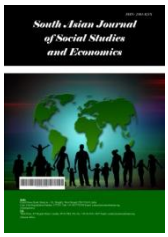

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Do Quality Standards Affect the Growth of the Fisheries Sector in Cameroon?

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Author's contribution

The sole author designed, analysed, interpreted and prepared the manuscript.

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ABSTRACT

This article aim's to assess the effect of quality standards on the growth of the fisheries sector in Cameroon. Cobb-Douglas function, the Autoregressive Distributed Lag (ARDL) estimation method and the stationary test (Augmented Dicky Fuller and Phillip Perron tests) were employed. In the light of the results obtained, we noted that in the short term, the quality standards are negatively and significantly correlated with the growth of the fisheries sector in Cameroon, but in the long term, we observed a positive correlation. Indeed, a 10% strengthening of quality standards is accompanied by a decrease in the growth of the Cameroonian fisheries sector of about 8.61%. Faced with the demanding nature of quality standards and with a view to making the fisheries sector efficient and attractive in the long term, we recommend that the public authorities implement a national strategy based on effective and relevant management of human and financial resources, aimed at supporting fisher folk on one hand, and on the other hand, improving the quality of institutions.

Keywords: Quality standards; growth of the fisheries sector; autoregressive distributed lag (ARDL) estimation method.

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1. INTRODUCTION

International trade plays a major role in the fisheries and aquaculture sector, as a job creator, food supplier, income generator and contributor to economic growth and development as well as food and nutritional security. Fish and fishery products are among the most heavily traded commodities of the global food sector, with around 78% of seafood products exposed to international competition. The fisheries sector makes a strong contribution to gross domestic product in a number of developing countries. In many countries in Asia and West Africa, fisheries represent between 2 and 5% of the GDP [1].

In Cameroon, the GDP of the livestock and hunting branch is estimated at 290 billion FCFA in 2017, contributing around 5% of the GDP [2]. Regarding the fishing sector, the national production has experienced significant growth since the early 1990s (Fig. 1). In fact, national fishery production, which was on average 86,843 tonnes during the period 1990 to 1999, increased to 135,935 tonnes between 2000 and 2009 and to 223,505 tonnes over the period 2010 to 2018. This shows that the State has not stopped promoting efforts to improve the productivity and competitiveness of this sector.

Despite these efforts, this productivity remains low to meet the annual demand estimated at 400,000 tonnes (Ministry of Livestock, Fisheries and Animal Industries, 2013). It is undoubtedly for this reason that one observes an increase in the imports of fishery products for several decades (Fig. 2), this is to compensate for this shortfall. Indeed, the value of imports which averaged 56,944 in US dollars between 2001 and 2007 rose to 242,039 of US dollars from 2008 to 2013 and 266,979 US dollars between 2014 and 2018, thus posting an average growth rate of 10.31% (Fig. 2). It is however important to specify that the main suppliers of fishery products to Cameroon are Mauritania (39.4%), the Netherlands (10.4%), South Africa (12.1%), Namibia (8, 6%), Ireland (7.1%), Angola (5.4%) and Senegal (4.1%) [2].

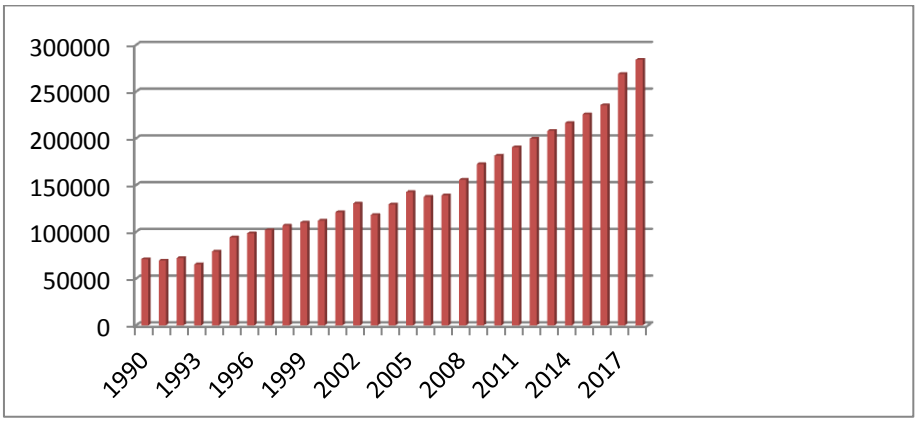

Fig. 1. National fishery production in Cameroon between 1990-2017
Source: FAOSTAT (2021)

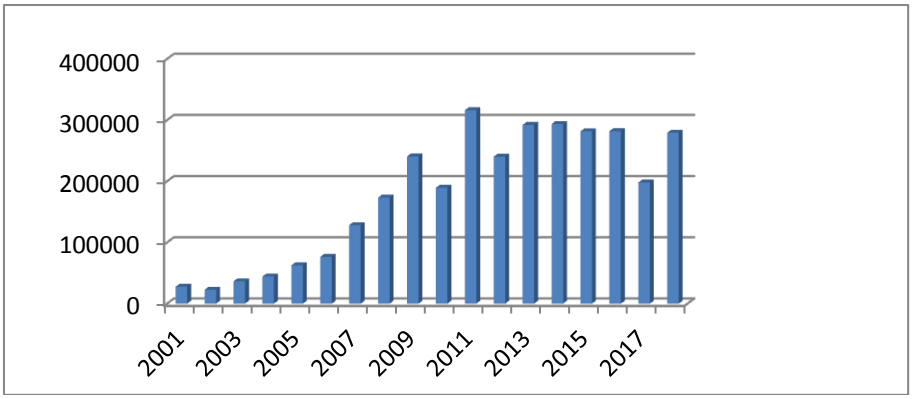

Fig. 2. Total imports of fishery products in Cameroon between 2001-2018
Source : Trade Map (2021)

It is with a view to closing this deficit, while remaining consistent with the economic policy documents[1] that the State has established since 2011, the Strategy Document of the Livestock, Fisheries and Animal Industries Sub-sector, under the supervision of the Ministry of Livestock, Fisheries and Animal Industries (MINEPIA). The main challenges facing this sub-sector are improving the productivity and competitiveness of sectors, food security and self-sufficiency, increasing the incomes of actors, creating decent jobs and sustainable management of natural resources.

Despite these challenges, the fisheries sectors in Africa are faced with the constraints of compliance with quality standards. The international body authorizes these member countries to adopt quality standards with the main aim of preserving human and animal health as well as biodiversity. However, non-compliance with standards can have negative consequences on trade and productivity of some countries. In the 1990s, the European Union (EU) banned the import of fishery products from India, Kenya, Mozambique, Uganda and Tanzania due to doubts about sanitary standards of these countries and their regulatory systems [3]. In the Cameroonian context, the State has continued to promote efforts to improve the quality of fishery products. First of all, since its integration as a member country within the World Trade Organization (WTO) in 1995, the country has applied non-tariff measures, in particular Sanitary and Phytosanitary (SPS) measures on organic products, animal and plant origin, as well as pharmaceutical products. In addition, in order to comply with WTO rules relating to quality standards, in 2009 the State created the Standards and Quality Agency (ANOR) which is an organization in charge of standards management quality at the national level. On the strength of these efforts, fish production remains insufficient to meet national demand, due to non-compliance with quality standards, hence the need for this study, which is to assess the influence of quality standards on the growth of the fisheries sector in Cameroon.

2. LITERATURE REVIEW

The multiplication of crises [2] related to the consumption of food products has made the markets more demanding with regard to the safety of different products. However, the literature on non-tariff measures and specifically on quality standards is broadly focused on trade in export products [4,5,6,7,8,9,10]. Chen et al. [11] show that standards imposed by importing countries had a negative and statistically significant effect on agricultural exports from China. Ferro et al. [8] constructed an index of standard restrictiveness to show that adherence to strict standards mainly increased the fixed costs of exports. By focusing on standards considered as barriers to trade, Fontagné et al. [12] showed that at the company level, SPS standards constitute compliance costs that may hinder market entry. Thus, these trade costs remain high in both low-income countries and small businesses. Ishaq et al. [9] established that standards imposed by importing countries play a facilitating role for food exports from China, as consumers will easily find the products safe and importers will not have to pay the search costs for certain minimum expectations for a particular product.

Other studies have focused specifically on the effect of quality standards on trade in fish products [4,13,14,15]. Henson et al. [4] showed that Kenyan fish suffered a significant commercial loss due to the requirements of food safety measures imposed by EU countries. Anders and Caswell [13]studied the effect of food safety standards for Hazard Analysis Critical Control Point (HACCP) on seafood imports. They found that although trade from developed countries taken as a whole benefit from standards, developing countries, on the other hand, experience a reduction in their trade intensity as a result of these measures. While emphasizing the need for standards in the African context, Kareem [15] shows that Sanitary and Phytosanitary (SPS) standards have reduced fish exports to Africa by approximately 8.61%. This effect thus indicates an insufficient level of compliance with standards.

Despite the relevance of previous studies, it is clear that the fishing sector is very often relegated to second place in developing countries, yet this sector has enormous socioeconomic potential. It is for this reason that we propose to assess the influence of quality standards on the growth of the Cameroonian fishing sector.

3. RESEARCH METHODOLOGY

This section is devoted to the presentation of the methodological framework of the study of the

[1] *Confer the National Development Strategy Document 2030 (SDN30).*

[2] *Poisoning linked to E. coli bacteria, Salmonellosis, Vibrio etc…*

influence of quality standards on the growth of the fishing sector in Cameroon. We structure this section around the presentation of the econometric model (3.1), preliminary tests (3.2) and data (3.3).

3.1 Econometric Model

The methodological approach used is inspired by Ahmad and Heng [16] who studied the factors that affect the productivity growth of the agricultural sector in Pakistan, starting from the Cobb-

Douglas production function. This function looks like this:

$$Q_{it} = A^{\delta} K_{it}^{\alpha} L_{it}^{\beta} \quad \text{---------- (1)}$$

Where Q represents production, α and β are the parameters for sharing the capital factor (K) and the labor factor (L), respectively. A represents technological change.

Thus, the empirical model is defined as follow:

$$Gr\_fish_t = a_0 + a_1 Cred\_acces_t + a_2\, Educ_t + a_3 Qua\_stand_t + a_4 Gov\_Ind_t + \varepsilon_t \quad ---(2)$$

With *Gr_fish* which represents the growth of the fisheries sector in Cameroon, *Cred_acces,* the rate of access to credit. *Educ* represents the proportion of the population with at least access to primary education, *Qua_stand*, the quality standard variable and *Gov_Ind*, the governance index that captures the quality of institutions in Cameroon.

3.2 Preliminary Tests and Estimation Method

For several years, the regression of time series has offered the opportunity to distinguish between short-run and long-run effects in econometric analyses. This is made possible with the analysis of cointegration which, when established, makes it possible to distinguish short-run effects from long-run effects. Thus, the study of the stationarity of the variables will make it possible to decide on the method to be used.

3.2.1 Preliminary tests

The preliminary tests essentially boil down to checking the level of integration of the study variables. To do this, the tests of Augmented Dickey Fuller (ADF) and of Phillips Perron [17] were used in this part, because of their efficiency in the study of the integration of variables within the framework of the times series. The Augmented Dickey Fuller test is a test developed following the Dickey Fuller [18] Standard test, which then only concerned autoregressive processes of order 1 or AR (1). The perculiarity of this test is that it allows the detection of first degree stationarity in a regression model of order p or AR (p). Therefore, the determination of the optimal number of delays is important, and will be done by comparing the results of the test of the selection criteria of the optimal number of delays which are Akaike Information Criterion (AIC), Hannan-Quinn Information Criterion (HIC) and Schwarz Information Criterion (SIC).

The Phillip Perron test allows for the detection of the presence of the unit root in time series. Built on a non-parametric approach, this test takes into account the error terms and makes it possible to distinguish the stationarity of the unit root from the stationarity of the deterministic trend.

These two ADF and Phillip Perron tests were used here to be reassured of the stationarity of the variables.

3.2.2 Estimation method

If there is a cointegrating relationship between the long-run variables, econometric analysis offers several methods for the regression. These include Fully Modified Ordinary Least Squares (FMOLS), Dynamic Ordinary Least Squares (DOLS) and Auto Regressive Distributed Lags (ARDL). The first two methods have the perculiarity of requiring that all the variables of the study be integrated of order 1, while the last requires that the variables be integrated of order 0 and/or order 1. For this reason, we used the ARDL model. This estimation method makes it possible to rewrite the model (2) above as follows:

$$\begin{aligned}\Delta Gr\_fish_t = {} & a_0 + \sum_{t=1}^{n} a_{1i}\, Gr\_fish_{t-i} + \\ & \sum_{t=0}^{n} a_{2i}\, Cred\_acces_{t-i} + \sum_{t=0}^{n} a_{3i}\, Educ_{t-i} + \\ & \sum_{t=0}^{n} a_{4i}\, Qua\_stand_{t-i} + \sum_{t=0}^{n} a_{5i}\, Gov\_ind_{t-i} + \\ & b_1 Gr\_fish_{t-1} + b_2 Cred\_acces_{t-1} + \\ & b_3 Educ_{t-1} + b_4 Qua\_stand_{t-1} + \\ & b_5 Gov\_ind_{t-1} + \varepsilon_t \quad ---------- \quad (3)\end{aligned}$$

where $a_0 - a_5$ and $b_1 - b_5$ are respectively the short term and long term coefficients to be estimated.

The application of the ARDL methodology requires that the variables be integrated of order 0 or of order 1. To do this, it is necessary to carry out unit root tests. Subsequently, it will be necessary to verify the existence of cointegration between the variables.

3.3 Data

The information used in our research comes from three main sources: the World Development Indicators (WDI), the Statistics Division of the Food Agricultural Organization (FAO) and the Integrated Trade Intelligence Portal (I-TIP). The work takes into account quarterly data for each variable for the period 2001T-2017T. For all of our data, we used the quarterly data method of Denton [19].

4. RESULTS AND DISCUSSION

The preliminary tests revolve around the checking of the existence of the unit root at level or in first difference only, precondition to the application of the ARDL modelization. In addition, the cointegration test makes it possible to verify the existence of a long-run relationship between the explanatory variable and the explained variables; this condition checked is essential for the definition of the modelization with correction of errors.

4.1 Results of Stationarity Tests

We carried out two categories of stationarity test: these are the Augmented Dickey Fuller (ADF) and Phillips Perron tests, the results of which are summarized in the following Table 1.

The results of the stationary tests of ADF and Phillip Perron show that only the variables growth of the fishing sector and accessibility to credit are stationary at level for the two tests. The education variable is stationary at level only for the ADF test. On the other hand, the quality standard and governance index variables are integrated as the first difference for the stationarity tests of ADF and Phillip Perron, while the education variable is integrated as the first difference with regard to the Phillip Perron stationarity test. Since all these variables are integrated in different orders, we will move on to the cointegration test.

The results of the Bound test cointegration summarized in the Table 2 showed that the value of the calculated Fisher statistic, 7.801, is greater than the critical values of the same test in

Table 1. Summary of the results of the stationarity tests of ADF and Phillip Perron

Variables	Tests	At level		At the first difference	
		Z(t)	p-value	Z(t)	p-value
Gr_fish	ADF	-5.385***	0.0000	/	/
	PP	-3.511**	0.0077	/	/
Cred_acces	ADF	-4.379***	0.0003	/	/
	PP	-3.369*	0.0121	/	/
Educ	ADF	-2.691*	0.0755	/	/
	PP	-2.168	0.2180	-3.480**	0.0085
Qua_stand	ADF	-1.162	0.6896	-10.677***	0.0000
	PP	-1.161	0.6902	-10.678***	0.0000
Gov_Ind	ADF	-1.321	0.6196	-4.913***	0.0000
	PP	-1.825	0.3683	-4.983***	0.0000

Source: Author, from Stata 14

, ** and * mean significance at 10, 5 and 1% respectively*

Table 2. Summary of the cointegration test

Fisher statistic calculated at 5%	**7.801**	
Student statistic calculated at 5%	-6.108	
Statistics	Critical values at 5%	
	I(0)	I(1)
Fisher	2.950	4.139
Student	-2.868	-4.001

Source: Author, from Stata14

absolute value. It results, in accordance with the. Decision criteria of this test, the rejection of the null hypothesis of absence of cointegration. This leads us to conclude that there is a long-run relationship between the explanatory variable and the variables explained in this study. This result thus offers the possibility of being able to distinguish between long-run and short-run effects in the presentation of the results of the regression of the model

4.2 Presentation of the Results

The results of our study showed that the variables in our study generally show expected signs. With regard to the coefficient associated with the education variable, we noted that there is no short-run relationship between education and the growth of the fisheries sector, but in the long run, we observe a positive correlation. Indeed, a 10% increase in the proportion of the population with the least access to primary education is accompanied by an increase in the growth of the fisheries sector of about 3.281%. Indeed, an educated fisherman is likely to have the ability to perceive and instruct, and therefore adopt relatively better technology much faster than an uneducated one. These results corroborate those of Reimers and Klasen [20] who showed in their study that education is a determining factor in increasing agricultural productivity. In the short run, we observe that the variable access to credit is not correlated with the growth of the fisheries sector, but in the long run, it presents a negative correlation. Indeed, a 10% increase in the ease of access to credit is accompanied by an increase of about 1.83% in the growth of the production of the fisheries sector in Cameroon. Indeed, accessibility to a source of credit is likely to be decisive in the use of better technology and even in the application of a new fishing standard. Conversely, a lack of funding for fishing activities can prevent these workers from adopting sufficiently improved fishing technology. These results are in line with those of Owusu [21] who shows that access to credit contributes to the improvement of the agricultural sector in Ghana. The results also show us that in the short run, there is no relationship between the governance indicator and the growth of the fisheries sector. However, in the long run, there is a positive relationship. Indeed, this result means that the quality of institutions constitutes a stimulus for the growth of fishery products in Cameroon.

The coefficient associated with the quality standard variable has a short-run negative influence on the growth of fishery products. In fact, a 10% strengthening of quality standards is accompanied by a decrease in the growth of fishery products by around 8.61%. The significance of this effect at 5% means that the quality standard is an important element in the development of fishery products in Cameroon. In addition, we observe that in the long run, quality standards are positively correlated with the growth of fishery products. Indeed, Cameroonian fishery products are not being exported to the international market and therefore consumed locally, this result could be explained by the absence of the costs of compliance with standards. The popularization of quality standards can in this context help to produce more quality fishery goods capable of arousing a particular attraction of these products at both national and international level. This result corroborates with those found by Kareem (2017) who showed that the standards have globally contributed to reducing the marketing of fishery products in the countries of the European Union.

Table 3. Summary of the model for studying the effects of quality standards on the growth of fisheries products

Variables	Long run		Short run	
	Coefficient	**Standard deviation**	**Coefficient**	**Standard deviation**
Gr_fish	/	/	0.7633***	0.066
Acces_credit	0.1828	0.4476	/	/
Qual_stand	-0.8608	5.2190	-3.6952**	1.6810
Educ	0.3281	0.3139	/	/
Gov_Ind	0.4935	0.7554	/	/
_cons			8.0256*	5.9933
ADJ Prod_gr L1			-0.1965***	0.3176

Source: Author, from Stata14

, ** and * mean significance at 10, 5 and 1% respectively*

5. CONCLUSION

The objective of this paper was to assess the impact of quality standards on the growth of the fisheries sector in Cameroon. After having carried out a critical review of the literature, we started with a Cobb-Douglas type function to which we applied the Autoregressive Distributed Lag (ARDL) estimation method. In the light of the results obtained, we note that in the short run, the quality standards are negatively and significantly correlated with the growth of the fisheries sector in Cameroon, but in the long term, we observed a negative correlation. Indeed, a 10% strengthening of quality standards is accompanied by a decrease in the growth of Cameroonian fishery products by around 8.61%. This result allowed us to understand that compliance with quality standards in the fishing sector is complex and therefore expensive. But in the long run, fishermen who manage to comply reap enormous benefits in this sector. In order to make this sector efficient and attractive in the long run, we recommend that the public authorities implement a national strategy based on effective and relevant human and financial resources, aimed at supporting fishermen on the one hand, and on the other hand, to improve the quality of institutions.

DISCLAIMER

The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the author.

COMPETING INTERESTS

Author has declared that no competing interests exist.

REFERENCES

1. Ahmad K, Heng ACT. Determinants of agriculture productivity growth in Pakistan. International Research Journal of Finance and Economics. 2012 ;95 :163-173.
2. Anders SM, Caswell JA. Standards as barriers versus standards as catalysts: Assessing the impact of HACCP implementation on US seafood imports. American Journal of Agricultural Economics. 2009;91(2):310-321.
3. Cadot O, Gourdon J, Van Tongeren F. Évaluer les effets des mesures non tarifaires sur les prix et les volumes d'échanges, Revue d'economie du developpement. 2019;27(1) :11-43.
4. Chen C, Yang J, Findlay C. Measuring the effect of food safety standards on China's agricultural exports. Review of World Economics. 2008;144(1):83-106.
5. Denton FT. Adjustment of monthly or quarterly series to annual totals: An approach based on quadratic minimization. Journal of the American Statistical Association. 1971;66(333):99-102.
6. Dey MM, Rab MA, Jahan KM, Nisapa A, Kumar A, Ahmed M. Food safety standards and regulatory measures: implications for selected fish exporting Asian countries. Aquaculture Economics & Management. 2005;9(1-2):217-236.
7. Dickey DA, Fuller WA. Distribution of the estimators for autoregressive time series with a unit root. Journal of the American Statistical Association. 1979;74(366):427-431.
8. Disdier AC, Fontagné L, Mimouni M. The impact of regulations on agricultural trade: Evidence from the SPS and TBT agreements. American Journal of Agricultural Economics. 2008;90(2):336-350.
9. FAO. The State of World Fisheries and Aquaculture: Contributing to Food Security and Nutrition For All. Rome; 2016
10. Ferro E, Otsuki T, Wilson JS. The effect of product standards on agricultural exports. Food Policy. 2015;50:68-79.
11. Fontagné L, Orefice G, Piermartini R, Rocha N. Product standards and margins of trade: Firm-level evidence. Journal of International Economics. 2015;97(1):29-44.
12. Henson S, Loader R, Swinbank A, Bredhal M, Lux N. Impact of Sanitary and Phytosanitary Measures on Developing Countries, Center for Food Economics Research, The University of Reading, Reading, 2000; UK.
13. Institut National de la Statistique. Annuaire Statistique du Cameroun, Edition; 2019.
14. Ishaq M, Ping Q, Haq Z, Li C, Tong C. Maximum residue limits and agrifood exports of China: choosing the best

estimation technique. Agricultural Economics. 2016;62(2):78-92.
15. Kareem OI. European Union's Product Standards and Africa's Food Exports: Implications for the Comprehensive Africa Agricultural Development Programme, 2016.
16. Mutume G. De nouveaux obstacles au commerce de l'Afrique. Afrique Renouveau. 2006;19(4):18-19.
17. Otsuki T, Wilson JS, Sewadeh M. Saving two in a billion: Quantifying the trade effect of European food safety standards on African exports, Food Policy. 2001;26(5): 495-514.
18. Owusu S. Effect of access to credit on agricultural productivity: Evidence from Cassava farmers in the afigya-kwabre district of ghana. International Journal of Innovative Research in Social Sciences & Strategic Management Techniques. 2017 ;4(2):55-67.
19. Phillips PC, Perron P. Testing for a unit root in time series regression. Biometrika. 1988;75(2) :335-346.
20. Reimers M, Klasen S. Revisiting the role of education for agricultural productivity. American Journal of Agricultural Economics. 2013;95(1) :131-152.
21. Wilson JS, Otsuki T. Food safety and trade: Winners and losers in a non-harmonized world », Journal of Economic Integration. 2003;266-287.

APPENDIX 1

Table 4. Descriptive statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Gr_fish	116	5.248990	5.515606	-9.47785	21.09046
Credit_acces	116	11.22614	4.528566	5.938795	26.41866
Qual_stand	116	.5775862	.4960866	0	1
Educ	116	87.90649	5.32948	74.67914	98.87776
Gi	116	17.11079	2.414631	12.80402	20.94309

Source: author

Table 5. Matrix correlation

	Gr_fish	Credit_acces	Qual_stand	Educ	GI
Gr_fish	1.0000				
Credit_acces	-0.1941	1.0000			
Qual_stand	0.0039	0.1421	1.0000		
Educ	-0.2083	-0.8012	0.4414	1.0000	
GI	0.1182	-0.2531	-0.7288	-0.5655	1.0000

Source: author

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