Languitone (2016), González et al. (2007), and Hussain (2011). Similarly, the same result holds for gender of the owner (male), ownership of the firm (sole proprietorship), medium sized firms, complex application process and interest rate charged as the odds ratio in favor of getting bank financing over non-bank financing is less than 1, supporting the findings of Beck & Demirgue-Kunt (2006) in terms of size of

the firm. The key reason for not using bank financing by the medium sized firms may be the low level of access to such financing as identified by the Beck & Demirgue-Kunt (2006), and Kung'u (2011). However, in case of large sized firms, firms with 5 years age and firms with 15 years or above age have odds ratio in favor of getting bank financing over non-bank financing is greater than 1. The overall result indicates that collateral demand for bank financing, sole proprietorship, male owners of the firm, high Interest rate, complex application process and small sized firms are the key barriers to bank financing. Interestingly, in contrast to the findings of Carthy et al. (2015), the current study found that women owners of the firm in Islampor cottage industry are more inclined towards bank financing and the key reason – observed through FGDs in this industry – is that women don't have any other source for financing except bank financing and most of the bank programs are advancing more loans for female entrepreneurs as compare to male entrepreneurs. Further, those firms which are operating under Partnership are also more inclined towards bank financing as compare to those firms owned by sole proprietors. The key barrier facing by Islampor cottage industry which abstain them from taking bank financing are complex application process and interest rate. According to focused group discussions (FGDs) conducted in this industry, most of the firms refrain from taking bank financing as they charge interest rate and according to the religious believes (Islam) interest rate is prohibited and this hinders bank financing. On the other hand, Large sized firms and Old aged firms are more inclined towards bank financing in case of Islampor cottage industry supporting the early findings of Öztürk & Mrkaic (2014), Zarook et al. (2013), Abor & Biekpe (2007), Beck & Demirgue-Kunt (2006), and Kung'u (2011).

6. Conclusion

In this empirical investigation an attempt is made to examine the determinants of bank financing for a local cottage industry in village Islampor, Swat in the province of Khyber Pakhtunkhwa, Pakistan. The findings of the study suggest there are several constraints to the local business owners in the industry which further hamper the development of the product manufactured in the area. We conclude among others, demand for collateral, complexity of the application process of credit advancing institutions, firms' ownership, gender and size of the firms as well as the interest rate are the major determinants of access to bank financing for owners of the local cottage industry. Based on the insights gained from this

study it is recommended that the policy makers in the finance sector should approve special package for credit advancement to cottage industry. This should include easing the demand for collateral, making the application process simpler, and provision of credit interest free. Moreover, the current discrimination on the basis of gender and size of the firm should be abolished.

References

Abdesamed, K. H., Wahab, K. A. (2014), *Financing of small and medium enterprises (SMEs): Determinants of bank loan application,* African Journal of Business Management, 8(17), 1.

Abor, J., Biekpe, N. (2007), *Small business reliance on bank financing in Ghana*, Emerging Markets Finance and Trade, 43(4), 93-102.

Ahmad, I., Alam, K. (2015), *Credit flows to Pakistan's manufacturing SME sector*, The Lahore Journal of Economics, 20(SE), 261-270.

Ahmed, J., Khalid, J. (2016), *Determinants of Bank Loan Availability: Evidence from Pakistani Non-Financial Firms,* Romanian Economic Journal,18(59), 61-72.

Al-Mahrouq, M. H. (2003), *The small firm loan guarantee scheme in Jordan: an empirical investigation,* Newcastle University Business School, PhD thesis.

Ayyagari, M., Demirguc-Kunt, A., and Maksimovic, V. (2007*), Formal versus informal finance: Evidence from China,* World Bank Policy Research Working Paper No. 4465.

Öztürk, B., Mrkaic, M. (2014), *SMEs' access to finance in the euro area: what helps or hampers?*. IMF Working Paper no. 14/78.

Beck, T., Demirguc-Kunt, A. (2006*), Small and medium-size enterprises: Access to finance as growth constraint,* Journal of banking and finance, 30 (0), 2931-2943.

Becker, G. S. (1975), *Front matter, human capital: a theoretical and empirical analysis, with special reference to education,* In Human Capital: A Theoretical and Empirical Analysis, with Special Reference to Education, Second Edition 22-0, NBER, New York.

Berger, A. N., Udell, G. F. (1998), *The economics of small business finance: The roles of private equity and debt markets in the financial growth cycle,* Journal of banking & finance, 22(6), 613-673.

Calice, P., Chando, V. M., Sekioua, S. (2012), *Bank financing to small and medium enterprises in east Africa: findings of a survey in Kenya, Tanzania, Uganda and Zambia,* African Development Bank Group Working Paper Series, 3-40.

Cassar, G. (2004). *The financing of business start-ups,* Journal of business venturing, *19*(2), 261-283.

Central Institute for Economic Management CIEM (2007), *Survey on SME's access to formal financing*. ABA journal, XXII (2).

Coleman, S., Cohn, R. (2000). *Small firms' use of financial leverage: Evidence from the 1993 National survey of Small business finances,* Journal of Business and Entrepreneurship, 12(3), 81.

Daily the "DAWN" (2015). Haunting issues in SME financing, retrieved from http://www.dawn.com/news/1156357

Davenport, T. O. (1999), *Human capital: What it is and why people invest it,* Jossey-Bass Inc Pub, San Francisco.

Galli, E., Rossi, S. P. (2016), *Bank Credit Access and Gender Discrimination: Some Stylized Facts*, In Rossi S., Malavasi R. (eds) Financial Crisis, Bank Behaviour and Credit Crunch, Contributions to Economics, Springer, Cham.

Gujarati, D. N. (2011), *Econometrics by Example*, Palgrave Macmillan, New York.

Isaac, M., Blessing, M., Simbarashe, M., Divaris, J., Lloyd, C. (2001), *Factors influencing micro and small enterprises' access to finance since the adoption of multi-currency system in Zimbabwe*, Journal of Business Management and Economics, 2(6), 217-222.

Khurana, I. K., Martin, X., Periera, R. (2008), *Cross-listing and firm growth*, Review of Finance, 12(2), 293-322.

Kung'u, G. K. (2011), *Factors influencing SMEs access to finance: A case study of Westland Division, Kenya,* Retrieved from MPRA: https://mpra.ub.uni- muenchen.de/66633/

Lago, R., Saurina Salas, J., Lopez, J. A. (2007*), Determinants of access to external finance: evidence from Spanish firms,* Federal Reserve Bank of San Francisco Working Paper No. 22.

Manjón-Antolín, M. C. (2010), *Firm size and short-term dynamics in aggregate entry and exit*, International Journal of Industrial Organization, 28(5), 464-476.

McCarthy, S., Oliver, B., Verreynne, M. L. (2015), *Bank financing and credit rationing of Australian SMEs*, Australian Journal of Management, 42(1), 58-85.

Mullei, A., Bokea, A. (2000), Micro and small enterprises in Kenya: agenda for improving the policy environment. Nairobi: I.C.E.G.

Nichter, S., Goldmark, L. (2009), *Small firm growth in developing countries*, World development, 37(9), 1453-1464.

Osano, H. M., Languitone, H. (2016), *Factors influencing access to finance by SMEs in Mozambique: case of SMEs in Maputo central business district*, Journal of Innovation and Entrepreneurship, *5*(13).

Raza, S. H., Zahoor, M., Hussain, N. (2013), *Financing Behavior of KSE Listed Companies,* Journal of Managerial Sciences, 22 (1), 21-35.

Vos, E., Yeh, A. J. Y., Carter, S., Tagg, S. (2007), *The happy story of small business financing*, Journal of Banking & Finance, 31(9), 2648-2672.

Zarook, T., Rahman, M. M., Khanam, R. (2013), *The impact of demographic factors on accessing finance in Libya's SMEs,* International Journal of Business and Management, 8(14), 55.

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THE ROLE OF CREDIT SUPPLY CHANNEL IN TRANSMISSION OF MONETARY POLICY: AN EMPIRICAL INVESTIGATION OF MALAYSIAN BANKS ON BASIS OF SIZE AND LIQUIDITY

Abstract

The transmission channels of monetary policy represent the path to affect the macroeconomic objectives of policy. After recent crisis, the transmission mechanism has recently received increased attention, especially with respect to the efficiency of banks' credit supply channel. Yet, we know less about the relative role of banks' credit supply channel in monetary policy transmission mechanism. This study therefore examines the impact of monetary policy on the credit supply of banks using an unbalanced panel dataset over the period 2005-2016 for Malaysia. To mitigate the problem of endogeneity, the robust two-step system-generalize method of moments (GMM) estimator is applied. While estimating three alternative measures of monetary policy on banks' credit supply, several bank-specific and macroeconomic variables are included in the specification as control variables. In baseline model, we provide strong evidence on the existence of credit supply cannel of monetary policy in Malaysia. Further, the baseline models are extended on basis of size and liquidity to investigate the same phenomena. The results from the extended model indicate that the small-sized banks and the less-liquid banks respond more as compared to the large-sized banks and the more-liquid banks, respectively in Malaysia. The relatively less response of large-sized banks and the more-liquid banks to monetary policy may make it difficult for the central bank to achieve the desired objectives of the monetary policy. Our findings suggest that the

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nature of large-sized banks and the more-liquid banks while devising the monetary policy instruments to manage credit supply in the economy. Further, the results imply that the central bank needs to revisit the monetary policy transmission through credit supply channel for the small-sized banks and the less-liquid banks, especially in economies with emerging banking system. Otherwise, there will appear adverse impact of monetary policy nullifying the objectives of policy.

JELCLASSIFICATION: G15, E52, E42, G21;
KEYWORDS: BANK LENDING CHANNEL, LOAN SUPPLY, MONETARY POLICY, CREDIT SUPPLY CHANNEL, TRANSMISSION MECHANISM, SIZE, LIQUIDITY.

1. Introduction

Monetary policy transmission is link between changes in supply of money and the real variables like output, prices of goods and services, currency exchange and employment level. These relationships among policy and targeted variables are discussed through diversified theoretical perspectives and through different channels of monetary policy transmission. Among this spectrum of monetary policy transmission channels, the banks' credit supply channel came to the forefront since the 2007 worldwide depression affected badly the stability of the banking sector. Mishkin (1996) dissatisfied with conventional interest rate channel and introduced impact of asymmetric information in financial market what led to credit channel by two ways in credit markets: the balance sheet channel and the bank lending channel. Reviewing the empirical literature, we find that the monetary transmission mechanism through these channels has been confirmed for different economies by several known scholars. Examples of these researchers include Bernanke & Blinder (1995), Kashyap & Stein (1994), Bernanke & Gertler (1995), and Cecchetti (1995). In the bank-centric view, it is assumed that there are three important asset types: money, bonds, and bank loans. In this context, the special response of banks to changes in monetary policy is their lending response. This paper is mainly related to the credit channel of monetary policy transmission mechanism because it highlighted the role of banks in monetary policy transmission mechanism by focusing on the bank lending channel and the balance sheet channel in line with Bernanke and

Gertler (1995) and further extended through additional characteristics of banks in terms of size and liquidity level.

The large and more-liquid banks are able to absorb the effects of tightening monetary policy, whereas the small and less-liquid banks that are affected more due to monetary policy actions. Further, the small and less-liquid banks reduce their financing more than large and more-liquid banks. The small and less-liquid banks are not able to find out an external source of financing because of heavy cost of external financing. Alper et al. (2012) have concluded that the negative coefficient suggests that the small and less-liquid banks lend more under tight monetary policy. These empirical results are consistent with the bank's centric view of monetary policy (Kashyab & Stein 1994, Sharpe 1995, Hasin & Majid 2012). Several studies such as, Bernanke & Blinder (1995), Gertler & Gilchrist (1993), Kashyab & Stein (1995), and Aikman et al. (2017) have noted the differential impact of monetary policy on banks' credit supply on the basis of size and liquidity stock. However, the focus of these studies was on consolidated macroeconomic data, rather than the bank-level data.

Overall, these studies have documented that there is a potential gap to explore the responses of microeconomic data of banks to monetary policy of a central bank. Indeed, if both the small and less-liquid and large and more-liquid banks are the part of financial system, then any instrument of monetary policy should have to affect the economy by affecting both types of banking. Thus, it is worth exploring whether the small and less-liquid banks hinder or intensify the monetary policy mechanism. Yet, until now we know less about the relative role of banks with specifications in monetary policy transmission mechanism of Malaysia. However, one should note that none has explored the relative role of small versus large banks and less-liquid versus more-liquid banks in the transmission mechanism of monetary policy in Malaysia: which is the core theme of this study. Therefore, this paper aims to find out the existence of credit supply channel of monetary policy transmission in Malaysia. Further, this study also intends to explore the role of the credit channel of monetary policy through small versus large banks and less-liquid versus more-liquid banks. To do so, we use microeconomic data of individual 27 banks. Our analytical framework enables us to examine the banks' centric-view of credit supply channel of monetary policy transmission mechanism in Malaysia by comparing the role of banks on basis of size and liquidity. Specifically, we examine whether tight monetary policy affects more the small and less-liquid or large and more-liquid banks' credit supply.

The rest of the paper is structured as follows. Section 2 reviews the

empirical literature on monetary policy transmission mechanism. Section 3 describes data and presents the empirical framework. Section 4 presents the empirical findings. Finally, Section 5 presents some conclusions and policy recommendations.

2. Review of empirical literature

Monetary policy works through different transmission channels to affect an economy. These channels behave differently in different economies based on structure and efficiency of an economic system. For example, any change in domestic demand affects the level of production, employment, and wages. During these procedures, there occurs a change in domestic prices as well. Thus, the central banks must assess the reasonable time to conduct a monetary action to affect the prices and output of the economy. So, it is vital for a central bank to consider the practical understanding of how a monetary policy transmits to the real economy of a country.

The various transmission mechanisms appear with distinguish characteristics and their relevance is found differently for different economies, not all of them are active in all countries of the world. If a transmission channel is not able to transmit the policy actions in one country, it does not imply that the same channel is not capable work in another country. The bank-lending channel of monetary policy works through the response of credit supply to the indicators of monetary policy such as interest rates and other policy instruments. Therefore, the credit channel of monetary policy transmission can also be said an enhancement mechanism to the interest rate channel. Bernanke and Blinder (1988, 1995) are the first who laid down the foundation for the roles of banks in monetary policy transmission. Bernanke & Blinder (1995), Kashyap & Stein (2000), and Kishan & Opiela (2000) have confirmed the presence of lending channel in the United States. Most of the studies deal with the responses of credit supplies of the banks from distinct characteristics, like banks' size, the level of liquidity and banks' capital. Bernanke et al. (1999) extend the New Keynesian model to account for the balance sheet channel of monetary transmission. Kashyap & Stein (1997) have concluded that small banks reduce their lending more than large banks in response of tightening monetary policy in the USA. Similarly, Kashyap & Stein (1997), Cecchetti (1999), Ehrmann et al. (2001), and Santis & Surico (2013) have explored some descriptive evidence on credit supply channel for the EU countries. In line with them, Bernanke & Lown (1991), Kashyab & Stein (1995),Wong (2000), Aysun & Hepp (2013), Janjua et al., (2014), Evans, Fisher, Gourio

and Kran (2015), Jermann & Schmid (2016), Auclert (2017), Erdogdu (2017), and Anwar & Nguyend (2018) have documented the credit view of monetary transmission mechanism. They have found that there is significant negative relationship between monetary measures and bank loan supply. Janjua et al. (2014), and Evans et al. (2015) have showed that small banks are likely to be more affected by monetary tightening than large banks. However, one should note that they do not explore the relative the role of the credit channel of monetary policy through small versus large banks and less-liquid versus more-liquid banks for emerging market like Malaysia.

Kashyap & Stein (1995, 2000) have examined the impact of monetary policy tightening on banks on the basis of size and liquidity. They have developed a new approach by studying the impact of monetary transmission mechanism in terms of size and liquidity of banks. In their panel data analysis, they have collected microeconomic quarterly data of individual bank balance sheets against every insured U.S. commercial bank from 1976 to 1993. They have developed the proxies for the informational asymmetries of a bank; the liquidity of its balance sheet and its size measured in total assets. They have found that the impact of monetary policy is stronger on smaller and less liquid balance sheets of banks. Gertler & Gilchrist (1994) have found that debt of small sized firms along with other variables are more responsive to changes in monetary policy than that of large firms. However, Ashcraft & Campello (2007), and Ciccarelli et al. (2015) have noted that these results might be appeared due to a contraction of banks' credit supply and they have verified the existence of the balance sheet channel. Further, Ippolito et al. (2017) have shown that a quantitatively significant balance sheet channel transmission channel of monetary policy is found for the firm's that avail credit of bank to finance their business activities. In their analysis, size and liquidity are found significant variables explaining the credit decision of financial firms. Likewise, Kishan & Opiela (2000), and Aikman et al., (2017) have also explored the same view of monetary policy in term of size and liquidity of banks. Further, Kashyap & Stein (2000) have suggested to include the interaction terms between the monetary policy measures and bank individual characteristics to identify the bank lending channel.

Yet, we know less about the relative role of banks in monetary policy transmission mechanism of Malaysia. Therefore, this paper contributes into the literature on the monetary policy transmission mechanism by exploring the banks' centric-view of monetary policy in baseline model. Similarly, we have extended the baseline model to investigate the role of size and liquidity position of any bank through their responses to monetary tightening.

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3. Data and Methodology

We have selected the sample of 21 banks of Malaysia. Annual data for the period 2005-2016are taken subject to availability of data. The data on bank-specific and macro-economic variables are collected from financial statements of the banks, available on their web-sites for public. Further, we have completed the data of Bank Nagara Malaysia (BNM), International Financial Statistics, and Orbis Bank Focus (Bank scope).Some data of conventional banks are taken from Thomson Reuters Data stream.

There are designed six empirical models with several specifications to achieve the objectives of this paper. In line with Kashyab & Stein (1994), these models explore the impact of monetary policy indicators on credit supply of banks with some additional specifications. The baseline model (1) is developed to examine the responses of credit supply to monetary policy indicators, along with bank-specific variables and macroeconomic conditions in Eq.1. The model adopts the following forms.

$$Y_{it} = \beta_i + X_{it}\alpha + Z_t\theta + \rho M_t + \mu_t + \varepsilon_{it} \tag{1}$$

Y_{it} = banks' credit supply;
β_i = individual-specific effect;
μ_t = year-specific effect;
ε_{it} = error term;
X_{it} = a set of bank-specific variables;
Z_t = a set of macroeconomic variables;
M_t = monetary policy indicator.

Further, the baseline model (1) is extended through adding the small-sized banks dummy and large-sized banks dummy into the specification. Specifically, we interact the both dummies with the monetary policy indicators to examine the differential response of banks across their size on the basis of their assets in Eq. (2).

$$Y_{it} = \beta_i + X_{it}\alpha + Z_t\theta + \rho_1 M_t \times D_i^{small} + \rho_2 M_t \times D_i^{large} + \mu_t + \varepsilon_{it} \tag{2}$$

Similarly, the baseline model (1) is extended through adding the less-liquid banks dummy and the more-liquid banks dummy into the specification. Specifically, we interact the both dummies with the monetary policy indicators to examine the differential response of banks across their stock of liquidity in Eq. (3).

$$Y_{it} = \beta_i + X_{it}\alpha + Z_t\theta + \rho_1 M_t \times D_i^{LL} + \rho_2 M_t \times D_i^{ML} + \mu_t + \varepsilon_{it} \qquad (3)$$

We have selected the bank-specific, the macroeconomic and the monetary policy variables to examine the existence of banks' credit-view of monetary policy and the differential impact of monetary policy on banks' credit supply on the basis of size and liquidity stock. The rationale of selection of these specific variables is discussed in detail. First, we begin with the dependent variable that is banks' credit supply. This study intends to investigate the effects of monetary policy indicators on credit supply decision of banks. As credit supply of banks decreases due to an increase in policy interest rate, it employs the existence of banks' centric view of credit supply channel (Alper et al. 2012, Sukmana & Kasim, 2010). The bank-specific independent variables are there described in Table 1. In line with Kashyab & Stein (1995), the lending interest rate, the deposit interest rate, and the interest rate spread: three interest rates are selected as measures of monetary policy."

Table 1. Bank-specific variables.

Variables	Description
Bank credit supply	Ratio of Gross Loans to Total Assets
Bank size	Log of Total Assets
Liquidity	Cash and cash equivalent divided by total assets
Capital	(Total Shareholder Equity/total assets) *100
Coverage ratio	(EBIT/Interest Expanse) *100
Credit risk	Ratio of classified loans to total loans
Profitability	(Profit after Tax/Total Assets) *100
Debt to equity ratio	Debt/Equity Ratio

Source: Authors' elaboration.

We use the robust two-step system-the Generalize Method of Moments (GMM) estimator. Further, the J-test of Hansen (1982) is employed to observe the null hypothesis for the instruments which are orthogonal to the residuals. This is conducted for the validity of the instruments.

4. Empirical finding

4.1. Findings of the baseline model

The results of the baseline model are presented in Table 2. Panel A and Panel B present the empirical results of variables and diagnostic tests, respectively. In the Panel A of Table 2, the monetary policy indicators; the lending interest, the interest rate-spread and the deposit rate indicate the negative and statistically significant coefficients that support the presence of banks' centric-view of monetary policy. Although, we regress the credit supply of banks on the lending interest, the interest rate spread and the deposit rate separately in different three regressions.

Table 2: Impact of monetary policy indicators on banks' credit supply

	Panel A. Estimation Results					
	Model 1 (A)		Model 1 (B)		Model 1(C)	
Variables	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Debt Ratio (t-1)	0.677***	0.134	0.763***	0.093	0.692***	0.076
Banks size	0.006**	0.028	0.016**	0.053	0.002**	0.003
Banks Liquidity	-0.484***	0.124	-0.323***	0.067	-0.304***	0.088
Banks Capital	0.456**	0.027	0.287***	0.094	0.004***	0.004
Coverage ratio	0.052	0.463	0.432	0.785	0.487	0.566
Credit risk	-0.123***	0.045	-0.038***	0.005	-0.032***	0.003
Banks Profitability	0.033***	0.006	0.016***	0.002	0.023***	0.004
Debt to equity ratio	-0.015***	0.003	-0.003***	0.004	-0.004***	0.006
Lending rate	-0.033***	0.016				
Interest rate spread			-0.034***	0.006		
Deposit rate					-0.033***	0.005
GDP Growth	0.286**	0.167	0.016**	0.032	0.079 *	0.096
Inflation	0.012*	0.025	0.004**	0.018	0.024**	0.007
Constants	-0.554	0.635	0.282**	0.022	-0.098*	0.082
	Panel B. Diagnostic Tests					
Observations	199		220		220	
Banks	21		21		21	

AR (2)	0.40	0.42	0.74
p-value	0.664	0.670	0.407
J- statistic	16.08	15.25	15.21
p-value	1.000	1.000	1.000

Notes: The J-statistics is a test of the over identifying restrictions and distributed as chi-squared under the null of instrument validity and AR (2) Arellano-Bond is the test of second-order autocorrelation in the first-differenced residuals. *** $p<0.01$, ** $p<0.05$, * $p<0.1$

The empirical results are consistent with the bank's centric view of monetary policy (Kashyab & Stein, 1994). Similarly, these results are in accordance with existing literature, such as Sharpe (1995), Hasin & Majid (2012), and Janjua et al. (2014). In Model 1A of Table 2, the results suggest that banks' credit supply is positively and significantly related to one-period lagged credit supply). This implies that those banks hold more credit supply (debt ratio) previously continue to supply more credit. Inspecting the coefficients of banks' size, we find that banks' credit supply increase significantly with an increase in size. This result is also consistent with previous empirical studies that have reported the positive relationship between bank size and the credit supply of banks (Alper et al., 2012, Köhler et al. 2006, and Schmitz 2004). However, one should note that this result is contrary to Pruteanu (2004), and Janjua et al. (2014), who have come with negative association between bank size and credit supply. The coefficient of banks' liquidity is negative and statistically insignificant, suggesting that liquidity affects negatively the credit supply of banks. Similarly, Alper et al. (2012), and Köhler et al. (2006) have found the negative effect of liquidity on banks' loan supply, but significant. It means there is shortage of liquidity stock to absorb monetary policy shocks. Although, Schmitz (2004), and Hasin & Majid (2012) have indicated a positive and significant relationship of banks' liquidity and loan growth, implying that liquid banks adjust the tightening of monetary policy.

Banks' capital appears positively and significantly related to the credit supply of banks. Several studies in the literature such as Girardin & Moussa (2011), Schmitz (2004), Bernanke & Lown (1991) have also reported the positive relation of capital with the credit supply of banks. Further, the positive impact of capital supports the prediction of monetarists that well-capitalized banks survive more in contractions of monetary policy. The coefficient of coverage ratio is positive and statistically significant, suggesting that bank with high coverage ratio in their cash flow streams increase their supply of credit. Likewise, Kaleem & Isa (2006), Sanrego &

Nikmawati (2010), and Alaro & Hakeem (2011) have documented the positive relationship between coverage ratio and banks' credit supply. Credit risk appears to be negatively related to banks' credit supply, suggesting that when the credit risk of a bank increases the bank become conscious in issuing loans. This finding is consistent with the findings of Pruteanu (2004) who has explained that the classified loans become a basic source to increase credit risk because it is defined as ratio of classified loans to total loans. Banks' profitability is positively and significantly associated to banks' credit supply decision. The debt to equity ratio appears to affect credit supply negatively and significantly, indicating that as the debt to equity ratio grows, the banks cut their credit to market because the banks are not capable to issue more credit.

The GDP growth is found positive and significant in all three regressions, suggesting that an increase in GDP growth will lead to an increase of credit growth in banks. Because, there is substantial reward to supply the funds in a growing economy. Inflation is also found positively and significantly related to credit growth of banks in line with existing literature.

In Model 1b of Table 2 and Model 1c of Table 2, we regress the banks credit supply on bank specific characteristics with the interest rate spread and the deposit rate, respectively as monetary policy indicator and with macroeconomic indicators. All the bank specific and macroeconomic variables are consistent with the results of previous Model 1a of Table 2.The interest rate-spread and the deposit rate negatively and significantly related to the banks' credit supply testifying the banks' centric-view of monetary policy.

In the Panel B of Table 2, the diagnostic tests reveal that our instruments are robust. Especially, the estimates of J-test do not provide any significant evidence in favor of rejecting the null hypothesis. Similarly, we do not find any significant evidence of the existence of autocorrelation in the residuals. Overall, these diagnostic tests prove the validity of the instruments.

4.2. Impact of monetary policy on banks on basis of size

The base-line model (1) is extended after categorizing banks on basis of size. There are included two dummies; a small banking dummy and a large banking dummy in base-line model to observe the impact of monetary policy indicators on banks' credit supply on basis of size. In Table 3, we regress the extended model of small versus large banks' credit supply on bank specific variables, macroeconomic conditions and monetary policy indicators. The Panel A present the estimation results of the bank-specific, the

macroeconomic variables and monetary policy indicators in three regressions. Almost, these results are similar to the results presented in Table 2. Further, the coefficient value of the credit supply suggests that banks' credit supply is positively and significantly related to one-period lagged credit supply in Table 4. This implies that those banks hold more credit supply previously would supply more credit to economy. The banks' size, the banks' capital, the coverage ratio, the banks' profitability and the debt to equity ratio are positively and significantly related to credit growth of banks. The coefficient of banks' liquidity and the credit risk is negative and significant to banks' credit supply. Only coverage ratio changes its sign from negative to positive, when it is regressed with the lending rate.

Table 3. Impact of monetary policy on banks on basis of size.

	Panel A. Estimation Results					
	Model 2 (A)		Model 2(B)		Model 2 (C)	
Variables	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Debt Ratio (t-1)	0.744***	0.117	0.644***	0.087	0.475***	0.214
Banks size	0.017**	0.008	0.012**	0.007	0.034***	0.015
Banks Liquidity	-0.441***	0.104	-0.629***	0.177	-0.492***	0.115
Banks Capital	0.692***	0.001	0.633**	0.002	0.319***	0.001
Coverage ratio	0.549	0.395	-1 .677*	0.959	-3.974**	2.084
Credit risk	0.042***	0.020	0.034***	0.010	0.093***	0.030
Banks Profitability	2.831*	1.804	0.089	1.527	0.024***	0.007
Debt-equity ratio	- 0.383**	0.200	-0.364	0.283	-0.218	0.204
Lending rate $\times D^{Small\ banks}$	-0.033***	0.010				
Lending rate $\times D^{Large\ banks}$	-0.027***	0.007				
Interest rate spread$\times D^{Small\ banks}$			-0.050***	0.006		
Interest rate spread$\times D^{Large\ banks}$			-0.034***	0.005		

Deposit rate $\times D^{Small\ banks}$					-0.098**	0.059
Deposit rate $\times D^{Large\ banks}$					-0.061**	0.009
GDP Growth	0.033**	0.084	0.053**	0.036	0.254***	0.125
Inflation	0.022**	0.017	0.109***	0.022	0.011**	0.018
Constants	0.589*	0.356	0.393***	0.169	0.445*	0.279
Panel B. Diagnostic Tests						
Observations	199		199		220	
Banks	21		21		21	
AR (2)	-0.75		-0.84		0.23	
p-value	0.451		0.402		0.820	
J- statistic	5.69		7.58		9.13	
p-value	1.000		1.000		1.000	

*** p<0.01, ** p<0.05, * p<0.1

Overall, all three monetary policy indicators are associated negatively and statistically significant with the credit supply of banks that support the presence of banks' centric-view of monetary policy in all three regressions. Although, we have regressed the credit supply of banks on the lending interest, the interest rate spread and the deposit rate separately in different three models. It is notable that small banks are more responsive to tightening monetary policy in all three models. Alper et al. (2012) have concluded that the negative coefficient suggests that small banks lend more under tight monetary policy. These empirical results are consistent with the banks' centric-view of monetary policy (Kashyab & Stein, 1994, Sharpe, 1995; and Hasin & Majid, 2012).Moreover, the large banks are found able to absorb the effects of tightening monetary policy, whereas the small banks that are affected more due to monetary policy actions. Further, the small banks reduce their financing more than large banks. The small banks are not able to find out an external source of financing because of heavy cost of external financing. Several studies such as, Bernanke & Blinder (1995), Gertler & Gilchrist (1993), and Kashyab & Stein (1995) have noted the differential effects of monetary policy on banks' credit supply across small and large banks.

The GDP growth and inflation are found positive and statistically significant in all three regressions in line with Table 2. In Table 3, the Panel B, the diagnostic tests reveal that our instruments are robust. Overall, the diagnostic tests prove the validity of the instruments.

4.3. Impact of Monetary Policy on Banks on basis of Liquidity

The base-line model (1) is extended after categorizing the banks on basis of their liquidity. There are included two dummies; a less liquid banking dummy and a more liquid banking dummy in base-line model to observe the responses of banks credit supply to monetary policy measures on basis of liquidity. In Table 4, we regress the extended model of less liquid versus more liquid banks' credit supply on bank specific variables, macroeconomic conditions and monetary policy indicators.

In the Panel A of Table 4, it is notable that less-liquid banks are affected more as compared to more liquid banks to tightening monetary policy in all three regressions. This evidence is in line with the findings of Kashyab & Stein (1997), Schmitz (2004), Köhler et al., (2006),Hasin & Majid (2012), and Santis & Surico (2013). Similarly, Schmitz (2004), and Hasin & Majid (2012) have noted that liquid banks adjust the tightening of monetary policy, whereas the banks with poor liquidity respond aggressively to monetary policy actions.

Almost, the results of bank-specific variables are similar to the results presented in Table 2 except the coverage ratio that appears with different results in Table 4. It is found positive in regression of lending interest rate and negative with remaining two interest rates, although this relationship is insignificant in all three regressions. The negative association is because of the coverage ratio accepts the immediate impact of tightening the monetary policy on financial position of banks (Janjua et al., 2014, and Alper et al., 2012). However, Kaleem & Isa (2006), Sanrego & Nikmawati (2010), and Alaro & Hakeem (2011) have documented the positive relationship between coverage ratio and banks' credit supply, suggesting that bank with high coverage ratio in their cash flow streams increase their supply of credit.

In Table 4, the GDP growth and inflation are found positive and statistically significant in all three regressions in line with Table 2. In Table 4, the Panel B, the diagnostic tests reveal that our instruments are robust. Overall, the diagnostic tests prove the validity of the instruments.

Table 4. Impact of monetary policy on banks on basis of liquidity

Panel A. Estimation Results						
	Model 3 (A)		Model 3 (B)		Model 3 (C)	
Regressors	Coefficient	Std. Error	Coefficient	Std. Error	Coefficient	Std. Error
Debt Ratio (t-1)	0.345***	0.161	0.398***	0.190	0.679***	0.114
Banks size	0.065**	0.038	0.047**	0.027	0.236**	0.018
Banks Liquidity	-0.845***	0.293	-0.749***	0.204	-0.472***	0.134
Banks Capital	0.499**	0.130	0.131*	0.783	0.903**	0.466
Coverage ratio	0.008	0.261	-0.140	0.095	-0.380	0.764
Credit risk	0.005***	0.020	0.079**	0.041	0.226**	0.139
Banks Profitability	0.365	0.317	0.276**	0.150	0.424***	0.187
Debt-equity ratio	-0.068	0.398	-0.275	0.199	-0.237	0.167
Lending rate $\times D^{Less\ Liquid}$	-0.047***	0.005				
Lending rate $\times D^{More\ Liquid}$	-0.044***	0.005				
Interestrate spread $\times D^{Less\ Liquid}$			-0.045***	0.006		
Interestrate spread $\times D^{More\ Liquid}$			-0.038***	0.006		
Deposit rate $\times D^{D^{Less\ Liquid}}$					-0.066***	0.003
Deposit rate $\times D^{More\ Liquid}$					-0.026***	0.004
GDP Growth	0.116**	0.027	0.222*	0.174	0.062*	0.057
Inflation	0.028***	0.011	0.026***	0.011	0.037***	0.014
Constants	1.929**	0.898	0.732**	0.308	0.696*	0.540
Panel B. Diagnostic Tests						
Observations	220		220		220	

Banks	21	21	21
AR (2)	0.07	0.67	0.35
p-value	0.947	0.504	0.725
J- statistic	6.39	6.64	4.08
p-value	1.000	1.000	1.000

<center>*** p<0.01, ** p<0.05, * p<0.1</center>

5. Conclusions and policy implications

The bank's centric-view of monetary policy has received an increased attention by researchers and practitioners after the financial crisis in last decade. In this paper, we have examined the existing of banks' centric-view of monetary policy and the impact of monetary policy on credit supply of small versus large banks and less-liquid versus more-liquid banks in the transmission mechanism of monetary policy for Malaysia: which is the core theme of this study. In empirical models, three alternative measures of monetary policy are regressed on banks' credit supply, several bank-specific variables and macroeconomic indicators as control variables. Estimating the baseline model, we provide the strong evidence on the existence of banks' centric-view of monetary policy. The results from the extended model indicate that large and more liquid banks respond less to monetary policy as compared to the small-sized and less-liquid counterparts. The relatively less response of large and more-liquid banks to monetary policy may make it difficult for the central bank to achieve the desired objectives of the monetary policy.

We can suggest several policy implications for monetary policy authorities. First, since banks' centric view plays a key role in transmission of monetary policy, the central bank should manage interest rate to stabilize the credit supply through banks. Second, our findings suggest that for an effective monetary policy, there is a vital need to consider the size and liquidity stock of banks while devising the instruments to manage credit supply in the economy, otherwise there may appear puzzles to monetary policy. Third, the policy makers should keep in preference the microeconomic aspects of banks' credit supply behavior in formulating monetary policy because we have found the small-sized and less-liquid banks are affected more as compared to their counter parts in Malaysia.

Otherwise, lack of adequate monetary instruments will lead to high intermediation cost and persistent inflationary pressures. Fourth, his study suggests that the monetary policy authorities should consider different alternate channels with additional specifications through which they can conduct an effective monetary policy in Malaysia.

References

Aikman, D., Lehnert, A., Liang, N. Modugno, M. (2017), *Credit, Financial Conditions, and Monetary Policy Transmission*, Hutchins Centre Working Paper No 39.

Alaro, A.R., Hakeem, M. (2011), *Financial Engineering and Financial Stability: The Role of Islamic Financial System*, Journal of Islamic Economics, Banking and Finance, 7 (1), 34-55.

Alper, K., Hulagu, T., Keles, G. (2012), *An empirical study on liquidity and bank lending*, Central Bank of the Republic of Turkey, Working Paper, No 4.

Anwar, S., Nguyend, L.P., (2018), *Channels of monetary policy transmission in Vietnam*, Journal of Policy Modelling, 1(10), 134-167.

Ashcraft, A.B., Campello, M. (2007), *Firm balance sheets and monetary policy transmission*, Journal of Monetary Economics, 54(6), 1515-1528.

Auclert, A., (2017), *Monetary Policy and The Redistribution Channel*, NBER Working Paper Series, Working Paper 23451, Cambridge, MA 02138, 1-46.

Aysun, U., Hepp, R. (2013), *Identifying the balance sheet and the lending channels of monetary transmission: A loan-level analysis*, Journal of Banking & Finance, 37, 2812-2822.

Bernanke, B.S., Lown, C.S., Friedman, B.M., (1991), *The credit crunch Brookings papers on economic activity*. 205-247.

Bernanke, B.S., Blinder, A.S. (1995), *Inside the Black Box: The Credit Channel of Monetary Policy Transmission*, Journal of Economic Perspectives, 9(4), 27-48.

Bernanke, B.S., Gertler, M., Gilchrist, S. (1999), *The Financial Accelerator in a Quantitative Business Cycle Framework*, Handbook of Macroeconomics. Elsevier, Amsterdam.

Cecchetti, S.G. (1999), *Legal Structure, Financial Structure, and the Monetary Policy Transmission Mechanism*, NBER Working Paper No. W 7151.

Ciccarelli, M., Maddaloni, A., Peydro, J.L., (2015), *Trusting the Bankers: A New Look at the Credit Channel of Monetary Policy*, Review of Economic Dynamics 18(4), 979-1002.

Erdogdu, A. (2017), *Functioning and Effectiveness of Monetary Transmission Mechanisms: Turkey Applications*, Journal of Finance and Bank Management, American Research Institute for Policy Development, 5(1), 29-41.

Evans, C., Fisher, J., Gourio, F., Kran, S., (2015), *Risk Management for Monetary Policy Near the Zero Lower Bound*, Brookings Papers on Economic Activity, 141-219.

Gertler, M., Gilchrist, S. (1993), *The role of credit market imperfections in the monetary transmission mechanism: Arguments and evidence*, The Scandinavian Journal of Economics, 95(1), 43–64.

Girardin, E., Moussa, Z., (2011), *Quantitative easing works: Lessons from the unique experience in Japan 2001–2006*, Journal of International Financial Markets, Institutions and Money, 21, 461-495.

Ippolito, F., Ozdagli, A.K., Perez-Orive, A. (2017), *The Transmission of Monetary Policy through Bank Lending: The Floating Rate Channel*, Finance and Economics Discussion Series. Washington. Board of Governors of the Federal Reserve System.

Janjua, P. Z., Rashid, A., Qurrat, U.A. (2014), *Impact of Monetary Policy on Bank' Balance Sheet in Pakistan*, International Journal of Economics and Finance, 6(11), 187-196

Kaleem, A., Isa, M. (2006), *Islamic Banking and Money Demand Function in Malaysia: An Econometric Analysis*, Pakistan Economic and Social Review, XLIV (2), 277-290.

Kashyab, A.K., Stein, J C. (1994), *Monetary policy and bank lending in Monetary policy*, The University of Chicago Press, 29(1).

Kashyab, A.K., Stein, J.C. (1995), The *Impact of Monetary Policy on Bank Balance Sheets*, NBER, Working Paper No. 4821.

Kishan, R.P., Opiela, T.P. (2000*), Bank Size, Bank Capital, and the Bank Lending Channel*, Journal of Money, Credit and Banking, 32(1), 121-141.

Köhler, M., Judit, H., Matthias, G. (2006), *The Role of Banks in the Transmission of Monetary Policy in the Baltics*, Centre for European Economic Research (ZEW), Discussion Paper, 06-005.

Mishkin, F.S. (1996), *The Channels of Monetary Transmission: Lesson for Monetary Policy*, NBER Working Paper No. 5464.

Pruteanu, A. (2004), *The Role of Banks in the Czech Monetary Policy Transmission Mechanism*, Czech National Bank, Working Papers 2004/03.

Sanrego, Y. D., Nikmawati, K. (2010), *Transmission Mechanism of*

Sharia Financing in Malaysia, The Journal of Muamalat & Islamic Finance, Research (JMIFR). 7(1).

Santis, R.A., Surico, P. (2013), *Bank lending and monetary transmission in the euro area*, Economic Policy, 28(75), 423-457.

Schmitz, B. (2004), *What Role do Banks play in Monetary Policy Transmission in EU New Member Countries?*, Mimeo 4(2).

Sharpe, S.A. (1995), *Bank Capitalization, Regulation, and the Credit Crunch: A Critical Review of the Research Findings,* Board of Governors of the Federal Reserve System, Finance and Economics Discussion Series No. 95-20.

Sukmana, R., Kassim, S.H. (2010), *Roles of the Islamic Banks in the Monetary Transmission in Malaysia*, International Journal of Islamic and Middle Eastern Finance and Management, 3I(1), 7-19.

Wong, K. (2000), *Variability in the effects of monetary policy on economic activity*, Journal of Money, Credit and Banking, 32(2), 179-198.

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INTERNATIONAL TRADE SPECIALIZATION AND ITS STABILITY IN LOW-INCOME COUNTRIES

Abstract

The main purpose of study is to measure the trade specialization by revealed comparative advantage (RCA) and revealed symmetric comparative advantage (RSCA) of low-income countries. The data are taken from 1996 to 2014 for measuring Balassa's RCA and RSCA. Specialization stability trends are also checked for all sectors by stability test. It is found that all low-income countries are under specialized in technological products like automotive products, chemicals, electronic data processing and office equipment, fuels, fuels and mining, iron and steel, office and telecom equipment, manufactures, pharmaceuticals sector, clothing, machinery and transport equipment, telecommunications equipment and transport equipment but specialized in agricultural sector, food sector and textile sector. According to the results of stability test, specialization in only North Korea has been decreased while the degree of turbulence is high in this country. Policy measures should be taken for promoting the high technological products sector in low-income countries.

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1. Introduction

Having an imperative role in the process of economic development, trade doesn't have necessarily immediate benefits (Santos-Paulino, 2017). According to classical comparative advantage theory, economic prosperity of world can be attaining by free trade and welfare maximization. There is direct impact of international trade on welfare in numerous ways through changes in relative good and factor prices, the nature of technological change, factor movements and knowledge spillover (Winters et al., 2004). Economic growth and resource allocation can be produced through the potential of trade policy. Trade policy is not impartial and trade liberalization is questionable to generate extensive beneficial outcomes for all countries (see Goldberg and Pavnick, 2007; Maiti and Marjit, 2008). Countries' potential to produce and export has the capacity to enhance economic performance (e.g., see Santos-Paulino 2017). Accumulation of human, physical and organizational capital, as well as dynamic change and structural transformation in trade specialization, and technological progress play key role in the development and full utilization of productive capacities (among others, see Anand et al., 2012). If the resources of a country have comparative advantage in case of production specialization then there is efficient utilization of a country's resources through trade dynamics (see UNCTAD, 2014). Therefore, it means that production specialization leads to international specialization and production specialization can be captured by revealed comparative advantage (see also Alcalá, 2009).

The "revealed comparative advantage" (RCA), introduced by Balassa (1965, 1977, 1991 and 1989), supposed that comparative advantage patterns be able to observe from post-trade data. Balassa's "stages of comparative advantages" research supported a "catch up" process that changes economies from one area of comparative advantage to another (see also Bender and Li, 2002; and Santos-Paulino, 2017). Thus, it is important to measure the international trade specialization because it leads to welfare development (Eckel, 2008) because many author (Cantwell, 1995; D'Agostino et al., 2012; Dixit and Stiglitz 1977; Eckel 2008; Laursen, 2015; Liegsalz and Wagner 2013; Soete and Wyatt 1983) said that specialization leads to welfare. So for policy makers it is very important to know that which country specialized and which is not international Specialization of each product for low-income countries can be measured through revealed comparative advantage (RCA). International trade specialization is important

for welfare development and it should be stable and this stability is very important for welfare development of each country. It becomes important to measure stability of international trade specialization. This stability analyzed the degree at which trade specialization patterns are stable over time or not. To check the stability of trade specialization patterns, technology is an important determinant (Dalum et al. 1998). Relatively technologies are stable through time and space. There is a strong association between technology and trade specialization so this will lead to stable the trade specialization patterns over time (Dosi et al., 1990; and Dosi and Nelson, 2013). If trade specialization and technological specialization are closely related with each other at country level than specialization trade patterns stable over long time at national level (Laursen, 2000b; and Soete, 1981, 1987).

There are many studies (Bender and Li, 2002; Chaudhary and Kumar 2016; De Benedictis and Tamberi 2004; Dosi et al. 1990; Laursen, 2015; Richardson and Zhang 2001) which calculated international trade specialization and stability for high-income countries for selected products. But no study is found for low-income countries that calculated the international trade specialization and its stability patterns. Measurement of trade specialization and its stability patterns may be very important for policy makers because these countries facing many challenges in terms of economic development. So it is important to see that which country is being specialized and in which sector either a country is specialized in agriculture products or in technology products so policy measures can be taken to improve the situation for each country. So this study aims to measure international trade specialization and stability patterns through revealed comparative advantage and regression equation respectively for all products[1] of low-income countries. This study is organized in three sections like review of literature, methodology and results and discussion. Next section addresses review of literature followed by methodology, result discussion and conclusion.

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[1] Agricultural sector, automotive products, chemicals, clothing sector, electronic data processing and office equipment, food sector, fuels, fuels and mining, iron and steel, office and telecom equipment, manufactures, pharmaceuticals sector, machinery and transport equipment, telecommunications equipment, transport equipment, and textiles.

1. Literature review

Welfare can be measured by specialization and specialization can be measured by different indexes like revealed comparative advantage (RCA), Michaely index, Contribution to the Trade Balance, Chi Square measure and Bowen's (1983) Net Trade Index (NTI) (Laursen and Salter 2014; Laursen 2015).

In previous research, various indices of international trade specialization such as Michaely index, Chi square measure, the Contribution to the trade balance and Net Trade index was compared to Revealed Comparative Advantage. Net Trade Index (NTI) discarded for theoretical reasons, and contribution to trade balance and Michaely index did not investigate because it found that these measures was identical with each other. Revealed Symmetric Comparative Advantage (RSCA) is the better measure of comparative advantage as compared to Chi-Square index and Michaely index (Laursen, 2015). RSCA reveals better the concept of specialization as it emphasis on a narrow area of economic activity within a given country, and less deep examination of other areas of activity. Michaely index and the Contribution to trade Balance measure contain abstracting foreign demand for a good from a certain sector, thereby reducing the level of economic activity in that sector of the economy. The need for import data to calculate the Michaely index also limits the possibility of their use in the context of other variables such as patents or production statistics. The Chi Square indicator only measures the level of specialization, regardless of whether a country is specialized or under-specialized in a certain sector. In addition, the way that the measure is calculated gives rise to rather strong fluctuations over time. Nevertheless, when applied on the same data the three measures are quite strongly correlated (Laursen 2015).

The RCA indices have been widely applied in empirical works so as to evaluate the patterns of trade and specialization of countries with respect to commodities in which they have a competitive edge (e.g., see Asmara et al. 2016; Bernhofen et al., 2004; Chowdhury and Neogi, 2016; Kilduff and Chi, 2006; Nesterenko, 2006; Sebaggala, 2008; Smit, 2010; Uchida and Cook, 2008; Utkulu et al., 2004; Van Hults et al., 1991; Vollrath, 1991; and Waqar et al., 2013). Researchers argued that RCA index should always transform into symmetric index (RSCA) for econometric analysis as the RCA is not comparable on both sides of unity. (Bahar et al., 2014; Hausmann and Hidalgo, 2011; Hidalgo et al., 2007; Laursen, 2015; and Sanidas and Shin,

2010). In particular, there are a growing number of researchers who worked on RCA, including the most celebrated figures represented in Balassa and Marcus (1989) who investigated the RCA for the United States and Japan. According to many studies (Benkovskis and Worz 2016; Chaudhar 2016; Haddad 2000; Parsad 2004; and Saricoban and Kaya 2017), RCA and RSCA are best measures for international trade specialization. They explained the strengths of RCA and RSCA over other indexes. So keeping in view the strength of RCA and RSCA, this study also uses these two indexes as measure of International trade specialization.

2. Methodology

The theory of specialization suggests a strong emphasis on one constricted area of activity and a less constricted focus on others. Revealed comparative advantage (RCA) is a relative measure demonstrating a strong focus on some sector but less on others in the perspective of international export specialization. Hence, revealed comparative advantage (Balassa, 1965) can be defined as:

$$\text{RCA} = \frac{X_{ij} / \sum_i X_{ij}}{\sum_j X_{ij} / \sum_j \sum_i X_{ij}}$$

X_{ij} are the exports of sector "i" at country "j";
$\sum_i X_{ij}$ are the total exports of country "j";
$\sum_j X_{ij}$ are the "world" exports of sector "i" (sum of countries sector's "i" exports); and j i
$\sum_j \sum_i X_{ij}$ are the total "world" exports.

Specifically, Balassa's RCA index compares the export share of a given sector in a country with the export share of that sector with respect to the world market (Bender and Li 2002). The respective RCAs is computed for each country in a panel of 18 low-income countries for 16 sectors from 1996 to 2014. Data of exports is taken from World Trade Organization (WTO). Country is supposed to be specialized in that sector if RCA >1 and country

said to be under-specialized in that sector if RCA<1. Since the results of RCA in an output that cannot be compared on both sides of unity, we suggest making the index symmetric, as (RCA - 1) / (RCA +1); thus this measure ranges from -1 to +1. We call this measure revealed symmetric comparative advantage (RSCA).

According to Vollrath (1991), taking logarithm of RCA is the solution to the A-symmetric problem of the RCA index. If a country's export is equal to zero in a product for a particular sector than the adjusted index is not defined thus the logarithm of RCA is helpful approach. As prior research suggested, we recommend using a symmetric version of the RCA, which we call RSCA. The RSCA index and the logarithm solution have similar properties in the case of zero exports from a sector.

3. Stability of trade patterns

The methodology used to test the stability of trade patterns is concisely discussed in this section[2]. Stability and specialization trends are tested using the following regression equation (country by country):

$$RSCA_{ij}^{t_2} = \alpha_i + \beta_i RSCA_{ij}^{t_1} + \varepsilon_{ij}$$

The superscripts t_1 and t_2 indicate the initial and final years. The explained variable, RSCA at time t_2 for sector i, is tested against the explanatory variable which is the value of the RSCA in the previous year t_1. a and b are linear regression parameters and e is an error term. Ultimately, the size of b* measures the stability of a country's specialization pattern between the two periods. A low b* indicates a high degree of turbulence but if b* is not significantly different from 1 then the pattern has remained unchanged, b*/R* (R* is the regression correlation coefficient) measures whether the level of specialization has gone up or down between the two periods (an increase or a fall in the spread of specialization). If b*/R*>1, specialization has increased; if b*/R*<1 then specialization has decreased.

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[2] For further details, the reader can refer to Dalum et al. (1998), and Cantwell (1989).

4. Results and discussion

This section contains the results of international trade specialization which is measured through RSCA for 16 sectors of 18 low-income countries. In agricultural sector (see Table 3 in Appendix), Guinea and Senegal are less specialized as compared to other low-income countries. North Korea is under specialized in agriculture sector. Benin, Burkina Faso and Mali are more specialized in agricultural sector as compared to other low-income countries. In food sector for low-income countries North Korea, Guinea and central Africa under specialized and Benin, Burundi, Malawi, Rwanda and Tanzania are specialized in food sector in low-income countries (see Table 4 in Appendix).

For Fuels and mining products, Benin, Burundi, Gambia, North Korea, Malawi and Uganda are under specialized throughout the time period. Burkina, Faso and Madagascar are under specialized throughout the year except last years in which these countries are being specialization. Guinea and Mozambique are specialized in fuels and mining products (see Table 5 in Appendix).

In Fuels sector (see Table 6 in Appendix), Benin, Burkina Faso and Niger are under specialized throughout the time period except last two years. Burundi, Central African, Gambia, Guinea, North Korea, Madagascar, Malawi, Mali, Tanzania, Togo, Uganda and Zimbabwe are under specialized in Fuels throughout the time period. Mozambique, Rwanda and Senegal are specialized in fuel.

In Manufactures sector, (see Table 7 in Appendix) North Korea is specialized but not all the time period. Benin, Burundi, Madagascar, Mozambique, Rwanda and Uganda are under specialized throughout the time period. Gambia and Togo became specialized in last 6 to 7 years. In the results of iron and steel sector (see Table 8 in Appendix), Benin, Senegal, and Uganda move towards specialization in the last six to seven years. Zimbabwe is highly specialized in iron and steel sector while North Korea is also specialized in iron and steel sector but less as compare to Zimbabwe. Burundi, Central Africa, Madagascar, Malawi, Mali, Mozambique, and Tanzania are under specialized low-income countries in iron and steel sector.

In Pharmaceuticals sector (see Table 10), chemicals sector[3] (see Table 9 in Appendix), machinery and transport equipment (see Table 11), office and telecom equipment (see Table 12 in Appendix), electronic data processing and office equipment (see Table 13 in Appendix) and Transport equipment (see Table 15 in appendix), all low-income countries are under specialized throughout the time period like (Lall, 2000). In Telecommunications equipment (see Table 14 in Appendix) and automotive product sector (see Table 16 in Appendix), all the low-income countries are also under specialized throughout the time period except North Korea. Burundi, Central Africa, Guinea, Malawi, Mozambique, Rwanda, Senegal, Uganda, and Zimbabwe are under specialized in textile sector[‡]. Madagascar, North Korea and Niger are specialized in textile sector (see Table 17 in Appendix). In low-income countries Madagascar is specialized in clothing sector while Malawi is specialized till 2008. All other low-income countries are under specialized in clothing sector (see Table 18 in Appendix). The overall results are given in Table 1(a) and Table 1(b).

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[3] Only Guinea is specialized in chemicals sector, till 2004, after that Guinea becomes under specialized.

Table 1(a). Specialization status of low-income countries.

Country	Benin	Bukinafaso	Burundi	Central Africa	Gambia	Guinea	North Korea	Madagascar	Malawi
Agricultural products	S	S	S	S	S	S	US	S	S
Food	S	S	S	US	S	US	US	S	S
Fuels and mining products	US	US	US	S	US	S	US	US	US
Fuels	US	US	US	US	US	US	US	US	US
Manufactures	US	US	US	US	US	US	US	US	US
Iron and steel	S	US	US	US	US	US	S	US	US
Chemicals	US	US	US	US	US	US	US	US	US
Pharmaceuticals	US	US	US	US	US	US	US	US	US
Machinery and transport equipment	US	US	US	US	US	US	S	US	US
Office and telecom equipment	US	US	US	US	US	US	S	US	US
Electronic data processing and office equipment	US	US	US	US	US	US	US	US	US
Telecommunications equipment	US	US	US	US	US	US	US	US	US
Transport equipment	US	US	US	US	US	US	US-S	US	US
Automotive products	US	US	US	US	US	US	US-S	US	US
Textiles	US	US	US	US	US-S	US	S	S	US
Clothing	US	US	US	US	US	US	US	S	S-US

Source: Authors' calculations.
Note: US = under specialized, S = specialized.

Table 1(b). Specialization status of low-income countries.

Country	Mali	Mozambique	Niger	Rwanda	Senegal	Tanzania	Togo	Uganda	Zimbabwe
Agricultural products	S	S	S	S	S	S	S	S	S
Food	S	S	S	S	S	S	S	S	S
Fuels and mining products	US	S	S	S	S	US	US	US	S
Fuels	US	S	US	US	S	US	US	US	S
Manufactures	US	US	US	US	US	US	US	US	S
Iron and steel	US	US	US	US	US –S	US	S	US-S	S
Chemicals	US	US	US	US	US	US	US	US	US
Pharmaceuticals	US	US	US	US	US	US	US	US	US
Machinery and transport equipment	US	US	US	US	US	US	US	US	US
Office and telecom equipment	US	US	US	US	US	US	US	US	US
Electronic data processing and office equipment	US	US	US	US	US	US	US	US	US
Telecommunications equipment	US	US	US	US	US	US	US	US	US
Transport equipment	US	US	US	US	US	US	US	US	US
Automotive products	US	US	US	US	US	US	US	US	US
Textiles	US	US	S	US	US	US-S	US-S	US	US
Clothing	US	US	US	US	US	US	US	US	US

Source: Authors' calculations.
Note: US = under specialized, S = specialized.

As in other studies (*e.g.*, see Furtado 2018; Lall 2000; and Ma et al., 2014), all low-income countries are under specialized in capital intensive

products but specialized in labor intensive products like agriculture sector. So it is one of the reasons for them to be low-income countries. Almost all the countries are found to be stable except North Korea so they are showing the same trend during the time period taken (see Table 2).

Table 2. Stability (specialization trends) test results.

Country	co-efficient (β)	R-square	β/ R- square
Benin	0.56	0.37	1.49***
Bukinafaso	0.62	0.41	1.53***
Burundi	0.73	0.57	1.28***
Central Africa	0.43	0.22	1.92*
Gambia	0.52	0.26	1.98**
Guinea	0.58	0.36	1.59***
North Korea	-0.04	0.00	-15.29
Madagascar	0.86	0.66	1.30***
Malawi	0.67	0.51	1.31***
Mali	0.71	0.45	1.60***
Mozambique	0.61	0.55	1.11***
Niger	0.76	0.52	1.45***
Rwanda	0.61	0.56	1.09***
Senegal	0.70	0.62	1.12***
Tanzania	0.67	0.54	1.23***
Togo	0.41	0.36	1.14***
Uganda	0.63	0.62	1.02***
Zimbabwe	0.92	0.73	1.25***

Source: Authors' calculations.
Note: *10 % level of significance ** 5% level of significance *** 1% level of significance.

5. Conclusion

It is concluded here that all the low-income countries are specialized in labor intensive products like agriculture sector. These all countries are under specialized in technological products like chemicals, Fuels, Fuels and mining, iron and steel, Office and telecom equipment, Manufactures, Pharmaceuticals sector, Machinery and transport equipment, Telecommunications equipment, Transport equipment, Electronic data processing and office equipment and Automotive Products. Almost all the countries are found to be stable except North Korea so they are showing the same trend during the time period taken. Under specialization in these sectors may be one of the reasons for being low-income countries so policy measures should be taken for promoting specialization of technological products. Further policy makers should focus on promoting development of industries having comparative advantages in low-income countries so value added products can be produced for local consumption as well as for exports.

References

Akhtar, W., Nadeem, A., Hassnain, S., Niazi, M.A., Tahir, A. (2013), *Export competitiveness of Pakistani horticultural products*. Pakistan Journal of Agricultural Research, 26(2), 87-96.

Agostino, L.M., Laursen, K., Santangelo, G.D. (2012), *The impact of R&D offshoring on the home knowledge production of OECD investing regions*. Journal of Economic Geography, 13(1), 145-175.

Alcalá, F. (2009), *Comparative advantage across goods and product quality*. The BBVA Foundation Working Papers. The BBVA Foundation, 1-56.

Ashu, J., Prasad, S.K.V. (2004), *Closure to comparative analysis of event-based rainfall-runoff modeling techniques-deterministic, statistical, and artificial neural networks by Ashu Jain and SKV Prasad Indurthy*. Journal of Hydrologic Engineering, 9(6), 551-553.

Bahar, D., Hausmann, R., Cesar, A. Hidalgo. (2014), *Neighbors and the evolution of the comparative advantage of nations: Evidence of international knowledge diffusion?.* Journal of International Economics, 92(1), 111-123.

Balassa, B.A. (1989), *Comparative advantage, trade policy and economic development.* Harvester Wheatsheaf, New York.

Balassa, B., Noland, M. (1989). *Revealed comparative advantage in Japan and the United States.* Journal of International Economic Integration, 4(2), 8-22.

Bela, B. (1965). *Trade liberalisation and revealed comparative advantage.* The Manchester School, 33(2), 99-123.

Bender, S., Li, K.-W. (2002), *The changing trade and revealed comparative advantages of Asian and Latin American manufacture exports.* Economic Growth Center, Yale University, Discussion Paper no. 843.

Benedictis, D., Tamberi, M. (2004), *Overall specialization empirics: techniques and applications.* Open Economies Review, 15(4), 323-346.

Benkovskis, K., Wörz, J. (2016), *Non-price competitiveness of exports from emerging countries.* Empirical Economics, 51(2), 707-735.

Bernhofen, D.M., John, C.B. (2004), *A direct test of the theory of comparative advantage: the case of Japan.* Journal of Political Economy, 112(1), 48-67.

Cantwell, J. (1995), *The globalisation of technology: What remains of the product cycle model?.* Cambridge Journal of Economics, 19, 155-155.

Cantwell, J., Iammarino, S. (2001), *EU regions and multinational corporations: change, stability and strengthening of technological comparative advantages.* Industrial and Corporate Change, 10(4), 1007-1037.

Chaudhary, A. (2016), *Revealed comparative advantage index: An analysis of export potential of Indian textiles industry in the post MFA period.* American Journal of Economics, 6(6), 344-351.

Chaudhary, S.D., Kumar, R. (2016), *An analysis of export specialization and competitiveness of the Indian sugar industry.* Journal of Competitiveness Studies, 24(4), 219+.

Chowdhury, A., Neogi, D. (2016), *Identifying suitability of commodities for trade among bay of Bengal initiative for multi-sectoral technical and economic cooperation (BIMSTEC) nations: An application of revealed comparative advantage approach.* International Journal of Management Sciences and Business Research, 5(5), 15-27.

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Cook, P., Uchida, Y. (2008), *Structural change, competition and income distribution.* The Quarterly Review of Economics and Finance, 48(2), 274-286.

Christopher, F., Soete, L. (1987), *Technical change and full employment.* Basil Blackwell, Oxford.

Dalum, B., Laursen, K., Villumsen, G. (1998), *Structural change in OECD export specialisation patterns: de-specialisation and 'stickiness'.* International Review of Applied Economics, 12(3), 423-443.

Dibyendu, M., Marjit, S. (2008), *Trade liberalization, production organization and informal sector of the developing countries.* Journal of International Trade and Economic Development, 17(3), 453-461.

Dixit, A.K., Stiglitz, J.E. (1977*), Monopolistic competition and optimum product diversity.* The American Economic Review, 67(3), 297-308.

Dosi, G., Richard, R.N. (2013), *The evolution of technologies: an assessment of the state-of-the-art.* Eurasian Business Review, 3(1), 3-46.

Dosi, G., Pavitt, K., Soete, L. (1990), *The economics of technical change and international trade.* Harvester Wheatsheaf Publisher, New York.

Eckel, C. (2008), *Globalization and specialization.* Journal of International Economics, 75(1), 219-228.

Furtado, C. (2018), *Economic development of Latin America. In promise of development,* 124-148. Routledge, London.

Johannes, L., Wagner, S. (2013), *Patent examination at the state intellectual property office in China.* Research Policy, 42(2), 552-563.

Julien, G. (2007), *Trade and wage inequality in developing countries: South-South trade matters.* MPRA, Paper no. 4177.

Kazim, S., Kaya, E. (2017), *Determination of the seafood export competitiveness: the comparative analysis of top ten countries having lion share from seafood export.* Journal of Business Economics and Finance, 6(2), 112-124.

Keld, L., Salter, A.J. (2014), *The paradox of openness: Appropriability, external search and collaboration.* Research Policy, 43(5), 867-878.

Kilduff, P., Chi, T. (2006), *Longitudinal patterns of comparative advantage in the textile complex–part 1: An aggregate perspective.* Journal of Fashion Marketing and Management, 10(2), 134-149.

Laursen, K. (2000), *Trade specialisation, technology and economic growth: Theory and evidence from advanced countries.* Edward Elgar, Cheltenham.

Mona, H. (2000), *Export competitiveness: Where does the Middle East and North Africa region stand?*. Economic Research Forum, Working Papers 2030

Mulaj, I. (2006), *Redefining property rights with specific reference to social ownership in successor states of former Yugoslavia: did it matter for economic efficiency?*. MPRA, Paper no. 243.

Paulino, S., Amelia, U. (2017), *Estimating the impact of trade specialization and trade policy on poverty in developing countries*. The Journal of International Trade & Economic Development, 26(6), 693-711.

Ricardo, H., Hidalgo, C.A. (2011), *The network structure of economic output.* Journal of Economic Growth, 16(4), 309-342.

Richard, S. (2008), *Revealed comparative advantage and competitiveness of Uganda's exports with the rest of the world*. East and Southern Africa Management Institute in Arusha, 31 March – 11 April 2008.

Richardson, J.D., Zhang, C. (2001), *Revealing comparative advantage: Chaotic or coherent patterns across time and sector and US trading partner?*. In Topics in Empirical International Economics: A Festschrift in Honor of Robert E. Lipsey, 195-232. University of Chicago Press, Chicago.

Sanidas, E., Shin, Y. (2010), *Comparison of revealed comparative advantage indices with application to trade tendencies of East Asian countries*. In 9th Korea and the World Economy Conference, Incheon.

Sanjaya, L. (2000), *The Technological structure and performance of developing country manufactured exports.* Oxford development studies, 28(3), 337-369.

Shepard, C., Hang, Y., Anand, N., Li, E., Marzetta, T., Yang, R., Zhong, L. (2012), *Argos: Practical many-antenna base stations*. In Proceedings of the 18th annual international conference on Mobile computing and networking, 53-64. ACM.

Smit, A.J. (2010), *The competitive advantage of nations: is Porter's diamond framework a new theory that explains the international competitiveness of countries?*. Southern African Business Review, 14(1).

Soete, L.G., Wyatt, S.M. (1983), *The use of foreign patenting as an internationally comparable science and technology output indicator*. Scientometrics, 5(1), 31-54.

Soete, L. (1981), *A general test of technological gap trade theory*. Weltwirtschaftliches Archiv, 117(4), 638-660.

Suci, S.C., Alla, A., Mulatsih, S. (2016), *The impact of globalization on economic growth in ASEAN*. Bisnis & Birokrasi Journal, 22(2), 79-87.

UNCTAD (2014), *Trade and development report.* United Nations, New York.

Utkulu, U., Seymen, D. (2004), *Revealed comparative advantage and competitiveness: Evidence for Turkey vis-à-vis the EU/15.* In European trade study group 6th annual conference, ETSG, 1-26.

Vollrath, T.L. (1991), *A theoretical evaluation of alternative trade intensity measures of revealed comparative advantage.* Weltwirtschaftliches Archiv, 127(2), 265-280.

Winters, L.A., McCulloch, N., McKay, A. (2004), *Trade liberalization and poverty: the evidence so far.* Journal of Economic Literature, 42(1), 72-115.

Yue, M., Tang, H., Zhang, Y. (2014), *Factor intensity, product switching, and productivity: Evidence from Chinese exporters*. Journal of International Economics, 92(2), 349-362.

Appendix

Table 3. Results of RSCA of agriculture sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	87.55	88.40	81.82	88.20	88.75	88.33	87.12	88.35	88.70	88.31	85.36	86.23	81.6	80.72	79.93	75.41	80.09	80.39	69.84
Burkina Faso	86.35	86.04	87.32	88.10	88.78	89.12	89.80	89.34	90.05	90.59	91.07	90.58	0.89	87.77	88.21	87.33	87.34	80.95	78.96
Burundi	79.72	78.97	85.66	84.37	85.15	83.73	85.03	84.18	85.90	85.77	84.08	78.63	0.77	75.92	83.56	79.39	79.41	79.59	79.73
Central African	67.76	68.53	75.67	76.57	70.09	76.33	75.49	74.61	85.08	84.78	79.91	86.76	0.86	78.08	80.39	75.98	75.42	81.81	77.65
Gambia	70.79	69.50	78.11	82.82	83.81	84.79	85.26	79.76	76.23	85.60	84.99	85.15	81	74.50	76.41	67.87	61.38	48.07	54.05
Guinea	27.42	10.91	-30.92	9.09	-20.88	-35.3	14.29	54.71	53.14	31.18	57.69	24.19	0.29	37.25	30.31	11.21	25.86	13.28	8.86
North Korea	-64.2	-55.3	-56.1	-56.7	-59.87	-59.1	-62.8	-65.6	-67.4	-67.4	-69.1	-69.5	-0.6	-68.8	-67.1	-63.9	-63.3	-66.8	-66.2
Madagascar	59.35	57.14	45.01	38.71	65.04	71.16	74.31	70.38	66.38	65.58	68.48	63.57	56	56.58	52.25	60.05	62.53	57.04	57.31
Malawi	81.06	80.80	81.90	82.58	85.05	83.91	84.14	84.15	84.50	84.79	85.60	85.42	0.85	83.27	82.80	82.39	82.41	82.35	82.27
Mali	86.62	90.12	88.64	88.68	90.24	84.36	87.74	90.28	89.98	89.56	89.83	88.30	0.84	82.16	82.71	75.28	80.26	79.97	81.18
Mozambique	78.94	78.49	78.90	73.75	69.43	63.34	63.01	51.58	57.16	52.50	57.95	48.93	0.64	51.96	53.78	60.41	49.02	43.37	63.44
Niger	71.58	58.78	61.83	65.81	78.51	78.43	75.81	74.91	78.48	74.27	74.79	72.91	77	70.44	61.36	55.54	56.00	21.27	35.24
Rwanda	84.43	83.36	82.66	83.75	85.34	71.29	31.14	79.31	80.50	72.15	81.68	75.20	0.75	72.83	78.08	71.84	73.22	72.88	65.34
Senegal	13.80	23.48	40.98	34.89	76.85	73.19	70.30	68.93	68.51	62.61	68.58	70.58	0.51	57.82	59.07	63.69	61.68	66.91	68.98
Tanzania	81.99	83.25	81.02	83.26	85.25	84.09	83.65	83.83	82.79	83.96	82.02	80.87	0.77	74.93	71.94	70.95	75.04	75.34	74.44
Togo	75.77	76.48	76.78	78.56	78.86	64.57	74.44	63.00	75.89	70.69	71.24	66.66	0.66	67.60	69.50	75.67	51.08	50.98	53.14
Uganda	80.42	81.26	80.91	83.80	83.22	83.25	82.55	84.63	82.57	82.44	81.07	78.24	0.77	73.03	75.14	74.64	72.14	74.78	74.86
Zimbabwe	73.99	74.54	72.39	78.61	80.59	81.45	73.05	77.73	78.13	74.35	78.68	74.15	0.71	75.29	65.73	72.08	73.17	72.71	73.97

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 3. Results of RSCA of agriculture sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	87.55	88.40	81.82	88.20	88.75	88.33	87.12	88.35	88.70	88.31	85.36	86.23	81.6	80.72	79.93	75.41	80.09	80.39	69.84
Burkina Faso	86.35	86.04	87.32	88.10	88.78	89.12	89.80	89.34	90.05	90.59	91.07	90.58	0.89	87.77	88.21	87.33	87.34	80.95	78.96
Burundi	79.72	78.97	85.66	84.37	85.15	83.73	85.03	84.18	85.90	85.77	84.08	78.63	0.77	75.92	83.56	79.39	79.41	79.59	79.73
Central African	67.76	68.53	75.67	76.57	70.09	76.33	75.49	74.61	85.08	84.78	79.91	86.76	0.86	78.08	80.39	75.98	75.42	81.81	77.65
Gambia	70.79	69.50	78.11	82.82	83.81	84.79	85.26	79.76	76.23	85.60	84.99	85.15	81	74.50	76.41	67.87	61.38	48.07	54.05
Guinea	27.42	10.91	-30.92	9.09	-20.88	-35.3	14.29	54.71	53.14	31.18	57.69	24.19	0.29	37.25	30.31	11.21	25.86	13.28	8.86
North Korea	-64.2	-55.3	-56.1	-56.7	-59.87	-59.1	-62.8	-65.6	-67.4	-67.4	-69.1	-69.5	-0.6	-68.8	-67.1	-63.9	-63.3	-66.8	-66.2
Madagascar	59.35	57.14	45.01	38.71	65.04	71.16	74.31	70.38	66.38	65.58	68.48	63.57	56	56.58	52.25	60.05	62.53	57.04	57.31
Malawi	81.06	80.80	81.90	82.58	85.05	83.91	84.14	84.15	84.50	84.79	85.60	85.42	0.85	83.27	82.80	82.39	82.41	82.35	82.27
Mali	86.62	90.12	88.64	88.68	90.24	84.36	87.74	90.28	89.98	89.56	89.83	88.30	0.84	82.16	82.71	75.28	80.26	79.97	81.18
Mozambique	78.94	78.49	78.90	73.75	69.43	63.34	63.01	51.58	57.16	52.50	57.95	48.93	0.64	51.96	53.78	60.41	49.02	43.37	63.44
Niger	71.58	58.78	61.83	65.81	78.51	78.43	75.81	74.91	78.48	74.27	74.79	72.91	77	70.44	61.36	55.54	56.00	21.27	35.24
Rwanda	84.43	83.36	82.66	83.75	85.34	71.29	31.14	79.31	80.50	72.15	81.68	75.20	0.75	72.83	78.08	71.84	73.22	72.88	65.34
Senegal	13.80	23.48	40.98	34.89	76.85	73.19	70.30	68.93	68.51	62.61	68.58	70.58	0.51	57.82	59.07	63.69	61.68	66.91	68.98
Tanzania	81.99	83.25	81.02	83.26	85.25	84.09	83.65	83.83	82.79	83.96	82.02	80.87	0.77	74.93	71.94	70.95	75.04	75.34	74.44
Togo	75.77	76.48	76.78	78.56	78.86	64.57	74.44	63.00	75.89	70.69	71.24	66.66	0.66	67.60	69.50	75.67	51.08	50.98	53.14
Uganda	80.42	81.26	80.91	83.80	83.22	83.25	82.55	84.63	82.57	82.44	81.07	78.24	0.77	73.03	75.14	74.64	72.14	74.78	74.86
Zimbabwe	73.99	74.54	72.39	78.61	80.59	81.45	73.05	77.73	78.13	74.35	78.68	74.15	0.71	75.29	65.73	72.08	73.17	72.71	73.97

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 5. Results of RSCA of fuels and mining products sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-38.39	-68.94	-70.14	-70.22	-98.42	-96.98	-91.78	-93.59	-88.96	-80.80	-87.89	-55.24	-79.46	-91.50	-36.35	-14.09	-28.31	-33.00	-13.46
Burkina Faso	-56.86	-50.21	-56.86	-64.93	-45.10	-98.62	-98.88	-63.47	-40.71	-49.80	-56.52	-95.95	-94.42	-88.45	-75.92	-81.56	-81.51	17.62	31.82
Burundi	-63.96	-56.96	-65.86	-72.56	-87.96	-3.74	-50.61	-70.85	-77.57	-68.84	-42.39	-3.55	-15.44	-34.57	-36.38	-30.52	-13.30	-14.10	-62.04
Central African	55.15	73.52	-64.52	-55.84	10.83	55.50	60.21	73.32	70.59	40.44	35.46	51.92	55.15	76.58	73.32	70.51	67.90	62.83	69.65
Gambia	-93.82	-74.14	-85.99	-93.82	-95.02	-97.12	-99.45	-64.35	-89.28	-97.05	-90.01	-94.24	-5.85	-37.26	-28.63	-78.99	-55.68	-78.34	-86.73
Guinea	80.75	82.54	86.37	85.90	80.74	80.95	81.85	77.55	78.90	80.80	80.31	81.68	76.37	79.10	77.85	75.60	74.71	76.20	77.47
North Korea	-45.49	-38.28	-29.12	-35.38	-39.53	-37.18	-46.08	-51.11	-50.18	-48.07	-42.61	-41.61	-36.12	-41.46	-42.71	-36.11	-32.86	-35.06	-31.63
Madagascar	-40.07	-28.67	-16.96	-51.49	-40.07	-65.17	-33.32	-36.11	-38.60	-29.79	-19.19	-38.07	-31.86	-38.54	-11.95	-13.07	14.24	33.10	36.86
Malawi	-92.92	-84.36	-94.96	-92.38	-92.92	-92.73	-94.50	-96.08	-90.12	-97.08	-96.91	-99.33	-99.49	-89.06	-18.41	-35.72	-35.69	-21.29	-17.66
Mali	-41.41	-73.87	-11.43	-26.30	-41.41	-34.06	-32.50	-65.62	-79.87	-71.29	-64.75	-63.29	-40.26	-31.92	-29.58	-23.08	-55.36	-53.67	-79.82
Mozambique	90.91	58.12	47.69	69.26	78.38	79.72	80.35	82.64	80.30	77.82	73.81	74.53	64.08	72.21	72.01	61.63	62.45	61.20	56.46
Niger	70.90	64.38	70.70	64.87	65.11	67.29	72.09	73.51	58.25	51.19	44.25	64.24	55.30	69.00	65.52	67.63	67.44	70.46	69.87
Rwanda	76.25	24	16.01	20.96	32.4	69.70	76.25	50.13	56.40	63.75	42.32	57.81	57.59	36.58	44.95	46.93	35.73	49.22	52.28
Senegal	26.37	62.58	55.52	53.81	26.37	36.04	33.64	37.59	31.98	22.40	33.04	19.93	34.90	27.89	28.36	3.70	6.11	15.49	18.12
Tanzania	-87.33	-84.63	-45.20	-75.24	-87.33	-0.36	18.35	4.72	14.52	5.43	7.82	10.35	11.69	35.21	44.01	40.59	24.22	6.70	22.01
Togo	59.65	61.08	74.05	59.65	53.99	40.29	38.08	-7.60	17.60	1.56	-3.13	5.92	26.24	36.16	-24.49	-35.71	7.01	-35.94	-5.54
Uganda	-21.16	-98.1	-32.24	-79.2	4.84	-8.81	-12.1	-93.2	-27.5	-35.2	-41.7	-51.9	-57.2	-29.2	-46.0	-51.5	-45.1	-46.6	-43.3
Zimbabwe	29.14	13.72	29.14	27.13	10.08	31.94	45.81	39.91	43.67	32.35	28.35	36.11	14.36	37.63	49.80	47.70	53.89	46.28	25.28

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

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Table 6. Results of RCA of fuels sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	44.84	-65.78	-47.84	-73.97	-72.34	-90.08	-96.31	-95.01	-82.64	-93.49	-52.85	-92.85	-88.94	-15.46	-22.74	-20.43	-26.16	14.12	13.07
Burkina Faso	-43.24	-46.39	-50.53	-57.96	-34.51	-95.65	-97.57	-57.42	-37.60	-48.06	-53.61	-89.40	-94.26	-94.85	-89.72	-72.74	-73.36	22.79	28.05
Burundi	-84.23	-95.13	-94.80	-78.04	21.64	-45.90	-8.02	-86.24	-76.47	-25.35	-90.83	-11.07	-78.65	-70.08	-68.07	-92.81	-94.86	-94.86	-90.96
Central Africa	30.47	-94.74	-88.81	-92.07	-83.26	-96.66	-97.03	-96.49	-92.81	-87.72	-61.91	-93.52	-88.69	-97.96	-86.23	-94.30	-97.41	-97.56	-38.66
Gambia	16.73	-78.82	-96.31	-95.73	-90.52	-96.33	-93.10	-84.28	-45.31	-52.97	-81.14	-93.21	-93.32	-92.25	-52.05	-90.07	-48.65	-75.48	-88.64
Guinea	-79.14	-98.85	-61.74	-98.92	-98.47	-70.47	-97.35	-84.52	-92.69	-100.00	-87.69	-73.46	-69.20	-64.74	-65.87	-69.47	-71.27	-66.00	-62.64
North Korea	-36.43	-37.89	-30.51	-35.00	-37.28	-34.64	-47.21	-54.51	-53.02	-49.25	-44.85	-43.27	-36.01	-41.87	-42.25	-34.74	-31.42	-33.76	-30.40
Madagascar	-27.25	-63.11	-44.91	-71.08	-47.03	-73.45	-50.00	-36.17	-47.61	-41.85	-22.99	-48.30	-41.37	-47.86	-40.29	-43.68	-39.32	-51.41	-48.42
Malawi	39.62	-82.35	-94.09	-91.38	-96.11	-96.82	-95.57	-97.36	-93.69	-96.53	-97.66	-93.88	-96.48	-82.95	-97.07	-87.37	-87.71	-94.97	-94.54
Mali	-0.21	-69.78	4.55	-12.51	-36.74	-22.94	-21.55	-59.83	-77.54	-67.08	-58.79	-65.10	-36.14	-26.40	-21.38	-23.88	-75.54	-74.48	-78.51
Mozambique	63.94	61.67	62.13	57.03	28.88	20.93	39.14	24.37	26.14	19.36	22.47	30.52	13.05	17.23	19.78	15.45	33.26	39.05	61.89
Niger	-30.74	-77.50	-75.44	-71.53	-61.58	-51.31	-61.78	-61.89	-53.06	-60.35	-67.71	-55.91	-74.24	-75.27	-68.15	-65.86	25.32	46.23	44.67
Rwanda	5.56	-94.72	-86.62	-93.38	-81.96	59.43	11.39	-7.07	-33.16	-41.59	-83.51	-89.26	-93.18	-96.03	-89.05	-44.41	-17.46	-20.98	14.36
Senegal	68.26	61.57	67.68	48.53	24.84	37.90	35.01	41.48	35.36	27.41	39.48	24.05	39.30	33.01	34.40	4.75	4.25	15.72	17.08
Tanzania	-95.32	-89.68	-95.32	-89.23	-96.75	-95.27	-96.60	-97.41	-57.95	-48.22	-76.72	-83.32	-62.12	-81.50	-61.08	-82.11	-74.69	-58.85	-64.23
Togo	39.31	-89.87	-81.79	-6.32	-80.63	-88.68	-83.57	-85.79	-90.12	-75.20	-76.46	-76.46	14.33	-97.59	-97.09	-88.40	-28.82	-37.97	-27.90
Uganda	-88.56	-94.32	-85.57	-92.67	-5.01	-18.52	-12.14	-97.24	-17.77	-41.39	-46.79	-56.12	-63.13	-28.00	-44.67	-49.03	-42.74	42.17	-38.34
Zimbabwe	-50.28	-62.24	-50.28	-49.79	-74.07	-83.55	-68.67	-59.91	-63.49	-93.44	-73.25	-83.61	-81.40	-79.01	-70.71	-84.81	-82.38	-82.99	-91.10

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 7. Results of RCA of manufactures sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-81.25	-77.55	-87.18	-81.25	-74.95	-78.61	-76.27	-70.88	-61.49	-59.18	-64.05	-71.20	-33.28	-56.99	-62.37	-35.61	-40.90	-45.86	-23.52
Burkina Faso	-54.13	-41.40	-52.76	-50.40	-47.75	-54.13	-53.41	-62.90	-68.98	-69.44	-71.34	-69.94	-63.85	-57.41	-66.60	-69.59	-69.48	-59.22	-57.45
Burundi	-96.33	-98.00	-97.07	-99.26	-98.70	-97.72	-94.63	-83.19	-85.61	-81.19	-60.59	-44.71	-47.86	-46.21	-81.69	-45.01	-50.30	-47.85	-38.14
Central Africa	27.49	-3.78	14.06	17.61	27.49	14.13	16.18	3.49	-36.04	5.05	23.86	-21.36	-50.26	-85.42	-82.72	-77.78	-60.95	-65.62	-62.60
Gambia	-71.31	-29.40	-51.68	-71.31	-60.30	-82.51	-84.22	-45.16	-26.05	-70.15	-65.04	-69.41	-46.43	-22.88	-23.96	0.89	2.95	6.67	6.91
Guinea	-30.07	-21.26	-10.95	-36.63	-14.72	-24.20	-30.50	-49.36	-48.78	-48.95	-80.42	-76.62	-38.13	-41.97	-39.85	-37.33	-38.86	-38.33	-38.69
North Korea	31.52	0.83	-0.25	-0.98	-1.37	-1.02	-1.72	-1.85	-1.86	0.23	1.55	1.30	3.36	2.94	3.49	3.97	4.46	3.87	3.88
Madagascar	-9.15	-11.37	-4.63	2.89	-9.15	-19.20	-26.91	-28.59	-12.22	-8.83	-13.32	-7.69	-5.49	-6.30	-4.45	-12.96	-19.57	-21.84	-22.83
Malawi	-69.45	-71.39	-73.00	-67.29	-75.00	-69.45	-69.68	-70.18	-61.07	-60.62	-65.79	-71.37	-71.73	-76.08	-73.18	-72.53	-72.44	-76.01	-76.43
Mali	-44.20	-91.49	-65.52	-42.95	-55.74	-44.20	-53.52	-70.91	-60.24	-56.65	-64.47	-56.80	-39.86	-41.45	-33.49	-13.85	-15.99	-16.48	-20.01
Mozambique	-85.79	-74.92	-66.39	-76.62	-85.79	-76.32	-80.80	-74.22	-82.51	-78.72	-80.62	-75.88	-69.45	-69.00	-67.83	-72.38	-62.23	-59.13	-31.14
Niger	-6.91	-38.07	-40.49	-37.93	-69.76	-76.62	-69.61	-73.90	-65.44	-45.80	-47.97	-61.85	-78.22	-80.85	-53.14	-59.82	-79.76	-72.92	-59.75
Rwanda	-90.98	-92.31	-84.79	-90.98	-91.34	-81.93	-5.44	-70.18	-78.93	-57.66	-74.34	-59.51	-69.30	-45.44	-69.92	-55.23	-58.73	-61.53	-52.37
Senegal	-41.19	-16.35	-13.14	-7.70	-41.19	-38.94	-29.35	-30.81	-24.94	-20.29	-32.21	-25.66	-20.84	-20.43	-19.85	-13.33	-11.53	-24.58	-24.29
Tanzania	-69.86	-69.86	-49.85	-61.02	-49.21	-54.73	-58.20	-56.58	-47.46	-53.68	-39.10	-32.49	-23.79	-33.63	-29.15	-30.38	-31.88	-30.56	-34.09
Togo	-42.41	-44.08	-42.41	-29.36	-20.14	-5.87	-8.55	0.90	-1.97	9.08	9.40	16.24	-9.07	0.60	9.02	7.80	6.68	10.30	13.80
Uganda	-83.75	-89.09	-87.57	-90.92	-83.75	-81.31	-79.98	-74.94	-63.85	-59.57	-53.16	-41.50	-30.80	-34.30	-36.73	-34.96	-29.11	-32.93	-33.56
Zimbabwe	-24.69	-30.60	-24.69	-38.69	-35.05	-60.09	-22.43	-37.15	-30.07	-15.48	-32.18	-28.76	-6.60	-10.83	-9.35	-30.68	-62.53	-46.29	-32.84

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 8. Results of RCA of iron and steel sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-59.37	-98.50	-99.74	-99.17	-55.23	-19.63	27.56	16.71	19.29	-26.05	78.45	66.05	41.33	64.86	62.58	71.03	59.90	57.99	30.45
Burkina Faso	7.04	-37.95	4.14	29.20	7.04	-80.82	-76.29	-47.56	-55.33	-73.27	-78.20	-95.95	-41.27	-9.54	-35.28	-54.46	-51.68	-24.71	-23.06
Burundi	-99.78	-98.55	-99.57	-99.79	-98.85	-99.60	-96.95	-83.93	-99.87	-82.21	-98.78	-90.48	-96.42	-29.90	-38.17	-14.41	-22.39	-4.50	-20.42
Central African	-92.07	-99.99	-99.91	-100.00	-99.21	-99.95	-99.83	-99.73	-99.87	-99.88	-99.86	-99.91	-99.91	-99.81	-99.84	-99.87	-99.88	-99.69	-99.65
Gambia	-74.60	-83.38	-96.60	-84.11	-69.85	-86.90	-86.20	-8.88	-67.24	-89.37	-78.64	-95.37	-60.07	-86.75	-97.47	-98.04	-96.50	-73.14	-39.48
Guinea	-10.83	-88.14	-95.40	-97.88	-92.00	-80.44	-92.94	-87.44	-90.18	-86.82	-95.57	-97.74	-95.44	-94.00	-94.26	-94.34	-94.12	-93.92	-94.34
North Korea	9.37	14.16	28.02	21.35	16.22	18.03	10.49	12.29	9.07	12.95	11.52	8.25	13.81	19.71	20.28	23.07	25.77	22.44	24.03
Madagascar	-93.35	-99.88	-99.97	-98.99	-99.77	-98.99	-97.20	-98.11	-96.25	-98.36	-98.60	-96.87	-97.86	-93.92	-91.89	-93.58	-92.65	-98.56	-98.61
Malawi	-98.56	-99.17	-95.79	-98.56	-97.60	-96.58	-99.06	-97.42	-98.23	-99.47	-91.34	-97.59	-97.79	-80.53	-86.74	-95.27	-94.88	-91.01	-91.35
Mali	-95.35	-99.79	-87.01	-78.21	-81.26	-92.50	-99.66	-95.54	-54.68	-36.69	-55.20	-72.69	-67.87	-57.66	-23.77	-38.47	-53.48	-50.02	-55.56
Mozambique	-97.79	-82.57	-89.65	-97.79	-98.07	-75.23	-89.10	-94.37	-97.13	-80.00	-95.03	-89.89	-56.00	-80.32	-89.23	-86.57	-80.88	-40.47	-30.75
Niger	-52.19	-99.96	-62.10	-96.70	-96.73	-91.67	-98.63	-99.10	-99.36	-97.47	-67.92	-99.17	-99.44	-99.87	-99.00	-99.87	-99.85	-95.54	-99.32
Rwanda	-73.77	-41.11	-47.53	-61.33	-73.77	-82.00	-82.10	-96.51	-95.38	-96.24	-97.32	-88.59	-69.27	-63.00	-59.29	-72.09	-42.21	-40.55	-5.18
Senegal	-34.01	-60.24	-50.50	-34.01	-41.87	-50.21	-49.10	-31.22	-21.55	-30.87	-21.96	-4.87	13.81	26.85	25.81	37.04	40.57	43.08	27.44
Tanzania	-88.74	-82.48	-85.51	-93.68	-76.72	-88.74	-74.43	-37.98	-25.07	-25.70	-34.70	-59.58	-6.62	-35.10	-17.18	-14.57	-19.36	-7.18	-14.78
Togo	44.85	19.20	32.93	12	44.85	68.51	65.56	48.05	68.46	62.71	61.86	70.22	34.32	38.39	44.08	30.05	32.08	59.84	52.99
Uganda	-43.47	-76.32	-85.75	-80.66	-59.60	-43.47	-31.67	-9.67	6.17	16.98	9.54	17.64	25.87	36.67	27.17	24.41	28.92	35.33	33.90
Zimbabwe	74.05	62.00	65.16	64.16	68.03	74.05	69.94	62.73	68.48	75.57	51.95	70.06	14.46	10.41	59.00	31.04	37.80	49.90	69.37

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 9. Results of RCA of chemicals sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-81.32	-79.58	-96.35	-91.92	-85.75	-81.32	-88.33	-90.41	-89.00	-87.45	-93.72	-91.97	-95.13	-86.60	-75.77	-70.17	-61.73	-89.36	-88.40
Burkina Faso	-66.24	-98.61	-95.65	-94.56	-89.74	-84.76	-99.42	-99.33	-97.74	-97.07	-96.44	-93.06	-91.16	-85.35	-85.02	-85.37	-85.45	-91.90	-91.46
Burundi	-63.93	-61.95	-44.39	-33.47	-80.46	-80.50	-62.46	-74.28	-76.89	-84.00	-72.40	-48.17	-90.43	-93.33	-91.45	-91.91	-89.01	-99.43	-99.53
Central African	-39.78	-97.16	-99.35	-99.75	-91.05	-24.49	-38.10	-78.66	-37.71	-42.56	-99.58	-98.93	-98.15	-97.18	-96.26	-98.95	-98.57	-98.31	-97.72
Gambia	-98.85	-53.42	-50.07	-99.81	-98.85	-89.56	-95.41	-89.50	-98.03	-93.85	-96.82	-78.18	-81.33	-96.40	-99.12	-97.29	-97.71	-99.77	-98.79
Guinea	17.56	32.00	15.25	59.04	47.66	58.12	57.96	52.15	38.22	-52.53	-98.02	-56.12	-77.59	-80.60	-79.35	-78.59	-78.98	-82.14	-83.68
North Korea	-90.66	-12.95	-14.01	-18.09	-14.89	-15.69	-17.74	-18.02	-16.13	-11.71	-9.56	-9.39	-7.99	-12.36	-9.74	-6.25	-3.54	-1.80	-2.12
Madagascar	-98.90	-99.92	-99.86	-99.95	-100.00	-99.68	-98.87	-98.98	-99.78	-98.24	-99.74	-99.92	-99.77	-98.39	-99.40	-99.33	-99.23	-99.89	-99.89
Malawi	-97.02	-93.79	-95.88	-95.93	-97.75	-97.02	-98.14	-95.21	-98.07	-99.32	-92.31	-99.14	-98.65	-97.98	-99.64	-97.50	-97.51	-99.14	-99.16
Mali	-90.52	-82.87	-77.07	-60.02	-51.77	-90.62	-76.14	-90.52	-87.72	-93.69	-90.16	-86.63	-90.18	-92.55	-93.13	-95.55	-91.98	-92.01	-93.25
Mozambique	-67.74	-83.82	-98.74	-96.61	-99.54	-93.11	-99.49	-99.04	-98.83	-99.90	-99.89	-96.65	-99.14	-93.24	-99.98	-83.69	-99.98	-99.91	-97.85
Niger	-74.67	-67.49	-75.20	-67.94	-86.22	-88.77	-86.87	-89.18	-86.98	-88.39	-87.14	-88.84	-87.81	-94.85	-93.08	-95.25	-93.87	-58.35	-95.90
Rwanda	-98.24	-86.64	-93.28	-98.24	-98.11	-99.81	-85.82	-88.09	-95.70	-87.17	-83.18	-81.37	-86.38	-96.00	-92.63	-68.80	-93.75	-95.79	-97.68
Senegal	-70.15	-48.59	-58.11	-49.71	-70.15	-70.61	-74.02	-78.24	-63.91	-66.96	-37.36	-44.68	-56.00	-59.63	-62.36	-61.64	-56.42	-62.89	-56.74
Tanzania	-83.58	-85.80	-76.77	-91.11	-83.58	-74.39	-93.26	-82.69	-84.64	-87.11	-90.75	-83.14	-84.76	-72.45	-90.61	-85.39	-93.29	-93.49	-93.62
Togo	-98.53	-88.90	-96.88	-97.10	-98.53	-64.36	-10.38	-92.87	-93.39	-97.49	-97.51	-99.32	-90.18	-64.20	-65.69	-69.22	-74.99	-55.65	-57.97
Uganda	-91.76	-73.74	-78.71	-91.76	-72.37	-70.53	-76.23	-78.06	-73.67	-84.77	-86.69	-83.89	-81.14	-85.25	-82.37	-86.69	-73.56	-70.43	-70.60
Zimbabwe	-68.13	-68.28	-72.37	-68.13	-59.01	-98.72	-87.34	-80.24	-80.31	-78.49	-85.79	-92.34	-93.99	-91.66	-89.42	-88.25	-91.90	-93.44	-91.66

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

International trade specialization and its stability in low-income countries

Table 10. Results of RCA of pharmaceutical sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-91.92	-79.58	-96.35	-91.92	-85.75	-81.32	-88.33	-90.41	-89.00	-87.45	-93.72	-91.97	-95.13	-86.60	-75.77	-70.17	-61.73	-89.36	-88.40
Burkina Faso	-66.24	-98.61	-95.65	-94.56	-89.74	-84.76	-99.42	-99.33	-97.74	-97.07	-96.44	-93.06	-91.16	-85.35	-85.02	-85.37	-85.45	-91.90	-91.46
Burundi	-63.93	-61.95	-44.39	-33.47	-80.46	-80.50	-62.46	-74.28	-76.89	-84.00	-72.40	-48.17	-90.43	-93.33	-91.45	-91.91	-89.01	-99.43	-99.53
Central African	-39.78	-97.16	-99.35	-99.75	-91.05	-24.49	-38.10	-78.66	-37.71	-42.56	-99.58	-98.93	-98.15	-97.18	-96.26	-98.95	-98.57	-98.31	-97.72
Gambia	-98.85	-53.42	-50.07	-99.81	-98.85	-89.56	-95.41	-89.50	-98.03	-93.85	-96.82	-78.18	-81.33	-96.40	-99.12	-97.29	-97.71	-99.77	-98.79
Guinea	-98.75	-99.95	-99.45	-99.64	-99.74	-99.87	-99.81	-99.84	-99.98	-99.96	-99.42	-99.82	-99.92	-99.94	-99.93	-99.92	-99.93	-99.92	-99.93
North Korea	-19.42	-80.50	-82.32	-85.21	-82.49	-84.42	-86.01	-88.11	-88.96	-88.67	-87.79	-86.15	-84.84	-84.50	-85.69	-85.73	-83.39	-83.48	-81.67
Madagascar	-98.90	-99.92	-99.86	-99.95	-100.00	-99.68	-98.87	-98.98	-99.78	-98.24	-99.74	-99.92	-99.77	-98.39	-99.40	-99.33	-99.23	-99.89	-99.89
Malawi	-95.88	-93.79	-95.88	-95.93	-97.75	-97.02	-98.14	-95.21	-98.07	-99.32	-92.31	-99.14	-98.65	-97.98	-99.64	-97.50	-97.51	-99.14	-99.16
Mali	-51.77	-82.87	-77.07	-60.02	-51.77	-90.62	-76.14	-90.52	-87.72	-93.69	-90.16	-86.63	-90.18	-92.55	-93.13	-95.55	-91.98	-92.01	-93.25
Mozambique	-67.74	-83.82	-98.74	-96.61	-99.54	-93.11	-99.49	-99.04	-98.83	-99.90	-99.89	-96.65	-99.14	-93.24	-99.98	-83.69	-99.98	-99.91	-97.85
Niger	-0.10	-95.05	-94.38	-92.39	-82.44	-95.60	-99.90	-95.47	-99.81	-95.90	-79.17	-93.66	-97.07	-97.86	-98.43	-99.94	-98.99	-98.13	-98.17
Rwanda	-98.11	-86.64	-93.28	-98.24	-98.11	-99.81	-85.82	-88.09	-95.70	-87.17	-83.18	-81.37	-86.38	-96.00	-92.63	-68.80	-93.75	-95.79	-97.68
Senegal	-49.71	-48.59	-58.11	-49.71	-70.15	-70.61	-74.02	-78.24	-63.91	-66.96	-37.36	-44.68	-56.00	-59.63	-62.36	-61.64	-56.42	-62.89	-56.74
Tanzania	-83.58	-85.80	-76.77	-91.11	-83.58	-74.39	-93.26	-82.69	-84.64	-87.11	-90.75	-83.14	-84.76	-72.45	-90.61	-85.39	-93.29	-93.49	-93.62
Togo	-98.53	-88.90	-96.88	-97.10	-98.53	-64.36	-10.38	-92.87	-93.39	-97.49	-97.51	-99.32	-90.18	-64.20	-65.69	-69.22	-74.99	-55.65	-57.97
Uganda	-91.76	-73.74	-78.71	-91.76	-72.37	-70.53	-76.23	-78.06	-73.67	-84.77	-86.69	-83.89	-81.14	-85.25	-82.37	-86.69	-73.56	-70.43	-70.60
Zimbabwe	-59.01	-68.28	-72.37	-68.13	-59.01	-98.72	-87.34	-80.24	-80.31	-78.49	-85.79	-92.34	-93.99	-91.66	-89.42	-88.25	-91.90	-93.44	-91.66

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 11. Results of RCA of machinery and transport equipment sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	3.94	-99.64	-92.99	-92.96	-91.06	-92.89	-94.36	-89.18	-91.71	-78.33	-92.59	-95.95	-43.56	-43.56	-71.08	-64.91	-85.27	-79.76	-16.02
Burkina Faso	-66.34	-62.19	-66.34	-62.85	-72.29	-74.61	-71.65	-66.71	-72.55	-69.14	-68.39	-85.09	-87.27	-87.27	-79.85	-79.54	-79.54	-57.14	-50.17
Burundi	-98.14	-99.79	-97.85	-99.94	-98.61	-99.84	-97.39	-79.29	-89.51	-76.00	-56.77	-52.05	-28.42	-28.42	-84.50	-42.32	-62.19	-83.14	-70.71
Central African	-79.28	-61.56	-50.53	-55.07	-79.28	-85.44	-89.38	-97.44	-89.63	-86.42	-97.69	-94.28	-72.08	-72.08	-78.71	-62.22	-44.02	-47.39	-45.31
Gambia	-78.25	-30.74	-51.68	-74.10	-78.25	-79.93	-94.09	-45.56	-2.62	-64.96	-57.22	-69.62	-63.53	-63.53	-85.35	-81.55	-81.45	-67.13	-58.04
Guinea	-20.27	-83.14	-82.34	-99.55	-90.77	-80.99	-98.83	-89.78	-92.43	-84.16	-97.67	-92.67	-87.90	-87.90	-88.36	-87.47	-87.93	-87.58	-87.77
North Korea	21.46	4.62	2.20	3.68	5.79	6.46	8.25	9.42	10.14	11.08	11.47	11.46	13.17	13.17	13.34	14.12	13.56	13.97	14.33
Madagascar	-22.86	-97.81	-82.59	-98.07	-96.21	-95.96	-92.78	-54.31	-86.25	-81.45	-86.48	-81.77	-64.03	-64.03	-49.98	-56.97	-88.20	-77.33	-77.68
Malawi	-77.24	-86.79	-91.09	-77.24	-85.99	-86.06	-99.64	-99.60	-92.83	-82.25	-85.88	-92.16	-89.51	-89.51	-84.62	-81.88	-81.91	-85.34	-85.55
Mali	-54.19	-92.47	-62.75	-69.99	-54.19	-32.10	-48.53	-66.47	-58.67	-54.87	-65.37	-52.91	-36.96	-36.96	-55.51	-51.15	-43.51	-43.92	-36.78
Mozambique	-88.42	-69.30	-83.90	-77.94	-88.42	-84.16	-79.98	-77.65	-78.28	-80.70	-76.48	-73.02	-64.52	-64.52	-90.01	-61.18	-70.59	-51.64	-75.64
Niger	-36.83	-38.37	-43.05	-46.81	-75.23	-93.95	-86.30	-91.61	-78.85	-37.61	-44.29	-67.51	-87.53	-87.53	-43.61	-53.34	-85.89	-84.44	-77.13
Rwanda	-97.92	-99.77	-97.45	-99.88	-97.92	-80.96	-46.29	-65.38	-79.26	-46.94	-68.81	-55.32	-76.00	-76.00	-73.83	-64.31	-58.74	-71.93	-51.97
Senegal	-54.02	-78.79	-77.82	-54.02	-82.56	-77.93	-87.44	-78.58	-79.88	-50.11	-68.47	-70.79	-62.25	-62.25	-72.51	-75.34	-62.88	-72.94	-62.84
Tanzania	-92.44	-91.75	-66.72	-71.25	-92.44	-94.41	-96.77	-97.36	-83.36	-82.27	-70.43	-64.80	-51.19	-51.19	-62.62	-58.90	-54.68	-52.49	-55.91
Togo	-67.96	-65.63	-69.67	-67.96	-74.02	-85.62	-84.40	-18.10	-90.56	-86.37	-86.38	-95.48	-55.98	-55.98	-65.64	-75.87	-37.56	-29.05	-27.23
Uganda	-92.30	-90.60	-92.46	-92.30	-86.41	-87.66	-86.39	-83.61	-78.74	-72.35	-55.77	-47.67	-50.59	-50.59	-48.15	-45.96	-40.68	-53.78	-54.17
Zimbabwe	-86.21	-80.65	-76.87	-87.35	-86.21	-95.60	-69.31	-80.31	-84.89	-84.40	-43.30	-52.26	-42.03	-42.03	-88.27	-87.25	-86.34	-86.16	-86.16

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 12. Results of RCA of office and telecom equipment sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-44.14	-99.07	-98.32	-98.22	-99.71	-99.78	-97.83	-99.11	-99.67	-99.70	-98.56	-97.11	-99.75	-98.15	-99.47	-99.72	-99.75	-99.21	-96.42
Burkina Faso	-94.33	-79.14	-90.82	-92.18	-94.33	-84.52	-97.62	-90.92	-86.12	-87.51	-86.85	-98.54	-99.01	-98.36	-99.07	-95.43	-95.42	-0.98	-0.98
Burundi	-94.58	-73.53	-86.25	-95.61	-95.61	-99.90	-93.01	-78.43	-90.28	-96.15	-82.80	-77.10	-59.83	-79.22	-89.24	-93.51	-93.78	-0.97	-0.86
Central African	-42.47	-96.24	-95.99	-97.83	-98.86	-97.64	-98.66	-98.23	-99.41	-98.98	-98.65	-99.18	-99.69	-99.69	-93.30	-99.95	-99.66	-1.00	-0.99
Gambia	-88.35	-87.27	-90.25	-91.63	-92.90	-74.15	-98.21	-88.35	-98.94	-94.24	-96.55	-96.40	-85.52	-92.93	-97.56	-97.40	-98.38	-0.98	-0.97
Guinea	-6.31	-99.69	-98.72	-99.93	-98.51	-99.62	-98.90	-98.94	-99.47	-99.88	-98.71	-98.46	-98.78	-98.13	-98.46	-98.79	-97.86	-0.98	-0.98
North Korea	19.64	28.37	26.45	29.55	30.21	28.17	31.68	33.09	32.62	29.35	25.26	28.28	25.81	22.30	21.25	19.23	17.45	0.20	0.22
Madagascar	-33.49	-98.15	-98.28	-98.26	-94.84	-98.01	-98.89	-97.44	-96.04	-92.53	-93.99	-93.01	-95.30	-83.20	-95.34	-95.39	-97.13	-0.97	-0.97
Malawi	-8.10	-97.06	-98.69	-95.75	-97.67	-92.62	-99.53	-99.85	-97.98	-97.58	-95.18	-92.97	-96.35	-95.90	-92.45	-94.27	-94.28	-0.98	-0.98
Mali	-63.96	-99.73	-98.44	-97.35	-94.40	-97.58	-94.43	-94.79	-93.10	-86.93	-86.14	-84.93	-85.19	-86.61	-88.55	-92.17	-95.69	-0.96	-0.97
Mozambique	24.93	-96.57	-99.34	-97.39	-98.47	-99.60	-97.24	-95.81	-90.98	-97.77	-98.50	-97.58	-95.49	-96.37	-97.73	-99.24	-99.83	-0.97	-0.98
Niger	-25.86	-88.94	-97.58	-96.56	-98.24	-98.96	-95.88	-95.84	-96.80	-95.51	-94.77	-92.66	-98.32	-95.49	-89.79	-90.60	-93.69	-0.87	-0.89
Rwanda	-65.91	-98.53	-81.74	-59.55	-46.35	-98.53	-81.74	-59.55	-83.59	-71.49	-91.50	-78.20	-86.62	-79.57	-87.00	-87.67	-93.78	-0.88	-0.75
Senegal	-96.39	-94.47	-93.13	-94.60	-96.75	-96.39	-96.79	-95.98	-92.60	-93.15	-74.29	-90.84	-90.14	-94.02	-91.50	-89.37	-91.32	-0.92	-0.91
Tanzania	42.08	-89.46	-90.26	-91.57	-98.05	-99.33	-99.26	-99.41	-97.22	-92.14	-93.25	-92.96	-93.53	-86.43	-88.64	-93.53	-93.91	-0.93	-0.94
Togo	-93.09	-92.50	-93.09	-97.48	-99.29	-99.04	-99.51	-99.54	-99.18	-97.83	-97.83	-97.39	-96.85	-95.14	-94.37	-97.72	-99.02	-0.99	-0.99
Uganda	-88.26	-98.46	-92.69	-96.64	-98.05	-90.88	-90.02	-90.64	-81.78	-67.14	-29.45	-21.71	-35.31	-43.33	-30.94	-20.08	-16.09	-0.60	-0.60
Zimbabwe	-51.40	-96.63	-94.47	-97.74	-97.33	-98.71	-88.51	-97.57	-97.37	-97.18	-89.04	-89.67	-95.75	-83.76	-98.82	-98.82	-98.84	-0.99	-0.83

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 13. Results of RCA of electronic data processing and office equipment sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	11.44	-93.39	-98.33	-96.62	-96.62	-99.96	-99.77	-99.94	-99.83	-99.96	-99.09	-97.10	-99.93	-98.91	-99.79	-99.73	-99.60	-99.20	-97.31
Burkina Faso	24.44	-83.16	-93.69	-0.90	-0.90	-0.94	-0.98	-0.88	-0.85	-0.85	-0.84	-0.99	-0.99	-0.98	-0.99	-0.89	-0.89	-0.96	-0.99
Burundi	-99.94	-99.97	-48.60	-0.98	-0.98	-1.00	-1.00	-0.57	-0.97	-0.94	-0.93	-0.71	-0.33	-0.84	-0.83	-0.98	-0.92	-0.99	-0.98
Central African	-85.42	-98.43	-98.99	-0.98	-0.98	-0.96	-1.00	-0.99	-0.99	-0.99	-0.99	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-0.99	-0.98
Gambia	-94.72	-90.82	-95.83	-0.95	-0.95	-0.95	-0.99	-0.96	-1.00	-0.99	-0.96	-0.94	-0.75	-0.99	-1.00	-1.00	-0.99	-0.98	-0.99
Guinea	-93.28	-99.13	-99.79	-1.00	-1.00	-0.97	-0.97	-0.97	-0.99	-1.00	-1.00	-1.00	-0.98	-0.98	-0.98	-0.97	-0.97	-0.97	-0.97
North Korea	-74.73	-5.79	-10.39	0.13	0.13	0.20	0.26	0.22	0.18	0.06	0.02	0.04	-0.08	-0.18	-0.16	-0.27	-0.32	-0.31	-0.27
Madagascar	-44.04	-98.07	-97.90	-0.99	-0.99	-0.98	-0.99	-0.98	-0.97	-0.94	-0.98	-0.98	-0.98	-0.85	-0.96	-0.93	-0.97	-0.97	-0.97
Malawi	-54.40	-97.37	-98.48	-0.98	-0.98	-0.95	-1.00	-1.00	-0.97	-0.97	-0.94	-0.85	-0.96	-0.96	-0.84	-0.97	-0.97	-0.96	-0.96
Mali	-73.12	-99.99	-99.61	-0.96	-0.96	-0.98	-0.97	-0.98	-0.93	-0.89	-0.98	-0.97	-0.97	-0.97	-0.99	-0.99	-0.99	-0.99	-0.99
Mozambique	-49.98	-99.41	-95.88	-0.85	-0.85	-1.00	-0.98	-0.95	-0.95	-0.98	-0.98	-0.98	-0.95	-0.98	-0.98	-0.99	-1.00	-0.99	-0.97
Niger	-51.11	-94.98	-98.35	-0.98	-0.98	-0.99	-0.99	-0.99	-0.99	-0.96	-0.93	-0.94	-0.99	-0.99	-0.91	-1.00	-1.00	-0.92	-0.99
Rwanda	-39.46	-97.94	-99.91	-1.00	-1.00	-0.99	-0.94	-0.95	-0.84	-0.92	-0.97	-0.92	-0.94	-0.85	-0.85	-0.93	-0.96	-0.93	-0.92
Senegal	-29.82	-92.49	-95.95	-0.88	-0.88	-0.97	-0.98	-0.95	-0.95	-0.95	-0.91	-0.95	-0.95	-0.96	-0.98	-0.99	-0.96	-0.98	-0.97
Tanzania	-3.77	-99.81	-99.93	-0.96	-0.96	-1.00	-1.00	-0.99	-0.99	-0.92	-0.96	-0.96	-0.95	-0.93	-0.96	-0.94	-0.94	-0.88	-0.92
Togo	-98.78	-99.86	-99.97	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-1.00	-0.99	-1.00	-0.99	-0.99	-0.88	-0.97	-0.94	-0.98	-0.97
Uganda	-97.62	-98.50	-95.70	-0.97	-0.97	-0.98	-0.95	-0.91	-0.93	-0.97	-0.97	-0.93	-0.86	-0.95	-0.81	-0.84	-0.90	-0.90	-0.90
Zimbabwe	-52.80	-98.55	-98.35	-0.97	-0.97	-0.98	-0.83	-0.96	-0.97	-0.96	-0.73	-0.91	-0.93	-0.95	-0.98	-0.99	-0.99	-0.97	-0.97

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

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Table 14. Results of RCA of telecommunications equipment sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-76.13	-99.31	-96.77	-98.14	-99.43	-99.42	-94.39	-97.66	-99.31	-99.30	-97.95	-95.35	-99.45	-96.49	-98.85	-99.51	-99.69	-98.65	-93.42
Burkina Faso	-9.45	-95.77	-62.82	-92.86	-96.31	-66.68	-96.94	-93.50	-79.05	-84.10	-83.92	-96.99	-98.70	-98.04	-98.20	-98.25	-98.25	-97.54	-97.18
Burundi	-99.84	-99.66	-82.27	-91.27	-99.88	-99.77	-81.97	-89.41	-78.75	-95.56	-67.37	-72.11	-67.57	-65.68	-87.26	-86.39	-95.23	-94.59	-70.29
Central African	-45.90	-94.09	-93.61	-95.80	-98.44	-98.29	-96.48	-96.30	-98.72	-98.66	-98.62	-99.60	-99.86	-99.50	-85.05	-89.19	-88.43	-98.09	-76.29
Gambia	-80.35	-75.46	-76.79	-80.35	-83.62	-44.62	-96.57	-74.06	-97.66	-87.22	-94.93	-98.37	-87.02	-84.94	-94.32	-94.05	-97.23	-95.19	-93.40
Guinea	-53.58	-98.68	-98.03	-99.73	-96.83	-97.27	-97.61	-97.24	-98.99	-98.49	-99.80	-98.20	-98.23	-98.50	-98.33	-98.11	-98.18	-98.14	-98.17
North Korea	29.87	8.11	6.19	17.25	16.04	28.34	33.89	38.78	38.78	34.57	28.29	32.14	34.94	30.69	21.52	18.74	11.67	16.31	15.87
Madagascar	-13.25	-97.06	-97.70	-96.85	-98.00	-96.68	-97.76	-95.46	-94.43	-88.74	-89.18	-85.82	-91.34	-73.73	-92.49	-94.93	-95.84	-95.44	-95.56
Malawi	-85.49	-94.73	-97.80	-89.46	-95.36	-85.49	-98.72	-99.74	-97.36	-96.86	-93.35	-95.90	-94.39	-94.14	-94.99	-88.96	-89.05	-97.73	-97.79
Mali	-42.81	-99.27	-95.87	-96.34	-88.64	-95.91	-88.29	-87.72	-88.73	-78.33	-70.63	-68.86	-69.25	-72.15	-74.37	-82.67	-90.82	-91.08	-95.84
Mozambique	-99.19	-98.17	-86.73	-81.27	-96.35	-99.19	-94.46	-94.19	-81.85	-96.58	-97.89	-96.03	-93.01	-93.25	-96.27	-99.03	-99.92	-93.92	-96.88
Niger	-76.68	-76.16	-94.81	-91.58	-95.95	-98.97	-90.09	-90.03	-92.58	-93.48	-94.13	-90.01	-96.51	-90.43	-82.84	-78.57	-86.54	-76.93	-76.43
Rwanda	-85.02	-99.90	-99.81	-99.93	-99.93	-96.92	-60.88	-19.51	-74.06	-45.37	-83.05	-59.49	-74.78	-66.10	-81.16	-76.70	-88.85	-77.24	-53.82
Senegal	-86.85	-84.24	-87.52	-86.85	-92.29	-93.61	-93.84	-94.79	-86.31	-88.37	-52.40	-83.44	-81.81	-89.71	-81.55	-76.81	-83.54	-82.14	-81.59
Tanzania	-78.87	-94.39	-98.24	-78.87	-94.56	-98.24	-98.10	-99.27	-93.52	-87.84	-87.16	-86.04	-90.94	-75.63	-77.46	-89.76	-90.66	-93.09	-92.27
Togo	-67.74	-97.92	-98.91	-97.70	-98.02	-97.53	-98.68	-98.85	-98.23	-94.67	-94.85	-93.57	-93.09	-90.09	-95.97	-96.84	-97.63	-99.50	-98.65
Uganda	-74.41	-94.98	-54.75	-6.35	-97.53	-78.35	-79.15	-83.70	-62.47	-35.63	12.88	22.70	4.32	-3.93	10.49	21.83	26.40	-28.49	-29.46
Zimbabwe	-34.94	-92.57	-86.45	-95.97	-96.81	-98.33	-86.42	-97.87	-95.86	-96.41	-98.18	-82.94	-98.63	-85.67	-98.82	-98.03	-98.64	-99.04	-98.22

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 15. Results of RCA of transport equipment sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-90.76	-96.85	-86.91	-90.76	-89.25	-96.64	-96.07	-89.76	-88.49	-72.26	-86.49	-95.54	0.83	-82.89	-78.65	-70.53	-86.81	-89.75	1.13
Burkina Faso	-57.91	-73.96	-57.91	-58.35	-36.68	-33.14	-75.16	-63.92	-69.33	-60.39	-56.74	-89.70	-80.35	-62.26	-85.27	-71.07	-70.97	-49.51	-42.52
Burundi	-99.52	-64.13	-86.74	-57.44	-3.69	8.94	-99.28	-67.97	-89.34	-57.19	-15.90	-11.83	5.65	9.66	-73.84	-52.08	-38.05	-85.38	-62.45
Central African	-15.95	-41.91	-15.95	-55.82	-75.99	-69.22	-80.54	-95.72	-85.25	-71.49	-98.23	-86.19	-49.81	-86.61	-84.71	-55.22	-42.20	-44.96	-43.51
Gambia	-16.81	-0.03	-16.81	-52.95	-70.05	-77.48	-93.41	-3.38	8.75	-72.32	-30.52	-45.79	-47.89	-55.57	-84.57	-76.99	-70.80	-44.46	-63.61
Guinea	-84.99	-92.68	-83.98	-97.48	-84.28	-82.46	-84.75	-82.77	-93.15	-82.38	-97.09	-91.39	-88.11	-88.49	-88.30	-87.73	-88.13	-88.22	-88.72
North Korea	-8.64	-5.54	-4.74	-12.32	-7.14	0.27	-1.25	0.02	3.56	8.62	12.79	13.67	20.76	22.93	22.01	24.32	20.90	18.87	19.74
Madagascar	-18.39	-97.86	-97.17	-98.37	-98.70	-97.07	-95.95	-14.70	-88.78	-81.73	-83.15	-90.04	-33.15	-84.02	-53.82	-36.55	-88.29	-59.66	-60.54
Malawi	-72.83	-77.63	-89.94	-72.83	-79.83	-86.39	-99.85	-99.95	-93.58	-75.07	-77.13	-93.67	-85.66	-85.61	-88.50	-69.34	-69.41	-89.84	-90.10
Mali	-63.05	-89.76	-63.05	-64.77	-57.09	-29.23	47.81	-76.65	-71.91	-55.49	-62.41	-70.22	-29.49	-28.32	-67.13	-61.27	-39.60	-39.87	-46.61
Mozambique	-55.78	-52.96	-55.78	-45.36	-83.48	-69.59	-80.38	-80.22	-79.16	-67.62	-63.96	-63.64	-58.96	-49.14	-88.86	-31.64	-51.65	-19.04	-63.69
Niger	-92.89	-0.20	-3.02	-10.40	-75.48	-91.57	-88.87	-93.52	-66.97	-22.35	-0.95	-62.01	-89.98	-84.05	-38.34	-52.60	-86.56	-77.73	-77.59
Rwanda	-96.61	-99.94	-96.61	-99.79	-92.98	-64.88	-32.38	-59.09	-74.48	-40.31	-46.26	-41.75	-65.01	-12.09	-65.81	-32.79	-20.43	-59.01	-58.58
Senegal	-45.05	-39.89	-77.11	-45.05	-83.91	-67.67	-85.93	-70.68	-72.49	-13.95	-59.68	-59.62	-45.43	-24.09	-64.39	-73.33	-53.35	-67.32	-51.64
Tanzania	-65.19	-99.47	-99.71	-65.19	-99.36	-99.64	-99.27	-99.77	-80.80	-82.90	-72.19	-75.32	-68.58	-76.83	-77.60	-72.35	-57.18	-44.83	-54.53
Togo	-84.01	-81.39	-84.65	-84.01	-93.71	36.14	-41.03	26.20	-83.22	-82.62	-82.44	-95.53	-14.24	-68.98	-57.30	-70.16	0.76	-0.34	9.23
Uganda	-90.37	-90.27	-90.37	-90.81	-83.96	-86.26	-82.62	-82.93	-76.52	-71.24	-64.38	-59.09	-59.71	-42.59	-53.57	-56.71	-49.22	-42.75	-43.63
Zimbabwe	-89.19	-79.65	-80.68	-89.19	-87.86	-94.81	-60.85	-82.06	-90.79	-87.35	-8.18	-46.54	-24.57	-81.48	-85.46	-88.30	-81.96	-80.10	-85.47

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

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Table 16. Results of RCA of automotive products sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-10.91	-87.00	-81.93	-91.53	-87.38	-96.46	-95.53	-97.11	-91.27	-69.29	-85.54	-95.13	-87.39	-87.39	-87.39	-63.17	-83.72	-87.13	-78.25
Burkina Faso	-62.36	-76.40	-67.04	-62.36	-68.23	-72.52	-72.40	-71.54	-69.67	-0.73	-72.64	-88.65	-74.27	-74.27	-74.27	-93.87	-93.95	-70.37	-37.21
Burundi	-92.67	-100.00	-99.99	-67.82	-94.12	-100.00	-99.99	-58.27	-85.27	-0.47	-23.44	-11.54	21.48	21.48	21.48	-38.15	-27.91	-79.22	-50.68
Central African	3.34	-23.84	3.34	-38.39	-69.68	-63.77	-75.81	-95.20	-81.31	-0.62	-97.48	-87.73	-34.00	-34.00	-34.00	-42.08	-26.96	-32.01	-29.07
Gambia	-60.96	18.37	-3.08	-34.08	-60.96	-69.76	-91.54	-20.91	-80.67	-0.63	-14.32	-30.81	-46.21	-46.21	-46.21	-90.71	-70.99	-31.30	-55.17
Guinea	-30.16	-84.65	-91.61	-99.84	-93.15	-82.97	-98.70	-91.41	-99.71	-0.99	-99.70	-91.93	-93.23	-93.23	-93.23	-92.78	-93.15	-93.63	-94.09
North Korea	-74.88	-9.34	-14.52	-14.35	-13.47	-7.21	-9.15	-4.46	0.23	0.06	8.73	8.51	8.08	8.08	8.08	14.70	17.72	16.67	17.09
Madagascar	-50.81	-98.01	-98.61	-99.20	-99.16	-99.30	-98.96	-96.29	-96.11	-0.89	-96.52	-95.30	-89.85	-89.85	-89.85	-73.70	-92.93	-96.09	-96.18
Malawi	-86.70	-83.84	-86.70	-74.22	-89.01	-84.95	-99.79	-100.00	-93.35	-0.79	-79.85	-93.04	-85.86	-85.86	-85.86	-61.04	-61.41	-88.41	-88.66
Mali	-52.11	-92.88	-53.65	-53.00	-52.11	-22.30	-48.05	-74.97	-71.98	-0.50	-58.46	-63.58	-19.00	-19.00	-19.00	-61.48	-26.47	-27.17	-35.10
Mozambique	-73.29	-72.61	-75.64	-73.29	-84.35	-69.92	-83.57	-86.75	-83.09	-0.90	-74.65	-83.99	-78.17	-78.17	-78.17	-93.36	-85.68	-84.14	-94.59
Niger	-73.52	18.05	15.13	12.35	-76.07	-91.20	-85.64	-92.36	-59.71	-0.23	5.92	-62.69	-87.58	-87.58	-87.58	-41.47	-85.02	-83.53	-82.00
Rwanda	-90.07	-99.90	-94.93	-99.66	-90.07	-53.94	-16.49	-49.13	-66.97	-0.32	-38.42	-29.14	-53.13	-53.13	-53.13	-15.20	-2.62	-46.14	-56.17
Senegal	-87.19	-65.00	-73.95	-48.61	-87.19	-87.42	-92.71	-73.28	-82.55	-0.30	-76.28	-64.90	-62.34	-62.34	-62.34	-67.06	-69.06	-74.89	-68.66
Tanzania	-59.66	-95.61	-52.86	-59.66	-99.80	-99.83	-99.60	-99.84	-86.81	-0.89	-81.86	-80.21	-88.20	-88.20	-88.20	-83.47	-88.53	-74.24	-83.17
Togo	-34.01	-50.03	-58.82	-41.22	-34.01	-85.43	-85.37	-92.37	-93.81	-0.94	-93.57	-95.60	-90.62	-90.62	-90.62	-67.89	-63.08	-64.53	-57.38
Uganda	-88.13	-88.73	-88.58	-88.13	-79.68	-86.25	-83.31	-80.72	-76.12	-0.69	-61.33	-55.97	-53.57	-53.57	-53.57	-50.62	-44.86	-48.54	-49.25
Zimbabwe	-91.57	-88.36	-87.28	-91.57	-87.33	-94.84	-59.50	-94.64	-94.06	-0.86	-78.50	-70.76	-14.06	-14.06	-14.06	-89.68	-90.15	-87.73	-88.59

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Table 17. Results of RCA of textile sector for low-income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-8.09	-15.43	-8.09	6.09	14.98	7.11	22.20	15.97	-4.46	-24.31	3.82	25.51	30.08	16.20	-10.87	47.53	38.75	24.09	-0.94
Burkina Faso	-31.16	-61.36	-70.32	-31.16	16.39	33.12	41.02	5.02	11.65	-1.55	-12.97	5.68	20.05	26.88	12.51	9.33	11.18	10.47	-8.47
Burundi	-95.37	-99.86	-97.07	-97.71	-95.62	-99.88	-96.01	-79.25	-79.48	-53.75	-22.69	-1.99	-89.49	-92.65	-97.76	-81.78	-91.86	-58.86	-88.63
Central African	-99.91	-90.50	-89.95	-99.91	-37.17	-12.45	-54.77	-54.93	-92.75	-40.82	-72.79	-92.89	-88.75	-81.54	-79.67	-99.32	-88.43	-87.03	-88.40
Gambia	-41.43	57.57	12.52	-41.43	-66.47	-58.63	7.02	49.47	-37.46	-30.63	-75.81	-61.28	27.52	87.93	88.52	93.39	94.15	94.85	94.79
Guinea	-32.18	-99.76	-96.78	-97.91	-99.55	-95.82	-99.77	-98.71	-99.59	-98.57	-95.55	-99.52	-98.67	-98.85	-98.79	-98.73	-98.73	-98.99	-99.07
North Korea	13.52	47.10	43.65	41.58	38.41	38.69	34.40	27.27	18.62	15.90	12.95	10.55	10.20	7.74	5.06	3.96	5.59	1.68	-0.80
Madagascar	54.80	58.99	54.80	68.47	66.56	2.57	19.88	43.45	15.93	3.79	20.51	32.91	31.22	55.77	25.81	34.87	35.46	28.66	27.76
Malawi	8.03	-1.37	9.30	8.03	-40.70	-70.91	-44.00	-66.84	-43.92	-50.61	-65.11	-72.35	23.98	-76.37	-64.58	-66.31	-65.23	-81.55	-81.88
Mali	-47.16	-97.77	-47.16	44.83	-24.94	-36.12	-36.67	-61.48	30.96	28.08	-38.87	-30.26	-23.00	-26.97	-13.76	-41.30	-41.95	-43.88	-44.90
Mozambique	-91.78	-87.01	-95.95	-95.15	-91.78	-94.36	-95.26	-93.58	-94.55	-94.12	-89.41	-66.12	-88.41	-93.40	-91.97	-94.29	-92.55	-85.17	-69.83
Niger	21.18	56.50	56.01	66.88	29.38	46.32	55.79	53.78	58.40	49.39	48.78	46.70	39.86	31.20	45.98	49.20	38.65	4.86	10.69
Rwanda	-18.18	-74.22	-18.18	-80.90	-60.76	-22.02	40.74	-27.18	-38.12	-38.60	-94.67	-82.02	-87.51	-22.74	-80.38	-72.18	-90.60	-86.88	-69.54
Senegal	-41.18	-62.24	-53.08	-41.18	-62.05	-63.49	-65.17	-48.61	-50.18	-52.17	-47.12	-41.17	-49.55	-31.09	-58.40	-65.55	-61.93	-59.37	-45.62
Tanzania	-45.31	-20.40	-20.56	-45.31	3.28	14.15	7.66	20.92	40.17	25.19	34.95	43.79	58.41	63.03	49.83	51.27	39.93	43.93	38.17
Togo	-8.15	17.76	4.31	7.77	-8.15	-16.07	-14.69	-30.67	-16.19	0.47	3.70	-2.23	21.64	8.49	29.80	47.11	34.32	38.87	37.58
Uganda	-77.06	-82.57	-86.58	-78.75	-77.06	-71.79	-64.96	-80.08	-62.29	-46.37	-52.33	-39.05	-28.26	-41.31	-39.81	-40.52	-31.00	-52.77	-53.19
Zimbabwe	10.79	2.21	10.79	-5.83	-8.61	-76.72	21.66	-5.63	6.65	-12.38	-12.93	35.40	56.77	-17.76	-28.28	-35.87	-29.24	-21.97	-38.22

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

International trade specialization and its stability in low-income countries

Table 18. Results of RCA of clothing sector for low income countries.

Years	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Benin	-48.97	-96.46	-93.98	-94.66	-95.21	-94.05	-93.95	-89.91	-92.95	-91.88	-92.79	-97.71	-96.68	-95.26	-97.00	-88.81	-96.75	-97.34	-96.92
Burkina Faso	-87.73	-82.76	-90.72	-71.75	-87.73	-96.31	-98.53	-98.66	-91.14	-91.61	-90.30	-81.08	-80.78	-85.23	-92.75	-93.26	-93.18	-95.76	-98.25
Burundi	-96.92	-97.32	-96.40	-98.85	-99.95	-97.09	-96.73	-96.69	-98.45	-98.30	-94.11	-66.70	-99.98	-96.22	-74.96	-62.64	-94.56	-90.41	-96.32
Central African	-95.57	-99.42	-99.19	-98.79	-97.89	-99.76	-97.55	-94.93	-98.80	-96.62	-95.62	-96.14	-94.82	-92.47	-91.76	-92.28	-92.59	-82.98	-79.80
Gambia	-88.85	-84.07	-84.76	-88.85	-93.23	-92.12	-92.29	-76.06	-3.15	-88.88	-47.89	-78.67	-93.49	-99.24	-98.45	-95.74	-99.96	-99.99	-99.96
Guinea	-52.70	-94.40	-92.79	-97.71	-90.77	-91.26	-96.54	-93.97	-100.00	-90.78	-99.55	-99.77	-98.62	-98.95	-99.51	-99.88	-100.30	-99.44	-99.18
North Korea	-1.68	-11.26	-6.74	-9.43	-16.84	-18.18	-26.70	-37.72	-48.07	-59.21	-66.56	-72.59	-75.13	-78.68	-79.03	-79.18	-77.69	-77.75	-77.57
Madagascar	88.59	85.25	86.98	88.59	84.71	84.28	76.16	74.34	86.70	87.40	85.16	87.75	88.49	86.71	86.16	81.77	83.89	81.46	80.85
Malawi	7.95	18.44	7.95	11.02	7.24	39.34	47.93	45.40	57.04	53.76	42.08	21.01	13.33	-0.91	-10.13	-27.33	-26.74	-43.22	-44.62
Mali	-60.98	-99.33	-99.02	-98.80	-99.50	-99.12	-100.00	-97.46	-99.70	-99.88	-99.80	-95.47	-94.80	-95.35	-94.74	-99.32	-98.45	-98.54	-99.43
Mozambique	-39.79	1.74	-27.62	-24.94	-39.79	-4.94	-47.20	-37.16	-79.21	-70.38	-82.83	-95.99	-95.52	-97.66	-97.72	-93.37	-98.20	-96.12	-93.02
Niger	-43.60	-79.95	-82.02	-63.13	-97.73	-98.29	-97.69	-99.00	-98.02	-90.77	-90.65	-84.32	-80.89	-92.84	-84.48	-89.03	-92.48	-93.25	-93.03
Rwanda	-5.28	-95.68	-92.08	-99.33	-97.45	-97.79	-97.93	-96.96	-99.36	-97.57	-99.72	-96.63	-98.54	-98.86	-97.43	-98.77	-99.68	-98.23	-90.49
Senegal	-93.30	-94.52	-96.59	-93.30	-97.22	-97.57	-96.78	-95.26	-96.28	-92.96	-94.59	-96.24	-95.61	-96.02	-96.78	-96.79	-97.49	-96.19	-80.75
Tanzania	-38.05	-33.01	-48.48	-38.05	-64.84	-71.19	-60.71	-55.82	-45.57	-60.44	-75.57	-51.66	-53.94	-66.61	-65.53	-65.75	-69.62	-55.84	-65.22
Togo	-77.41	-29.41	-78.25	-77.41	-94.92	-86.00	-93.20	-92.27	-96.07	-92.26	-92.09	-55.31	-40.63	-26.33	29.96	-53.58	-72.90	-86.44	-80.46
Uganda	-63.33	-99.59	-99.29	-98.94	-99.93	-99.43	-99.02	-68.97	-55.72	-61.95	-87.00	-84.36	-94.66	-93.27	-84.25	-87.09	-90.74	-87.60	-87.93
Zimbabwe	-13.62	-10.58	-13.62	-10.51	-5.09	-91.84	-15.83	-39.06	-57.13	-57.15	-42.38	-44.46	21.25	-41.89	-75.78	-81.97	-87.07	-86.09	-85.32

Source: Authors' calculations.

Note: A negative sign shows under specialization, while a positive sign shows specialization.

Paola Nardone[*] - Natascia Ridolfi[**^]

WORK AND TOURISM IN LIBYA BETWEEN FASCISM
AND THE SECOND WORLD WAR

Abstract

The colonization of Libya together with the consolidation of the power of fascism and its empire was also intended to lower Italian demographic pressures. The tourism sector was supposed to contribute to achieving these goals and for this reason, Libya was proposed to travellers and holidaymakers both as National conquest and as a touristic attraction. In this way, Italy was increasing its prestige and power by showing not only to be able to colonialize but also to export the European touristic model to Libya.

JEL CLASSIFICATION: N3; N4
KEYWORDS: COLONIZATION, TOURISM, LIBYA.

1. Colonial emigration in Libya

After the conquest of Tripolitania and Cyrenaica, the fascist government initiated an intensive colonization process of the Libyan territory by pursuing a policy of prevarication and control but also, by relocating Italian immigrants. In particular, "the conquest of the entire territory ended in 1932 with the annexation of Cyrenaica, which resulted in the massacre and

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deportation of more than 100,000 Libyans. The country was the victim of an extremely violent Italianization" (Gigliotti 2006, p. 14). The colonial expansion in Libya was considered by the regime as "a manifestation of power by the people who renovate[d] their Roman origins and carry[ed] the triumphant and immortal Roman Littorio to the shores of the African sea"[1].

In this respect, emigration to overseas territories was supported whereas departures to countries outside national control, such as the United States, Canada, Argentina, Brazil and Australia, were discouraged.

Colonial emigration was therefore completely different from past relocations since, in that case, Italians were regarded as "representatives of the regime serving their homeland" destined to have a position of strength and command over the local population, as opposed to what happened in the case of non-colonial emigration where, in the country of destination, Italians were subject to the power of the host country[2].

The colonization process, which involved Ethiopia at the same time, was structured in different phases. (Gagliardi 2016, p. 2). The first phase consisted in the military occupation of the areas, and the second one implemented the emigration process aimed at consolidating the power while relieving the national demographic pressure, whose growth continued to be advocated by the Duce: "we are land-hungry because we are prolific and we intend to remain prolific"[3]. The objective of the regime was twofold: to reduce the pressure related to population growth but, above all, to solve the problem of unemployment that was dogging Italy. Due to the crisis of 1929, the number of unemployed people went from 300,000 to 1,300,000 in 1933 (Cresti 2012, p. 109), the lack of employment contributed to undermining the general state of popular support but, even more, it posed a threat to public order. Fascists deemed the occupation of African countries as an opportunity, and for this reason:

the colonies were not considered as lands to exploit, but as regions that needed to develop within the framework of a superior imperial organization, assigning to each territory its own economic function, based on its position, environmental conditions, possibilities and natural resources (Massi 1939, pp. 411-439).

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[1] *Il Duce in Libia*, in «Annali del Fascismo», n. 3, March 1937, p. 9.
[2] For more information on the political organization of the colonies, see Labanca, 2003, pp. 85-100.
[3] *Il Duce in Libia*, «Annali del Fascismo», 1937, March, n. 3, p. 9.

Moreover, Mussolini himself thought it was necessary for Italy:

Whether it is good or bad, emigration is a physiological need for the Italian people. We are forty million people squeezed in our cramped and adorable peninsula that cannot feed everyone. We thus understand why the problem of the Italian expansion in the world is a matter of life and death for the Italian race. I here say expansion: expansion in every sense, moral, political, economic, demographic. I hereby declare that the Italian government intends to protect Italian emigration; it cannot neglect those who cross the mountains and travel across the Ocean; it cannot neglect them because they are men, workers and above all Italians… And wherever there is an Italian, there is their tricolour flag, their Homeland, their Government defending these Italians (Arena 1927, X).

Since the 1930s, the phenomenon of emigration has been synonymous with Italian-ness abroad and this concept was to be appropriately accepted and fully spread among Italian people. It was therefore necessary to start sharing the benefits resulting from the colonial policy, whose purpose was to "educate" Italians and slowly instil the desire to leave for North African lands:

A new generation is now rising in Italy: the one shaped by fascism. Few words and many actions. Tenacity, perseverance, and method must become tomorrow the fundamental virtues of the character of the Italians and these virtues must shine, especially in the colonies […]. I will bring to Rome the products of this land and I will show the example set by the settlers and the pioneers in Tripoli to all the Italians so that it can be imitated (Mussolini 1957, p. 117).

A new idea of emigrant, settler and status of Italian was spreading and in this context, it became essential to make the population understand the new interpretation of the policy related to expatriation in order to create a "colonial" conscience; the key word was therefore "vulgarize". As such, all the means of mass communications were used: radio, newspapers and magazines propagandized the Italian achievements. Of particular significance was the contribution of some editorials such as: *Rivista coloniale*, *Libia*, *Rivista delle Colonie Italiane*, *Africa Italiana* but, above all, the Italian Touring Club magazine *Le Vie d'Italia*.

There were also street celebrations aimed at engaging families in a festive atmosphere. Colonial Day was thus established in 1926, and it was celebrated nationwide for about two years and then converted into a festivity conducted by the provinces. Such dislocation slowly marked the blurring of

its popular nature, turning into a celebration intended only for technicians, veterans, scholars and nostalgics (Deplano 2015, pp. 28-31).

In 1937, the General Secretariat for Italian fascists abroad published the volume *Norme di vita fascista all'estero* which codified the behaviour of the Italian emigrant who was "like all the Italians in the Kingdom, a citizen, a soldier, and a worker. His private existence must be a model and a reflection of those traditional qualities that fascist education has perfected and refined"[4]. In support of the migration policy, specific institutions were created to steer the flows and establish contacts in the destination countries. In 1927, the General Commissariat for Emigration was replaced by the Directorate General for Italians abroad which included the Secretariat for Italian fascists abroad, the Directorate for Italian Schools abroad and the Directorate for Italian Labor abroad (Petrelli, 2009, pp. 374-375). The colonial policy in Libya contemplated the inclusion of Italians in the context of employment. The agricultural sector was the one assigned to this task where the rural colonization was in all respects a colonization process aimed at populating new lands, which was defined by the regime as:

a colonization of resettlement, that is to say, an organized emigration of Italian communities aiming at the creation of new Italian provinces in African lands and the transformation of the rural working-class into a category of smallholders with the help of special colonial institutions; a colonization of placement based on a local policy that does not tend towards Europeanization, but towards the evolution and development of the native society, within the limits of its anthropic, social and economic environment, resulting in the reinforcement and development of the local production for autarchic and export purposes and of the indigenous market in order to increase the absorption of metropolitan products; a colonization for enhancement or association carried out by means of large colonial companies and aiming at the industrial valorisation of natural resources and agricultural possibilities in order to supply raw materials to the metropolis (Massi 1939, pp. 411-412).

There were also people who engaged in speculative ventures through the machinery of colonization. They were entrepreneurs and profiteers who, by taking advantage of public funding, started companies in Libya where they first employed Italians[5] who were then replaced in the short term by the

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[4] Segreteria generale dei fasci all'estero (1937), *Norme di vita fascista all'estero*, p. 15, Mondadori, Verona.
[5] Of particular interest are the stories of emigrants in relation to their life and work experiences in Africa, see for this purpose: Labanca 2001.

much cheaper local labour force. In fact, the remuneration of Libyan workers could not exceed one-third of that of Italians (Labanca 2003, p. 95). In this case, colonization assumed a capitalistic nature (Sori 1979, p. 439). After the overbearing occupation of rural areas, the General Census of Agriculture in 1937 reported the presence in Libya of 2,711 families of Italian settlers. This number increased due to the following planned departures and, at the end of 1940, there were more than 140,000 civilians between settlers and non-settlers. The expropriated rural areas amounted to about 133,000 hectares. For the rural population settled in Libya actual villages were built, including city halls, fascist party headquarters, post offices, fascist party offices, churches, schools, etc. The management was entrusted to the ECL (*Ente di colonizzazione della Libia* – Agency for the colonization of Libya) and INFPS (*Istituto Nazionale Fascista della Previdenza Sociale* – Fascist National Institute for Social Welfare) (Cresti 2015, pp. 125-148; Biagi 1938, pp. 9-12; Piraino 2015, pp. 145-157).

The regime contemplated the Italian presence also in other sectors of the economy providing capital and directly managing the activities in full compliance with the totalitarian policy. Colonization was intended as "a correction to the terrible administration of world wealth: it will create new forms of wealth and profit with the support of work" (Sangiorgi 1938, p. 6). This encouraged all the activities related to agriculture, like agricultural products processing industries, such as for example distilleries, mills, pasta factories, oil mills, but also industries for the extraction of potassium salts and tobacco, in addition to those related to farming and fishing[6]. The regime also planned the integration into industrial activities of Italian workers who had already been recruited in their homeland, after a prior assessment of their physical and political suitability. The hiring occurred through the stipulation of a contract of employment that required a minimum stay of six months and a biweekly pay. Employers were responsible for the workers' outward and return journey. The salary was subject to an increase if the firm operated in poor locations, but also to a decrease if the worker was ill and could not work. The worker had to provide for his own food, while being granted accommodation in permanent "shacks". At that time, the use of shacks represented a well-established accommodation solution even for workers in Italy, as a matter of fact, they were also typically utilized in Fiat

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[6] In particular in 1938 the wool's production in Libya reached 10,800 quintals, while leather's production reached 12,732 quintals (Piraino 2015, p. 160).

and Ansaldo yards (Olmo 1994, p. 79)[7]. If the worker was employed by road construction companies, accommodation was not permanent. In that case, the need to move the yards required workers to sleep in tents or even outdoors, as was the case for companies operating in the highlands of Ethiopia[8].

Besides the industrial sector, the regime designed an intensive program of public works to serve local communities and economies, aimed at building roads, bridges, public and private buildings, water supply systems, communication networks, etc. It was an intervention plan of the Italian government made in the name of propaganda and national prestige, despite the high costs (Podestà 2004, p. 170).

2. The Libyan Governorate of Italo Balbo: social and economic aspects

After the violence and repression related to the occupation, the first governor-general of Libya was Italo Balbo who ruled over Tripolitania and Cyrenaica, brought together under the same government. He established a more relaxed colonization through the implementation of moderate and conciliatory policies for the local population. In this same period, some great infrastructural and communication developments were accomplished which opened Libya to relative economic progress supported by a correspondingly relative social serenity. The Italian investment policy was carried out along the same lines as that adopted by other European countries in their African possessions (Gagliardi 2016, p. 7). The Litoranea, extending for 1,822 km, built to join Tripolitania and Cyrenaica, represented the first great success of Balbo and, it was the result of the work of 15,000 workers, 500 assistants and 20 engineers. The connection, approved by R.D.L. March 14th, 1935, no. 545, was made by joining two already existing stretches of road: Zuara-Tripoli-Misurata in Tripolitania and Sidi Mohammed Esc-Scerif–Bengasi – Gasr Giçua and Derna – Tobruch junction in Cyrenaica. The missing section was 813 km long, which during construction was reduced to 799 km (De Agostini 1938, p. 21; Titta Rosa 1941, p. 44-45).

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[7] The documentation is in Historical Archive, Ansaldo Foundation, Perrone Archive, "serie scatole numerazione blu", b. 610/15b.
[8] Presidenza del Consiglio, *Le migrazioni nel Regno e nelle colonie nell'anno 1935 – XIII*, Roma, Failli, 1936, p. VI.

Balbo's colonial project represented a liberation from the colonial failure of previous governments, and it was based on the understanding between "Christian Italians and Muslim Italians as basic elements of the fascist empire" (Munzi 2001, p. 71) proclaimed by the Duce on May 9th, 1936, after the conquest of Ethiopia.

Balbo pursued a policy aimed at reconciling and collaborating with the local population by banning actions of violence and abuse and supporting the integration of the Italian "guests". He also encouraged the participation of Muslims in the life of the colonial villages, established schools and recreational centres, founded the Higher School of Islamic Culture and suggested the government of Rome to confer on the Libyan people the qualification of Libyan Italian citizens. For the development of economic activities, Balbo implemented a concrete support plan by providing funds for farmers and breeders (Giuliani 2006, p. 28).

In those years, the coastal territory, which received the biggest Italian migratory flow, was divided into four provinces for administrative purposes: Tripoli, capital of Libya, Misrata, Derna and Benghazi, while the inner constituted the "Territory of the Libyan Sahara" (Loschi 2011, p. 5). The provinces were administered by a prefect recruited among the senior government officials, reporting to the governor-general. Each province was divided into sections, residences and districts administered respectively by section commissioners, residents and district agents (Giorgi 2012, pp. 103-113).

This new image of Libya was as well promoted by the magazine *Libia*, founded by Balbo in 1937. Its purpose was that of portraying the colony as a modern and "charming" place. Its reading, aimed at discovering the colonies, offered subjects and topics intended to entice the mass to visit, besides the tourist attractions of the territory, the villages of the settlers. The magazine, which primarily praised the initiatives of the regime, suggested archaeological visits, seaside trips, but above all, the realization of how much "Italian-ness" was present in Libya thanks to the interventions made by the government (Spadaro 2013, pp. 93-34). Many articles were devoted to the life of the settlers in the villages, where the exotic element of the territory became secondary to the modern and reassuring element of Libyan cities (Berhe 2017, pp. 1-11).

3. Tourism in Libya

In the Thirties, as already noted, Libya fully entered into the fascist propaganda of the government that placed expectations and hopes in the territory outside the border and offered Italy the opportunity to be reintroduced as a colonizing nation in the international context. Fascist propaganda promoted relocations to Libya as a direct participation of the citizens in the imperial project, which Italy also regarded as a path leading to national redemption[9]. The tourism sector had to contribute to the realization of this new vision of the country, aimed at proposing Libya as a tourist attraction as well. In this way, Italy reinforced its prestige and power, showing to be able not only to colonize but also to export the European model of tourism to Libya (Spadaro 2013, p. 6). Italy in those years, in spite of the crisis of 1929, established itself as the second largest tourist destination in the world, preceded by France, a well-established destination chosen not only by Europeans (Mochi 1983, pp. 180-182). The fascist government promoted many initiatives aimed to encourage both foreign tourists to come to Italy and Italians to go on a trip. For the Jubilee announced by Pope Pius IX, for example, they decided to reduce the price of train tickets and initiatives of a different nature were proposed such as benefits for newlyweds who were going on a honeymoon or tariff reductions for sport and cultural events, etc.

In any case, the position of Italy in this sector was reinforced enough to attempt a tourist expansion also in Libya, which thus became a connection between Italian and European bourgeois classes (Spadaro 2013, pp. 6-7). Moreover, by embodying the charm of Africa, Libya attracted tourists who travelled there to visit the "white" Tripoli, the areas of Zliten, Tagiura and Misrata, the ruins of Leptis Magna, Sabratha, Cyrene and Apollonia (De Agostini 1938, pp. 17-18).

In 1935, the fascist government created the ETAL (*Ente turistico alberghiero della Libia*, Libyan Tourism and Hotel Association), which replaced the Commissariat of Tourism in Libya. The ETAL, established by the Royal Decree of May 31st, 1935, no. 1410, was based in Tripoli, and it served the purpose to promote the tourist industry in Libya. The agency had

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[9] The occupation of Libya was carried out by Giuseppe Volpi, Rodolfo Graziani and Pietro Badoglio, who used the repressive forms typical of a totalitarian regime (Al-Hesnawi 1991, pp. 42-44). For further information see also Speziale 2018, pp. 95-115.

to replace private operators through direct management of tourist activities and services, from hospitality to entertainment. In this respect, it played multiple roles: hotel management, route promotion, transport organization, commercial, tourist and recreational activities management[10].

A policy of centralization of the industry was brought into being, aimed at the total control of tourism in Libya, which, in addition to incorporating the territory into a developing environment, also favoured homeland in both economic and employment terms. That was the purpose of this organization which, however, had its roots in a real need, probably induced by Italy for reasons different than tourism, but that in practice required the management of a tourist flow that at the end of the Thirties consisted of "20,000 tourists arriving by cruise ships and in groups, 45,034 isolated travellers 16,578 of which were foreigners" (Piraino 2015, p. 160). In fact, the arrivals at the ports of Tripoli and Benghazi[11] were numerous, but there were also numerous travellers using the airline, which was initially activated in 1929 with departures every three weeks, which became daily starting from the summer of 1934 (Vedovato 1934, pp. 18-19).

The policy of the fascist government, which aimed at stimulating the tourism industry, proposed discounted fares for both sea and air transport. The discounts depended on the purchase of "Libya's tourist card" that was duly designed to grant benefits, also serving locally as an identification document. Libya's tourist card costed 25 lire (De Agostini 1938, p. 67).

The most important function of ETAL was represented by the management of several hotels situated throughout the territory[12], which

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[10] Archivio Centrale dello Stato (ACS), fondo ETAL, b. 30, Regio Decreto 31 May 1935 n. 1410, *Istituzione dell'Ente turistico alberghiero della Libia* (gazzetta ufficiale n. 181 del 5/8/1935).

[11] The Tirrenia company, based in Naples, carried out four sea routes with departures from: Syracuse-Tripoli, Naples-Syracuse-Malta-Tripoli, Naples-Palermo-Tripoli, Genoa-Livorno-Civitavecchia-Cagliari-Trapani-Tunis-Malta-Tripoli and Syracuse-Benghazi. The Air company "Ala Littoria" made departures three times a week: Rome-Syracuse-Tripoli, Rome - Naples-Syracuse-Malta-Tripoli, Rome-Tunis-Tripoli, Tripoli-Benghazi and once a month there was a flight Rome-Syracuse-Bangasi-Italian East Africa (De Agostini 1938, pp. 67-68).

[12] The hotels managed by the ETAL were the following: "Agedabia, Albergo Agedabia; Barce, Albergo Barce; Bengasi, Albergo Berenice; Cirene, Grande Albergo Agli Scavi; Derna, Albergo Derna; Gadames, Albergo Ain el Fras; Garian, Albergo Gebel; Homs, Albergo agli Scavi di Leptis Magna; Jeffren, Albergo Rumia; Misurata, Albergo Misurata; Nalut, Albergo Nalut; Sirte, Albergo Sirte; Tobruk, Albergo Tobruk; Tripoli, Grande Albergo, Albergo Uddan, Albergo Mehari, Albergo Tripolitania; Zliten, Albergo Alle Gazzelle; Zuara,

constituted the most significant item in the budget of the agency, as referred in Table 1.

Table 1. Economic outcome ETAL hotels (1936-1941)

HOTELS	1936-37	1937-38	1938-39	1939-40	1940-41
Uaddan		-394,000	-526,000	-410,300	+350,372.21
Grande Albergo	-347,400	395,000	-1,851,000	-581,900	=167,504.55
Mehari	-68,700	-19,500	+70,500	-12,800	+338,711.84
Tripolitania	-5,700	+9,000	+8,700	+72,500	+105,789.40
Zuara			-96,000	-27,700	+31,088.30
Garian	-30,800	-39,500	-35,000	-48,500	+86,444.24
Jefren	-27,500	-45,600	-91,000	-71,600	=17,624
Nalut	-54,200	-52,000	-45,000	-87,000	=2,071.00
Gadames	-24,000	-88,500	-71,600	-335,000	=21,730.22
Homs	-109,300	-35,800	-122,300	-320,000	=30,847.27
Zliten	-35,600	-58,000	-55,000	-60,000	=19,507.25
Misurata	-75,200	-62,000	-72,000	+11,000	+148,263.14
Sirte	-50,000	-93,200	-113,400	-25,000	+109,126.61
Agedabia	-34,000	-65,000	-64,700	-2,500	+14,273.38
Bengasi	-267,000	-213,00	-420,400	-190,000	-109,931.38
Cirene	-112,000	-195,500	-171,000	-89,000	+85,790.37
Derna		-70,000	-47,500	-10,000	
Tobruk		-162,300	-115,000	+13,500	

Source: Authors' own processing of data contained in: ACS, fondo ETAL, b. 6, *Rapporto del commissario straordinario ETAL Fassini al Ministro Africa italiana, Attilio Teruzzi, 27 febbraio 1942*.

The losses observed in the accounting ledgers of some hotels were attributable to expenditure on "improvements on third-party properties", which ETAL made to adapt hospitality to Italian and European standards.The hospitality industry was assisted by tourist offices situated in Tripoli and Benghazi, which dealt with hospitality for travellers arriving in Libya13. from Italy and abroad, and they operated exclusively on the territory. ETAL also ran some transport companies that possessed a large fleet of vehicles for short local travels. The service provided the use of taxis (ten cars were available in Tripoli) or car rental. For group trips they had

Albergo Zuara". ACS, fondo ETAL, b. 6, *Rapporto del commissario straordinario ETAL Fassini al Ministro Africa italiana, Attilio Teruzzi, 27 febbraio 1942.*
[13] ACS, fondo ETAL, b. 6, *Rapporto del commissario straordinario ETAL Fassini al Ministro Africa italiana, Attilio Teruzzi, 27 February 1942*.

coaches, along with open top buses for special excursions. In this regard, the program of tours organized by ETAL were quite extensive and diversified, including for example, a tour of the oasis in the surrounding area of Tripoli; excursions to Sabratha, Zuara and Pisida and the archaeological sites near Sabratha (museum, forum, temple of Jupiter, necropolis and amphitheatre) and the seaside resort of Zuara; a trip from Tripoli to Leptis-Magna which, along a path surrounded by palm groves and farms, led to the city of Leptis, famous for the ancient monuments of the Roman age; the journey Misurata–Sirte offered on the route of over 230 km, a view of steppes, dunes and rocks accompanying the traveller to the modernly organized, well-served seaside resort[14].Transport service was supported by repair shops for vehicles used by tourist offices, hotels and individuals. ETAL also managed tourist entertainment thanks to the ownership of recreational venues such as theatres, cafes and casinos located in major cities like Tripoli and Benghazi. In Tripoli it run the 500-seat Uddan Theater, the Arabic Café, which hosted variety shows and Arabic dances and the Uaddan casino, the latter being directed by the employees of Venice casino, who worked alternatively in both facilities, the Venetian and Libyan ones, and finally the arena, was first used as a shooting range and then turned into an open-air cinema. Tourists and local population did not appreciate much the Roman baths, built along the line of the Italian ones, and closed between 1940 and 1941. In Benghazi, instead, ETAL ran the 2000-seat municipal theatre and the 1000-seat cinema "Nuova Italia".The agency also controlled some commercial activities such as stores and tobacco shops on the shoreline; there were beach resorts along the coast, provided with cabins, perfectly organized for the needs of tourists, and they were able to offer entertainment and food service. The lido of Tripoli boasted facilities equipped with 400 cabins, while that in Benghazi had 300 cabins. In both cities, the agency made improvements to make local seaside tourism meet the modern Italian and European standards[15]. The management of the tourism industry in Libya also implied an intense promotion activity aimed both at magnifying fascist politics and promoting

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[14] There were many itineraries proposed by the ETAL, which in addition to those reported in the text, also included the tour: Homs-El-Gusbat-Tarhuna-Castel Benito–Tripoli, Tripoli–El-Azizia–Garian-Tegrinna-Ièfren-Nalut-Gadames, Garian-Mizda, Begasi–Ghemines-Agedabia-El-Agheila-Arae Philaenorum, Bengasi-Tocra-Barce-Tolemaide, Bengasi–Barce–Cirene-Apollonia–Derna-Tobrugh-Porto Bardia (De Agostini 1938, pp. 58-65).

[15] ACS, fondo ETAL, b. 6, Rapporto cit. Excursions were also organized around Tripoli and Gadames.

tourism initiatives. Such an action was carried out through dedicated agencies located in Tripoli and Benghazi and controlled by ETAL. They were responsible for placing posters along the streets and on the shoreline as well as disseminating advertisements through the press. ETAL's companies worked in spaces granted to the agency which, in most cases, paid symbolic rent charges to the tenants. ETAL promotional action was also widespread in Italy, where Libyan tourist offer was at the same level as the national one promoting comfort, safety and high-class services, suitable for all those who needed a relaxing or adventurous stay (Spadaro 2013, pp. 92-93).

4. Tourism during the war

The outbreak of the Second World War considerably reduced tourism in Libya, giving way to an almost completely military foreign presence in the country. Colonial tourism for recreation and pleasure diminished and the publication of the editorial '"Libia" was suspended in 1940 (Berhe 2017, pp. 10). This resulted in a different organizational structure of ETAL, which focused its activity on war demands, by eliminating all those initiatives exclusively intended for entertainment and amusement; moreover, the fascist government suspended the appropriations reserved for propaganda and tourism.

Theatres, cinemas, and casinos were closed or sold to third parties. The Arabian Cafe and Uaddan Theatre in Tripoli, for example, were rented to Germans who used the café as a meeting place for soldiers and the theatre for the screening of propaganda films for the army. Commercial activities of Benghazi were sold as well.

ETAL maintained the management of the tobacco shop in Tripoli, which was particularly profitable as it supplied soldiers and passing troops. It registered a decrease in the revenues only in 1942 due to the rationing of cigarettes imposed by the government, which established the use of a card to buy only 5 cigarettes per person[16].As a consequence of the outbreak of the Second World War tourist offices were also forced to adapt their activities; they mainly dealt with the transfer of soldiers and the transport of goods to and from Libya, concentrating everything on the sale of flight tickets and air transportation of goods. Of course, the industry connected with travel organization and tourist itineraries also ceased to operate.

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[16] ACS, fondo ETAL, b. 6, *Rapporto,* cit.

Car rental and taxi services were suppressed. Most of the vehicles were sold and the agency only kept a few vehicles for hotel inspections and local transportation, carried out by a Cinquecento, a Saharan, an Aprilia, and a van. After 1940, car repair shops were rented out. Only a few of them remained available for the agency. Eventually, during the war, ETAL abandoned the management of some of the most prestigious hotels such as Berenice (Benghazi), Scavi (Cyrene), Derna, Barce, Tobruk, Agedabia. In the accounting ledgers they were registered as war damages for their entire value.The agency kept managing only a few hotels and restaurants, which paradoxically continued offering hospitality to soldiers. In this way they maintained positive management results due to their new organizational structure, aimed at meeting the "modest" needs of soldiers, which were much less expensive than the "presumptuous" needs of tourists[17]. It is also worth remembering that the choice of the armed forces to stay in ETAL's hotels, although meeting quality standards, was probably unique in the context of war.In the first months of 1942, the hotels located in Tripoli highlighted a remarkable presence of soldiers-customers who, for example, only in the quarter February-April exceeded the 10,800 units on the whole, as reported in Table 2. In the reports before 1940, there was also an item for children-customers. The presence of children in hotels was typical for a family stay during the pre-war period.

Table 2. Employment and tourism in Tripoli hotels (February-April 1942)

Presences	Uaddan	Grande Albergo	Mehari	Tripolitania	Total
Adult clients	3,235	1,540	4,891	1,149	10,815
Employees and head of service	113	348	372	33	866
National employees	532	703	871	92	2,198
Native employees	410	319	438	69	1,236
Total	4,290	2,910	6,572	1,343	15,115

Source: Authors' own processing of data contained in: ACS, fondo ETAL, b. 22, *Andamento alberghi febbraio-marzo 1942* (average data for the considered period).

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[17] ACS, fondo ETAL, b. 26, *Relazione del collegio sindacale sul bilancio dell'esercizio 1° ottobre 1941 – 30 settembre 1942 dell'ente turistico alberghiero della Libia (ETAL).*

The staff employed in the facilities was both Italian and Libyan: 2,198 employees were from the homeland and 1,236 were local. The hotels hosted mainly German troops who, as in the case of the Hotel Uaddan, reserved their accommodation. The hotels were also turned into canteens for soldiers: the hotel Mahari was used as a canteen service for army officials. In the remaining area of Tripolitania, ETAL maintained the management of some hotels which likewise offered hospitality to soldiers.

Table 3. Employment and tourism in Tripolitania hotels (June - November 1942)

Presences	Garian	Iefren	Nalut	Homs	Zliten	Misurata	Sirte	Total
Masters (adult clients)	215	169	82	182	97	412	492	1.649
Management	54	61	68	62	28	77	30	380
National employees	63	75	50	40	51	82	81	442
Native employees	59	37	40	140	68	197	154	695
Total	391	342	240	424	244	768	757	3,166

Source: Authors' own processing of data contained in: ACS, fondo ETAL, b. 22, *Andamento alberghi giugno- novembre 1942* (average data for the considered period).

In the reports sent by the hotels to the agency (Table 3), it is possible to notice the presence of the item "masters," which is supposed to refer to adult customers[18], which amounted to 1,649 units overall for the considered period. The management of hotels was restricted to Italian staff and entrusted to 380 employees. The 442 people employed as head of service were also from the homeland, joined by 695 Libyan workers.

In a difficult and peculiar context such as that of war, ETAL almost acquired a monopoly position, by benefiting from special advantages, including the application of fixed rates for meals and accommodation. The prices, which were approved by Arcorguerra, were in any case lower than those applied in Italy for the same categories. Hotels were guaranteed a constant presence of customers by hosting soldiers, even in those periods

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[18] The word "padroni" in the reports is placed before the child customers, absent in the period considered and therefore not shown in the table, so it is assumed they are to indicate the adult customers. The reports were the same for all hotels in all locations.

with reduced tourist flow, since during the war there were no tourist "seasons". Offering accommodation to the troops also ensured to ETAL hotels the possibility to benefit from privileged channels for the supply of food and other commodities, which in addition to being subject to rationing, also encountered considerable logistical difficulties in overseas transport[19].Obviously, there were critical situations that the agency was forced to face after the conflict, in fact, although the trend of the hotels was positive, the general activity of ETAL which, as reported, was made up of several sectors, was put to the test, so much that in 1940 it led the institution to ask the Savings Bank of Libya for the financing of 5,500,000 lire. ETAL had contracted debts towards suppliers, the Personnel Insurance Fund, as well as the Savings Bank itself to which it had already requested a previous loan. Part of the requested funding was also to be used for the constitution of a pension fund for employees. The lack of tourist movement and the typical activities associated with it, the closing of some profitable businesses such as casinos and cinemas raised liquidity problems in the accounts of the agency, without jeopardizing its activity[20].

5. Some final considerations

In the early days, the colony of Libya ultimately represented an important alternative to the Italian demographic growth by offering employment to settlers, workers, and entrepreneurs. The fascist government probably planned a number of relocations that actually did not live up to the regime's expectations, but which enabled Italy to solve not only demographic problems but also public order issues by making it possible for the regime to expel dissidents, anti-fascists and also unemployed people who represented a threat to social and party life. Not to mention, the glory and prestige that Italy flaunted in the realization of the Empire, that fascist project of self-proclamation of Italian-ness that integrated the country, albeit belatedly, among the main characters of international imperialism.

The colony of Libya was successful until the fascist government was able to financially support the economic activities, especially those connected with tourism, that were first affected by the changes taking place. However,

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[19] The hotel of Zuara, of which we are not in possession of information, housed the Italian soldiers of the Regia Aeronautica. Ibidem.
[20] ACS, fondo ETAL, b. 26, *Lettera del ETAL alla Cassa di Risparmio, 31 ottobre 1940.*

the regime had the merit of modifying the image of Libya from an undeveloped and inhospitable country into a modern Mediterranean colony. Economically speaking, Libya did not develop and was unable to participate in Italian growth. In 1938, imports exceeded exports by eight times, weighing heavily on the State budget. The standard of living of the population was still at subsistence levels and the weight of fascist repression, which had strongly affected society, constrained the Libyans for the following decades. The colonial action managed to improve the hygienic and sanitary conditions of the population who resided in the colonial areas where pathologies and diseases typical of undeveloped environments were eradicated (Cresti, Cricco 2012, pp. 120-121).

References

Al-Hesnawi H.W. (1991), *Note sulla politica coloniale italiana verso gli arabi libici,* in Del Boca A., (ed.), *Le guerre coloniali del fascismo*, Laterza, Roma-Bari, pp. 31-48.

Arena C. (1927), *Italiani per il mondo*, Alpes, Milano.

Bertonha, J.F. (2001), *Emigrazione e politica estera: la «diplomazia sovversiva» di Mussolini e la questione degli italiani all'estero, 1922-1945,* Altreitalie, 23, s.p.

Berhe S. (2017), *Un impero di carte: l'immagine della Libia nelle riviste turistiche «Le Vie d'Italia» e «Libia»*, Clio@Thèmis, 12, 1-11.

Biagi B. (1938), *L'azione colonizzatrice dell'Istituto Fascista della Previdenza Sociale*, Africa Italiana, 1, 9-12.

Cresti F. (2012), *La Libia dalla "riconquista" alla "pacificazione"*, in Cresti F., Cricco M. (eds) *Storia della Libia contemporanea*, 1-140, Carocci, Roma.

Cresti F. (2015), *Agricoltori italiani e arabi nella colonizzazione della Libia. Una sintesi*, in Trinchese S. (ed.), *La Libia nella storia d'Italia*, Mesogea, Messina, 125-148.

De Agostini G. (1938), *La Libia turistica*, Alfieri & Lacroix, Milano.

Deplano V. (2011), *L'Africa in casa*, Le Monnier, Milano.

Gagliardi A. (2016), *La mancata «valorizzazione» dell'impero. Le colonie italiane in Africa orientale e l'economia dell'Italia fascista*, Storicamente, 12, 1-14.

Gigliotti G. (2006), *Libia*, Rubettino, Soveria Mannelli.

Giorgi C. (2012), *L'Africa come carriera. Funzioni e funzionari del colonialismo italiano*, Carocci, Roma.

Giuliani T. (2006), *Profilo storico e ordinamento politico*, Libia, Globe, Roma.

Labanca N. (2001), *Posti al sole. Diari e memorie di vita e di lavoro dalle colonie d'Africa,* Museo Storico Italiano della Guerra, Rovereto.

Labanca N. (2003), *I Fasci nelle colonie italiane*, in Franzina E., Sanfilippo M. (eds), *Il fascismo e gli emigrati*, 85-100, Laterza, Roma-Bari.

Loschi C. (2011), *Fuori dal regime fascista: organizzazioni politiche degli italiani a Tripoli durante la fase postcoloniale (1948-1951)*, Diacronie. *Studi di Storia Contemporanea*, 5, 1-14.

Massi E. (1939), *Economia dell'Africa italiana*, Rivista Internazionale di Scienze Sociali, Serie III, 10(3), 411-439.

Mochi C. (1983), *Commercio e turismo*, Annali dell'economia italiana 1930-1938, 8(2), 117-210, IPSOA, Milano.

Munzi M. (2001), *L'epica del ritorno: archeologia e politica nella Tripolitania italiana*, L'Erma di Bretschneider, Roma.

Mussolini B. (1957), *Quarto discorso di Tripoli*, in Susmel E. e D. (eds), *Opera Omnia*, vol. XXII, La Fenice, Firenze.

Olmo C. (1994), *Il Lingotto 1915-1939. L'architettura, l'immagine, il lavoro,* Allemandi, Torino.

Petrelli M. (2009), *Fascismo e postfascismo tra gli italiani all'estero,* in Corti P., Sanfilippo M. (eds), *Storia d'Italia*, 24, 371-386, Einaudi, Torino.

Piraino M. (2015), *L'Italia fascista e la colonizzazione demografica della Libia,* la Razòn Història, 31, 138-167.

Podestà G. (2004), *Il mito dell'impero*, Giappichelli, Torino.

Presidenza del Consiglio (1936), *Le migrazioni nel Regno e nelle colonie nell'anno 1935 – XIII*, Roma, Failli.

Sangiorgi G.M. (1938), *La potenza dell'Impero è nella colonizzazione demografica,* Africa Italiana, 1, 5-8.

Segreteria generale dei fasci all'estero (1937), *Norme di vita fascista all'estero*, Mondadori, Verona.

Spadaro B. (2013), *Una colonia italiana. Incontri, memorie e rappresentazioni tra Italia e Libia*, Le Monnier, Milano.

Sori E. (1979), *L'emigrazione italiana dall'unità alla seconda guerra mondiale*, il Mulino, Bologna.

Speziale S. (2018), *Più a Sud del nostro Sud: spunti e problemi per lo studio dell'emigrazione italiana in Africa mediterranea tra le due guerre*, Meridiana, 92, 95-115.

Titta Rosa G. (1941), *Vita di Balbo*, Rizzoli, Milano-Roma.

Vedovato G. (1934), *Colonizzazione e turismo in Libia*, Beraglia, Salerno.