"Do not fear to be eccentric in opinion, for every opinion now accepted was once eccentric."

Bertrand Russell

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Editorial Foreword

Dear Readers,

In times of pandemic, when nothing is the same, we are still running, and we inviting you to forget your daily-life worries and to maintain your brain sharp and up-to-date reading interesting articles in our ***Review of Applied Socio-Economic Research, Volume 21, Issue 1/2021.***

This issue gathers the research results of authors coming from European Union, Central Asia, Middle East, Africa, and Russia which will challenge you, as readers, to look from a different perspective on topics such as foreign trade agreements, industrial opportunities, youth unemployment and economic consequences of happiness at the societal level,

Moreover, you will discover new perspectives on inequality, polarization, and poverty in developing countries, and you are invited to acknowledge the difficulties that SMEs are facing.

The subjects' diversity, included in the current issue, will drive your curiosity to explore horizons and will boost your confidence in developing new research interests having these articles as a starting point.

We express our gratitude to all authors who dedicated time and efforts to continue their work, despite the lockdown and constant fear, and to pursue their goals as responsible researchers. Also, we would like to thank all our reviewers for their dedicated commitment to guiding and supporting authors to publish valuable research papers.

Finally, we encourage the REASER community of researchers to discuss with eachother, to cooperate for establishing new partnerships, to accept the challenge to become peer-reviewers, and, constantly, to cite the published papers that they consider valuable to be known worldwide.

Only by working together, we will prosper and succeed to enhance our publication's visibility worldwide!

Enjoy your reading!

Dr. Manuela Epure
Deputy Editor-in-chief

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The Effects of the Economic Partnership Agreements on the ACR Countries' Foreign Trade

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Abstract *The aim of this paper is to measure the impact of the 2008 Economic Partnership Agreements between the European Union and the countries of Africa, the Caribbean and the Pacific on the bilateral creation of trade. To achieve this goal, the gravity model seems to be the most suitable. It has been associated with this model the econometric tool that is the panel data estimation technique. The databases used are from secondary sources and come from the United Nations Conference on Trade and Development (UNCTAD) and the Center for Prospective Studies and International Information (CEPII). The analysis period is from 2000 to 2016. The results show that the Economic Partnership Agreement has a positive and significant effect on trade between the two economic blocks even after controlling the variable of interest by other variables*.

Keywords: Economic Partnership, Agreements, Countries' Foreign Trade

JEL Classification: F13, F 15

1. Introduction

Free trade agreements play a very important role in the development of international trade (Smith, 1776; Ricardo, 1817). In effect, any country needs to exchange with the rest of the world given their factorial and material differential. However, this exchange is often confronted with barriers erected between states within the context of protectionism, which limits the volume of exchanges between economies. On the contrary, the intensification of commercial fluxes comes with an economic integration between regions

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and states., an integration that supposes the abolition of some customs due to products and services exchanged. The point in this economic literature is to reveal the concept of free movement of goods and services, people, etc. From this perspective, the trade gets its justification from the need for exchanging and moves beyond this need by providing the major actors with mutually advantageous money saving.

The Economic partnership agreements signed between the countries of Africa, the Caribbean and the Pacific (ACP), and the European Union (EU) are numerous and of various sorts. The aim of this paper is not to do a review of literature on those agreements but, rather, its ambitions to assess the impact of the last agreements—the 2008 economic partnership—signed by the countries of ACP and EU on the bilateral creation of trade between the two blocks of the region. The continuation of this work is structured as follows: Section 2 will focus upon the debate concerning the foundations of the creation of international trade. Section 3 will describe the functioning model, define the variables used in the empirical analysis and announce the sources of data. The results of estimations are reported in section 4. The last section is a conclusion to this paper.

2. Review of literature

The economic partnership agreement in force since 2008 marks a new era in the commercial relationships between the European Union and the countries of Africa, the Caribbean, and the Pacific. Those agreements which enable the reinforcement of regional integration through the creation of a free trade zone present a real interest, from theoretical as well as empirical perspectives (Trotignon, 2007).

From a theoretical viewpoint, the review of literature on the Economic Partnership Agreements shows two opposed main points of view. The first one supports the Economic Partnership Agreements and is based on the hypotheses of growth. The second viewpoint maintains that the EPA has no positive effects on African countries' foreign trade. This last viewpoint rests on the theory of the world system and that of dependence.

As for the optimistic viewpoint, its analysis rests on the different hypotheses of growth (Ahlfeld et al., 2005) to justify the EPA. The first among the hypotheses one can consider is the one that holds that the EPA favors a trade opening which has a positive incidence on economic growth. In effect, the trade opening is important for economic growth in that it helps develop the home competition, attract investments, facilitate technologies diffusion, and favor the learning process and economies of scale as well.

Two other hypotheses are equally to be mentioned to justify the EPAs. It is about institutions and regional integration which will be reinforced thanks to the EPA while impacting positively the economic growth. In effect, an open trade system has a positive incidence on the institutional development of the ACP countries, henceforth the quality improvement of institutions is considered a precondition for benefiting

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from the EPA (Borrmann and Busse, 2006). The EPAs mean a reform policy ensuring the putting in place of best regulation in the fields of trade, investments, which will contribute to the quality improvement of institutions.

The EPAs reinforce regional integration and consequently the economic growth in the ACP countries. The regional integration enables a fall in the costs of transactions and improves the attractivity of their markets thanks to the economies of scale they generate, for example, or to the participation in large infrastructures projects. The consolidation of the regional integration in the ACP countries should favor the EPAs with European Union and promote intra- and extra- regional trade.

As for the second viewpoint, the theory of the world system stipulates that countries from the south cannot be transformed because of the unbalanced relationships at the level of the exchanges (Wallerstein, 1975). International trade induced by the division of labor gives rise to an international structure of nation-states, with unbalanced relationships, which ensures an accelerated accumulation process in the countries from the center. Those unbalanced economic relationships reinforce the backwardness cycle in peripheral countries. This argument highlights the reason why African economies are equally capitalist because the world system is capitalist. The economic and political concerns of the countries from the south are perceived as resulting from structural contradictions of the capitalist economy.

Following the same logic, the theory of dependence suggests that the socio-economic foundations of society are indispensable in the understanding of its process of development. The argument maintained here is that most of the participation of the societies in the Third-World in the worldwide economy is manifested in the disintegration of their economies by increasing the gap between the rich and the poor within the international system because of structural differences. Through international trade, foreign direct investments, external debt, and aid, the industrialized societies get in contact with the Third-World societies. This collaboration will lead, not only to an economic dependence vis-à-vis industrialized countries but also to a transfer of resources (both human and material). The consequence of this is the appearance of distortions in the process of development (Akpotor, 2000; Odion, Agbebaku and Kadiri, 2013).

From an empirical perspective, though a great deal of works about the effects of creation and traffic perversion date back to Aitken (1973), it is only during the 2000s decade that interest is manifested within the context of EPAs. Two approaches are commonly used to quantify the effects of EPAs on trade fluxes, notably the gravity model and the General and Partial Calculable balance models. Wilson et al. (2003; 2005) resorted to the first approach and to the Ordinary Lesser Double Square (OLDS) estimator to assess the effects of four trade facilitation indicators. They consider that in all regressions, the four indicators are significant. Soloaga et al., too, resorted to the gravity model and the same type of data as Wilson et al. to assess the effects of the EPAs. Rather than using the OLDS, those authors employ a negative binomial regression. To the four variables, they added four customs efficiency indicators**.** The results prove a positive and significant effect of customs efficiency for the exporting countries. Conversely, this effect is importantly negative for the importing countries.

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Resorting to the gravity model, Djankov et al. hold that a one-day deadline extension in an exporting country reduces by 1% the volume of exportations. From Heckman's selection process, Nordas et al. (2006) sought to discover through which mechanisms, deadlines, in terms of time-limit, affect trade fluxes and trade occurrence probability between two economies as well. Analyzing exportations from 192 countries to Australia, Japan, and the United Kingdom, the authors discover that the time required for exportations in most cases impacts negatively the probability of exporting and the volume to be exported. Person (2008) discovers through the gravity model that a one-day deadline reduction in an exporting country raises exportations by 1% while the same reduction in an importing country raises importations by 0.5%.

OECD (2003), Francois et al. (2005), Devereux and Fontagné (2006), Hertel and Keeney and Denis (2006) alongside, who resorted to the General Calculable Balance (GCB) model discover importantly significant effects of trade facilities on trade flux. Moreover, beneficial effects are important for developing countries. From the Partially Calculable Balance Model, Fontagné, Labode, and Mitaritonna (2008) conclude a trade increase of 10% because of the EPAs while Lwafyo Thindwa (2010) succeeds in showing an importantly significant effect in trade creation in the case of Malawi.

The reviewing of theoretical and empirical literature suggests a few comments. There is a lack of uniformity of viewpoints, from theoretical as well as empirical perspectives, since some focus on possible positive effects inherent in the implementation of EPAs, while others get the means to establish an unbalanced relationship or a dependent relationship between countries in the north and those in the south. The different empirical analyses cannot allow settling the theoretical debate insofar as EPAs are not linear. They depend on several factors among which the poorly varied nature (or not) of the economic basis, the Direct Foreign Investments' attractivity, the governance quality, etc. Henceforth, the central question is to find out if the EPAs contribute to the creation of trade.

This issue is important to be examined among the ACP signatory countries that mostly have poorly varied economies and are very dependent on primary resources. Furthermore, those countries have difficulties in reforming their institutions and have a governance quality that ranks them among the lowest ones (cf Kaufman et al., 2012).

3. Foreign trade methodology

Prior to the presentation of data analysis, we present a sample of the method chosen for estimation.

3.1. International trade creation modeling

Despite the poor quality of the theoretical foundations which marred the gravity model during the 1970s, this model has been largely used, above all, to quantify the effects of trade agreements like in the case we are here interested in, in the determination of the effects of trade creation and traffic diversion. However,

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authors such as Anderson (1979), Bergstrand (195; 1989), Helpmam and Krugman (1985) and Deardoff (1998) supplied sound theoretical foundations in order to give the model a large range.

This present endeavour is based on works by Anderson and Van Wincoop (2003) who diverted a gravity equation under some hypotheses and introduced to the model a variable associated with the terms of multilateral resistance. It is newly introduced in the EPAs variable model to see the effects of the ACP-EU bilateral trade. The formalization of this relationship is presented as follows:

$$Importation_{ij}\ \ a_o + \ a_1 APE + e^{\pi X + \varepsilon ij}\ (1)$$

This equation can be rewritten as follows;

$$M_{ij} = e^{\alpha_0}((APE)^{\alpha_1} e^{\pi X} e^{\varepsilon_{ij}} (2)$$

Where Mij stands for importations (exportations respectively) of the country i (in this case, the ACP countries) from the country j (EU countries);

EPA, for the interest variable which takes the value 1 in case the country has signed the agreement and zero if not:

X, for the overall of variables, generally used in the literature of the gravity model

α_0, α_1 and π, for respectively, the constant, the interest variable parameter and the matrix of the control variables parameters;

ε_{ij}, for errors terms, that is, the other variables that can explain the creation of bilateral trade and that are not taken into consideration in the model.

The logarithmic form of this equation enables the interpretation of the coefficients of each explanatory variable in terms of elasticity;

$$\log(Mij) = \alpha_0 + \alpha_1 APE + \pi \log(X) + \varepsilon_{ij}$$

The effects of expected agreements vary depending on whether the country in question is from the European Union or Africa. Anderson and Van Wincoop (2003), in their search to control the importance of multilateral resistance, introduced specific effects to the importing countries and the exporting ones as well. However, available data on the costs of transportation, specific to each country and varying differently, according to partners, is not relevant to include, in the context of this paper, specific effects for each country. In addition, there is a cause for considering specific effects for each region. In order to enable us to estimate the specific effects caused by transaction costs in each EPA group and in UE, an extension of the model is done by variables interactions. In this order, the variables which capture the transaction costs both at exportation and importation are multiplied by silent specific variables of exporters and importers.

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3.2. Data and variables

This paper is based on the premise that the signature of the 2008 economic partnership agreement by some ACP countries affects positively the flux of International trade of these very countries. Put differently, the Economic Partnership Agreement defined as the abolition of customs due to some categories of products is positively correlated with the development of international trade between ACP-EU countries. The United Nations Conference on Trade and Development (UNCTAD) supplies a database that gives information about the fluxes of International trade, that is, importations and exportations of the countries of Africa, the Caribbean and the Pacific (ACP). Data relating to the EPAs signature by some ACP countries are collected thanks to the different reports consecrated to the EPAs. The Centre for the Prospective Studies and International Information (CPSII) supplies data relating to the surface area of the APC countries, the distance between capital cities of these countries and finally, their respective populations. The sample consists of 42 ACP countries that signed the EPAs at different moments. The main reason presiding over the choice of these 42 countries is that most countries signed them before 2016. For instance, the fifteen (15) countries from the Caribbean signed the full agreement in 2009, the two (2) from the Pacific, in 2014. The countries from Africa, although consisting of several blocks, only a few among them were part of the signatories. Most of the Western African countries, except Nigeria, the Gambia, and Mauritania signed the Agreement in 2014. In Central Africa, only Cameroon signed the agreement in 2014. Such Eastern and Southern countries as Madagascar, Mauritius, Seychelles and Zimbabwe signed the temporary agreement in 2007, the full agreement being signed later but its application was made possible only in 2012. The other countries are not included in the model either because the agreement was signed later on and that their taking into consideration within the model could not give more information, or they are not considered for the simple fact that those countries did not sign the EU-ACP economic partnership agreement. The study period is from 2000 to 2016. The choice of this period can be justified by the simple need of symmetrizing the date of the first signatories of the EPAs which took place in 2008.

The variables used to consist of endogen and exogenous variables. The endogen variables are the international trade fluxes between ACP-EU countries, that is, the exportations of the ACP countries and thus, the importations of EU countries, the importations from ACP countries being considered as the exportations of the EU countries. The exogenous variables consist of the interest variable, that is, an indicator of the EPA and control variables. The control variable is the area surface of each country taken into consideration, the distance between capital cities and the populations of those countries. They enable us to control the effect of the EPA-interest variable.

4. Empirical analysis of results

The results are presented following two steps. The preliminary results are based on statistical tests in order to detect possible biases which can be prejudicial to the analysis (4.1), and, subsequently, the

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examination of the relation of cause and effect as well as the firmness tests of this relation are reported in table 4.2.

4.1. Reliability of analysis tests

In tables (2) and (3) below, different tests allow us to specify the model and detect possible problems likely to bias the analysis.

The Breush-Pagan's test realized in table (2) shows that the required econometric estimation technique is the model with unpredictable effect. However, the implementation of other tests (heterosedasticity, autocorrelation, coefficients stability tests), it revealed that the model comprises an autocorrelation and heterosedasticity bias (statistics in the second, third, fourth and fifth columns of table (2), respectively). Such problems, when they are not solved, can dissimulate the reliability of sought effect.

Table 2: Specification, stability, heterosedasticity and autocorrelation test

Variables	Breusch-Pagan's heterosedaticity test	Wooldrig's Errors correlation test	Baltagi-Wu and Durbin Watson's errors correlation		Show's test for coefficient stability
			Durbin Watson	Baltagi-Wu LBI	
LExport(sqrt(var)) E(sqrt(var))	3320.99 (0.0000) 1.706243 0.2717617 0.6906456	72.208 (0.0000)	0.50028179[(a)]	0.7833766[(a)]	

(a) These two statistics are to be compared with their tabulated value

(Source: Author, from UNCTAD databases and CPSII and STRATA 13 software)

Other tests of unit root realized in table (3) indicate that the data analyzed are not statuary and are subjected to a fallacious regression. Tests upon the variable population (p-value corresponding to the population is 0.3734 for the increased Dickey-Fuller test and Phillips-Peron test, respectively) show that the variable is not stationary in terms of level but on these delayed values.

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Table 3: Unit root test on the panel databases

Variables		test de Im, Pesaran et Shin (IPS)	test de ADF-Fisher Chi-Square	test de PP–Fisher Chi-Square
LnExportation	Niveau		117.4535	117.4535
			(0.0094)	(0.0094)
	Valeurs retardées	-4.2895	121.5821	121.5821
		(0.0000)	(0.0046)	(0.0046)
LnImportation			136.5082	136.5082
			(0.0003)	(0.0003)
	Valeurs retardées	-5.0546	136.1271	136.1271
		(0.0000)	(0.0003)	(0.0003)
LnPopulation	Niveau		87.5681	87.5681
			(0.3734)	(0.3734)
	Valeurs retardées	-7.7520	131.7021	131.7021
		(0.0006)	(0.0007)	(0.0007)

Source : Author, from UNCTAD databases and CPSII and STRATA 13 software.

The Im, Pesaran and Shin (IPS) test confirms this non-stationarity in terms of level and concludes that the General Lesser Square Estimator applied to the delayed values is reliable and enables us to get parameters that are free from all bias.

4.2. Results Interpretation

Column (1) of table (3) exposes a regression of the EPA and the fluxes of exportations of ACP countries. It sets up a positive and significant relationship between the EPAs and the exportations, which means that the signature by some APC countries has a significant and positive effect on the exportation of these signatory countries *ceteris paribus*.

Table 3: Relation between ACP countries' exportations, the Economic Partnership agreement and some control variables

Variables	**(1)**	**(2)**	**(3)**	**(4)**
APE	0.4949549 *** (0.0633537)	0.4978719 *** (0.0625873)	0.5002487 *** (0.0625153)	0.1882121 ** (0.0828395)
LnDistance		0.1602598*** (0.0555871)	0.1315386** (0.0628068)	0.2354942** (0.1194247)
LnSurface area			0.4058635*** (0.0680571)	-1.399389*** (0.3828048)
LnPopulation				2.745401*** (0.4844825)
Constant	13.13608***	11.95025***	8.037688***	5.120986 ***

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	(0 .2778489)	(0.5534566)	(0.8157982)	(1.165719)
Observation	558	558	558	558
R^2-ajusted				
Within	0.1885	0.1901	0.1901	0.6228
Between	0.0407	0.0006	0.4358	0.3058
Overall	0.0035	0.0117	0.4108	0.3033

Note: The figures between brackets show the classical corrected gaps of the heterosedasticity, errors autocorrelation and the unit root as well. ***significant by 1% ; **significant by 5%.

(Source: Author, from UNCTAD data and CPSII and Stata 13 software)

Column (1) of table (4) exposes the regression of this very economic agreement and the flux of the ACP countries' importations. It establishes that the signing of the EPA has a positive and significant effect on exportations in the ACP countries. The signing of the EPA by some CP countries has a significant and positive effect on the exportation of these signatory countries *ceteris paribus.*

Table 4: Relationship between ACP countries' importations, Economic Partnership Agreement and some control variables

Variables	(1)	(2)	(3)	(4)
APE	0.5259187 ***	0.5249025***	0.5272842 ***	0.2548471***
	(0.050079)	(0 .046422)	(0.050155)	(0.0747485)
LnDistance		-0.059249	-0.0660773	0.0344613
		(0.063857)	(0.062029)	(0.1579295)
LnSuface area			0.2153747 ***	-1.367381***
			(0.0493515)	(0.3213361)
LnPopulation				2.406662***
				(0.4013177)
Constant	13.94319 ***	14.38158***	12.2428***	9.618543***
	(0.1858753)	(0.5139978)	(0.5828629)	(1.211051)
Observation	558	558	558	558
R^2-ajusted				
Within	0.2405	0.2413	0.2413	0.6890
Between	0.0113	0.0120	0.2500	0.3322
Overall	0.0229	0.0193	0.2458	0.3227

Note: The figures between brackets show the classical corrected gaps of the heterosedasticity, errors autocorrelation and the unit root as well. ***significant by1%.

*(Source : Author, à partir des données UNCTAD and CPSII and Stata 13 software***)**

From an analytical perspective, the signature of the EPAs leads to the abolition of customs due on some goods and favours the creation of international trade. This hypothesis proves sound by the fact that the EPAs have a positive and significant effect both on exportations and importations. When we successively consider such control variables as the distance between capital cities (column (3)), the surface area of those countries (column (4)) and their respective populations (column (5)), we get to discover that the Economic partnership agreement remains. This confirms, thus, that our hypothesis according to which the signature of the EPAs between the countries of Africa, the Caribbean and the Pacific (ACP) and the European Union has a positive and significant effect on the creation of trade in the ACP and EU areas.

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In effect, the abolition of some customs due to some goods and services at importation and exportation between ACP countries and EU spurs the movements of exchanges between these blocks of the region.

5. Conclusion

This article uses the gravity model in association with the econometric tool that is the panel data estimation technique in order to determine the influence of the 2008 economic partnership agreement on the creation of bilateral trade. It is based on the premise according to which the bilateral liberalization of markets on some goods and services between ACP countries and the European Union supports the creation of trade between the two blocks. From a practical perspective, it is manifested in the fact that the economic partnership agreement permits the signatory countries to abolish customs due to some goods and services subjected to exchange. The results show that the signature of the 2008 EPAs stimulates the development of bilateral trade. This signature influences importations from ACP countries up to 0.5259187 and exportations up to 0.4949549.

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Industrial Opportunities of the Energy Transition (Specifics and the importance of investing in renewable energy)

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Abstract. *The health crisis that has hit the planet over the course of several months will cause serious shocks. The global economy has been also suffering and it will take time for all socio-economic indicators to return to a positive trajectory. However, this particularly difficult situation presents us with a collectively unprecedented opportunity: to anchor economic, political and energy choices in the energy transition and make them an important lever to restart the economy.*
The research aimed at the preferences for renewable energies provides the ground for this paper. The main question that this paper seeks to answer is whether renewable energy is an engine of economic growth and an industrial opportunity that Russia can look at to become the world leader.
In the coming months and years, renewable energies will make it possible to provide concrete responses to the three objectives which should guide the recovery plan: fostering the creation of jobs and added value in the world; decarbonizing the economy (particularly in the industrial, building and mobility sectors), the only guarantee of generating sustainable jobs and activities; and developing the industrial sector of renewable energies

Keywords: Production of renewable energy, Economic growth, Labor market

JEL Codes : O13, Q40 , Q43, Q47

1. Introduction

The paper is based on the research devoted to industrial opportunities offered by the energy transition, such as renewable energies in Russia. It deals with the topical issues related to the problems of restructuring industrial production in Russia given the COVID-19 health crisis the world is going through, but also the economic sanctions imposed on Russia.

The article describes how renewable energy sources have become an engine of global energy development and an opportunity for reindustrialization, and a lever for competitiveness.

Investing in renewable energies means investing in a sustainable and profitable future, as the incredible growth of renewable energies has shown over the past decade [1].

In the months and years to come, renewable energies will provide concrete responses to three objectives that should guide the recovery plan:

- Fostering job creation and added value in our regions;
- The decarbonization of our economy (in industry, construction, and mobility), which is the only guarantee of job creation and sustainable activities;
- The development of the industrial renewable energy sector in Russia.

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According to the latest data (International Energy Agency), in the first half of 2020, renewable energy production in Europe has, for the first time, exceeded the production of traditional thermal power plants, and thus increased up to 40%. In some countries, green generation already provides up to 90% of all electricity production[3].

The development of renewable energy technologies has economic benefits.

Renewable energies have the potential to reduce the dependence on imported fuels and solve energy access problems for over 1.4 billion people around the world who remain “energy poor”. The renewable energy industry can also help to create jobs and encouraging the creation of small industries in rural areas. [2,3]

This article aims to help to prove the relative importance of renewable energy on economic growth by analysing separate panels for developed and underdeveloped countries. The main research question that this paper seeks to answer is whether renewable energy is an engine of economic growth and an industrial opportunity that Russia can look at to become the world leader.

This research question is broken down into the 3 sub-questions below:

(1) Does the renewable energy industry have an impact on economic growth?

(2) Does the renewable energy industry increase the participation in labor market?

(3) Is the cost of production advantage for investing in renewable energy?

To answer these questions, we are going to study the impact (the results) of this alternative energy on countries that have already a technological advance, and which have already switched to this mode of production.

2. Literature Review: Renewable Energy Development and Economic Growth

Over the past decades, the economy of emerging and developing countries has experienced significant growth rates which have been reflected in very sharp increases in energy production and consumption.

The “great leap forward” of the energy sector mobilized considerable investments, but also massive fossil resources as well as natural resources in biomass, land, and water.

Based on panel estimation techniques of 38 main renewable energy-producing countries in the period 1990-2012, Bhattacharya et al. [4] found that renewable energy consumption had a "significant positive impact" on long-term economic growth in 57% of the selected countries. This confirms the growth hypothesis and implies that the consumption of renewable energy is an engine of economic growth. This is in accordance with Ito's results. [5]

The growth hypothesis was also supported by Bilgili and Ozturk for a panel of G7 countries in the period 1980–2009. [6]

Today, the index of average energy consumption is one of the most reliable variables to assess the quality of life of a population and is strongly correlated with a number of other economic and social indicators. The correlations between energy and development prompted the International Energy Agency to propose an analysis of countries using an energy development index to complement the analysis with the United Nations Human Development Index (IEA 2010).

In the German context, the energy transition is seen as a radical turning point. Thus, Deshaies points out: “In the eyes of the promoters of the energy transition, it is not only a question of achieving a change in the energy system but also a profound transformation of the economy and of society, comparable to that brought

[3] URL: https://www.iea.org/reports/world-energy-investment-2020/power-sector

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about by the industrial revolution. From this perspective, the objective of the energy transition is to replace the centralized production structures controlled by large capitalistic companies with a highly decentralized system of small production structures which, ideally, would belong to the citizens who can thus ensure their energy autonomy". [7]

Recent news, particularly with national declarations at COP21, have shown that emerging countries recognize that they will not be able to escape a transition of their energy systems, whether because of the impact of global warming, caused mainly by the production of energy (electricity, heating) and fuel for transport (mainly cars), or the (relative) scarcity of fossil resources. [8]

A recent study revealed that the albedo of transparent ice and inhomogeneous snow has changed from 30% to 98% and that the formation of internal radiant superheat has been discussed.

One of the major current challenges is to make such a transition coincide with the objectives of sustainable development for countries undergoing profound changes. The economic, environmental, and social dimensions require a balance or a compromise in the process of energy development. Thus, the forms of energy transition can turn out to be quite different from one continent and from one country to another.

3. Renewable Energy Sources in the World

Renewable energy is a cost-effective source of new energy that protects electricity markets and consumers from volatility strengthen economic stability and spur sustainable growth [9]

Renewable energies have continued to dominate the global power generation mix over the past year. Installed renewable energy capacity reached 2.537 gigawatts (GW) worldwide at the end of 2019, up 176 GW from the previous year[4].

The 2020 Renewable Capacity Statistics Annual Report shows that renewables grew by 7.6% last year, and this growth was dominated by Asia, which accounted for 54% of totally new installations. [5]

Although the growth in renewables has been slower in the past year, their total growth was 2.6 times that of fossil fuels.[6]

Thus, the dominance of renewables in capacity expansion continues, which once again confirms the trend that began in 2012. In 2019, the share of solar and wind energy in the total capacity of renewable sources was 90%.[7]

Renewables account for at least 70% of new installations in virtually all regions in 2019, except for Africa and the Middle East, where their respective shares are 52% and 26% of net capacity growth. These additions increased the share of renewables in the global energy potential to 34.7%, up from 33.3% at the end of 2018.[8]

In 2019, solar energy increased by 98 GW, of which 60% came from Asia. Wind power generated an additional 60 GW. The growth leaders were China (26 GW) and the USA (9 GW).[9]

Today, these two technologies produce 623 GW and 586 GW respectively or almost half of the world's renewable capacity. Hydropower, bioenergy, geothermal and marine energy have shown moderate growth from last year, with 12 GW, 6 GW, 700 MW and 500 MW, respectively.[10]

[4] Press release: The International Renewable Energy Agency (Abu Dhabi, United Arab Emirates, April 6, 2020)
[5] URL: https://bioenergyinternational.com.
[6] URL: https://bioenergyinternational.com.
[7] URL: https://www.irena.org/newsroom/pressreleases/2020
[8] Renewable capacity highlights 31 March 2020
[9] Renewable capacity highlights 31 March 2020

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Table 1 shows how the production of renewable energy has increased between 2015-2019 in the world, which explains that governments' production of renewable energy has an impact on economic growth.

Table 1: The production of renewable energy in the world and by region (2015-2019)

CAP (MW)	2015	2016	2017	2018	2019
Word	1 846 060	2 008 547	2 182 449	2 361 061	2 536 853
Asia	716 899	808 844	915 052	1 023 514	1 118 969
Europe	465 097	488 661	513 087	537 993	573 266
N America	307 701	331 179	348 558	368 956	391 241
S America	177 663	192 215	202 682	212 693	221 130
Eurasia	88 140	91 220	98 764	102 748	105 800
Africa	35 288	37 950	42 724	46 462	48 443
Oceania	26 435	27 305	28 526	33 563	39 723
Middle East	16 919	17 757	18 891	20 177	22 710
C America + Carib	11 918	13 417	14 165	14 955	15 572

Source: International Renewable Energy Agency [11]

The global energy transformation makes economic sense. The additional costs resulting from the long-term global energy transition are estimated to be $ 1.7 trillion (US) per year in 2050. However, the savings from reducing air pollution, improving health, and reducing damage to the environment would more than compensate for these costs. The remap[12] scenario estimates that the amount of savings in these three areas alone could already amount to an average of $ 6 trillion per year until 2050.[13]

Globally, GDP grows by 2050 in both the baseline and transition scenarios. The energy transition stimulates not the only economic activity but also growth as desired in a status quo approach. The cumulative gains from rising GDP between 2018 and 2050 would amount to $ 52 trillion[14]

Graph 1 below shows the impact of the energy transformation on GDP, indeed the impact on GDP compared to current plans has increased by 9% to reach near neutrality. Most regions/countries show a positive impact on GDP, largely due to increased investment and trade gains, energy transformation will increase GDP in most regions and countries above expected level current plans, which leads to answering first that the production of renewable energies has an impact on economic growth.

In addition, the energy transition would make the socioeconomic effects of the energy system at the global level much more positive than a status quo situation, by allowing the improvement of well-being, the increase of GDP, and growth of employment.

[10] URL: https://www.irena.org/newsroom/pressreleases/2019/Apr/Renewable-Energy-Now-Accounts-for-a-Third-of-Global-Power-Capacity
[11] Renewable capacity statistics 2020
[12] IRENA's REmap programme determines the potential for countries, regions, and the world to scale up renewables
Note: EU28 = Member states of the European Union;
GDP = gross domestic product;
MENA = Middle East and North Africa;
OPEC = Organization of the Petroleum Exporting Countries.
[13] Global energy transformation (A ROADMAP TO 2050)
[14] Global energy transformation (A ROADMAP TO 2050)

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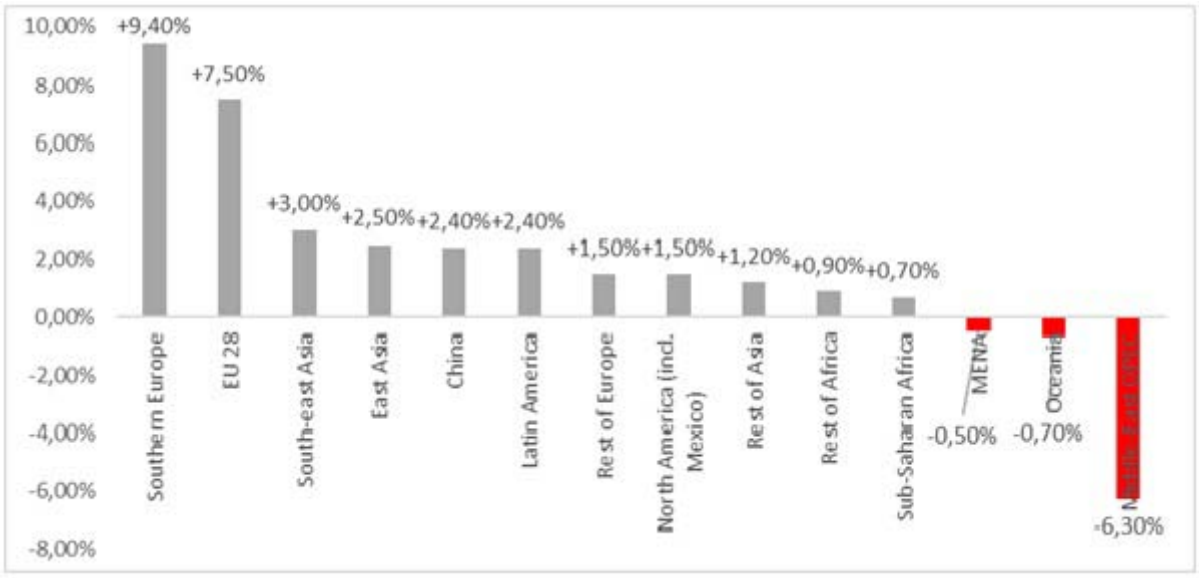

Graph 1: Effect of Current Plans vs. Energy Transformation on GDP in selected regions and countries By 2050 (% difference)

Source: IRENA analysis 2019 (transforming the energy system) [15]

With the global energy transition underway, renewable energies have a strong impact on employment.

The renewable energy sector generated 500,000 new jobs in 2019, bringing the number of professionals worldwide to 11.5 million.[16]

Solar technology maintains its leadership position with 3.8 million jobs, of which 3.1 million are concentrated in Asia. The region has in fact added 55 GW of the 97 GW of new solar power plants built last year. The number of jobs in the solar sector has grown by 4% over the past year. Africa, on the other hand, provided 3.7% of jobs in the solar PV sector in 2019. Around 372,000 jobs in Asia and Africa were created by off-grid solar (Table 2).[17]

The socio-economic benefits of technologies linked to the energy transition would create 5,5 million more jobs by 2023 than would be possible in the less ambitious planned energy scenario, based on the current plans and commitments of nations.

In the longer term, investing in the energy transition would result in 100 million people employed in the energy sector by 2030 under the energy transformation scenario, up to 74% from the 58 million today and 15 million more than in the planned energy scenario.[18]

Renewable energy jobs are expected to increase to nearly 30 million in 2030, up from around 12 million in recent years. Employment in energy efficiency would increase from less than 10 million to 29 million, while the flexibility of energy networks and systems would likely see an increase from 7,4 million to 12

[15] Transforming the energy system IRENA analysis 2019
[16] URL: https://www.irena.org/publications/2020/Sep/Renewable-Energy-and-Jobs-Annual-Review-2020.
[17] URL: https://www.agenceecofin.com/energies-renouvelables
[18] Global landscape of renewable energy finance 2020, *IRENA, 2020*

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million workers, which confirms that renewable energy production increases participation in the labour market. [19]

Table 2: Estimated Direct and Indirect Jobs in Renewable Energy, by Country/Region and Technology, 2017-2018

	World	**China**	**Brazil**	**United States**	**India**	**European Union**
Solar PV	3,605	2,194	15.6	225	115[k]	96
Liquid biofuels	2,063	51	832[g]	311[h]	35	208
Hydropower	2,054	308	203	66.5	347	74
Wind power	1,160	510	34	114	58	314
Solar thermal heating/cooling	801	670	41	12	20.7	24[m]
Solid biomass b, c	787	186	-	79[i]	58	387
Biogas	334	145	-	7	85	67
Geothermal energy	94	2.5	-	35[j]		23
Concentrating solar thermal power (CSP)	34	11	-	5	-	5
Total	**10.983**	**4,078**	**1,125**	**855**	**719**	**1,235[n]**

Source: International Renewable Energy Agency[20]

The last point which is important, and encourages investment in renewable energy is the decrease in the production cost of the latter, the production cost of renewable energies (RE) has continued to decrease since 2010. And the figures speak for themselves: a decrease in 82% of production costs for photovoltaic panels, 47% for thermal solar, 39% for onshore wind and 29% for offshore wind.[21]

Graph 2 below shows us how newly installed renewable energy capacity is costing less and less than cheaper power generation options based on fossil fuels.

A rapid and phenomenal decline can be explained by the fact that renewable energies are not experiencing the scarcity effect (unlike fossil fuels) and that their development depends solely on our technological advances.

The significant reductions in the cost of wind and solar power over the past few years have changed the choice of policymakers. These technologies were always low in carbon and relatively quick to build. Now, in many countries around the world, wind or solar power is the cheapest option for generating electricity [10]

4. Conclusions and Policy Recommendations

Over the past few years, we have seen how energy based on renewable sources confidently pushes the traditional sources. Hundreds of gigawatts of renewable energy are built each year around the world.

For five years in a row, green production has overtaken coal, gas and nuclear in terms of commissioning, and global investments in renewable energy sources exceed $ 300 billion annually.

[19] The socio-economic benefits of the energy transition (GLOBAL LANDSCAPE OF RENEWABLE ENERGY FINANCE 2020), IRENA, 2020
[20] Renewables 2019 global status report
[21] https://www.irena.org/publications/2020/Jun/Renewable-Power-Costs-in-2019

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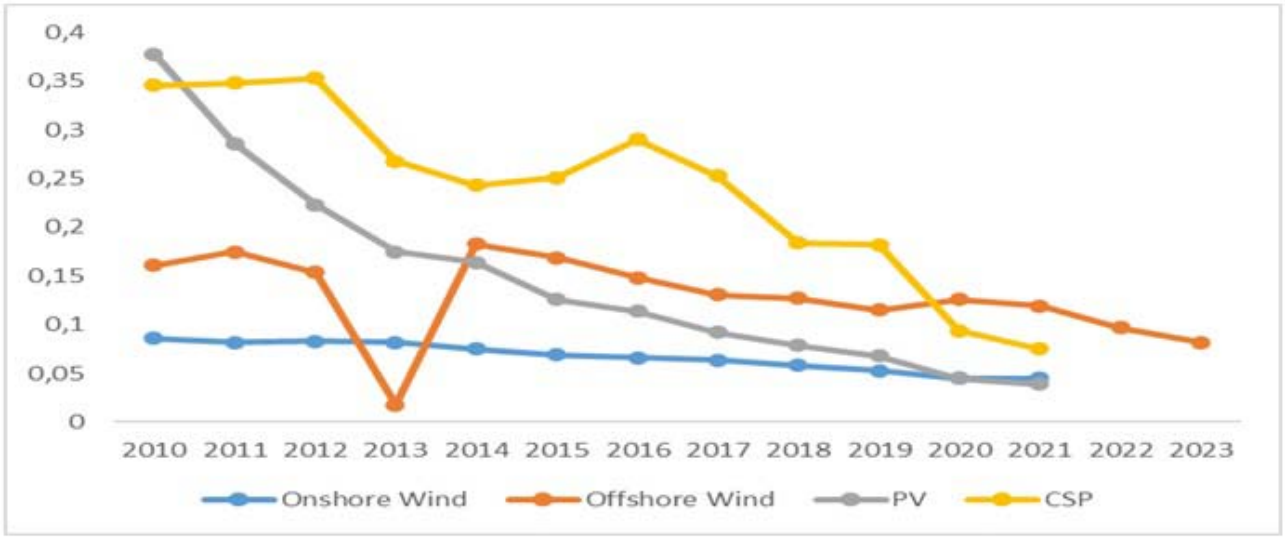

Graph 2: Completion year for committed projects per technology (2010-2023)

Source: IRENA Renewable power generation costs in 2019 [22]

This article contributes to the existing literature on the relationship between renewable energy production and economic growth. We analyzed the relationship between renewable energy production and economic growth, using three key economic indicators: real GDP, the number of jobs created, and the cost of production.

The main findings of this research revealed that there is a statistically significant and positive relationship between renewable energy production and economic growth for developed and developing countries. These results confirm the existence of a growth hypothesis and imply that renewable energies can be an important source of sustainable economic growth in the future.

This study also examined the contribution of renewable energy production to labor market participation. Results varied between developed and developing countries. The production of renewable energy has been found to have a statistically significant impact on the workforce.

These findings have contributed to the literature on the links between renewable energy production and economic growth. This research provides new and rich information on the channels through which renewable energy production influences economic growth. In addition, in this study, we use the production of renewable energy as the main dependent variable, to see its impact on the economy (increase in GDP, job creation, decrease in the cost of production). Although the energy transition is technically feasible and economically advantageous, it will not happen by itself.

There is an urgent need for political action to redirect the global energy system on a more sustainable path. Among the decisions that governments must make, one can mention:

- Security of supply. This involves ensuring a regular (uninterrupted) supply flow of final energy.
- Accessibility and economic efficiency. This includes guaranteed access (physical and economic) to a minimum modern energy service for the entire population. Likewise, this criterion concerns the impact of energy prices on the competitiveness of other economic sectors.

[22] URL/ https://www.irena.org/newsroom/articles/2020/Jun/How-Falling-Costs-Make-Renewables-a-Cost-effective-Investment

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- Cleanliness. This implies minimizing environmental impact at the global (mainly GHG emissions) and local (pollutant emissions, water, or soil contamination, etc.) level.
- Support innovation throughout the system. Just as the development of new technologies has played an active role in the advancement of renewable energies in the past, continuous technological innovations will be needed in the future to ensure the success of the energy transition globally.
- Exploitation of the strong synergies existing between energy efficiency and renewable energies. These two elements should figure among the main priorities in the design of energy policies because their combined effects would make it possible to economically meet the decarbonisation needs linked to energy.

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[9] Francesco La Camera 2020. General Director of IRENA Abu Dhabi, United Arab Emirates, April 6, - Press conference (Access mode: https://www.irena.org/newsroom/pressreleases/2019/Jan/Francesco-La-Camera-appointed-as-new-IRENA-Director-General; last application 04.01.2020)

[10] Jon Moore (2019), Managing Director of BloombergNEF (BNEF), the research company that provides the data and analysis for the Global Trends report. Press conference (Access mode: https://about.bnef.com/blog/decade-renewable-energy-investment-led-solar-tops-usd-2-5-trillion; last application 04.01.2020)

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Youth Unemployment in Romania: a problem that needs to be solved

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Abstract. *Youth unemployment is a problem that affects all EU countries, and the economy is losing young talents, the phenomenon is not to be ignored or addressed with ineffective and sporadic policy measures. The paper aims to describe Romanian youth unemployment in comparison with other EU countries, looking at causes shaping the trends and economic landscape and growth perspective additionally exploring the labour market characteristics and evolution. The descriptive statistics are used to present the scenery and the research can be defined as exploratory research of which results are used to make policy recommendations useful to tackle the causes of youth unemployment offering solutions through education and supportive measures. National and EU statistical data have been used to describe the global, regional, and national trends of youth unemployment and labour market perspectives. The research results seen as policy recommendations are valuable for governmental institutions addressing youth issues and also to NGOs having interests in supporting the young generation in the transition to the labour market. Youth unemployment seems to be a problem not because of job sacristy but mainly because of the lack of skills and competencies required today by employers. The paper examines the shifts registered in the jobs landscape: some job categories will decline, while others will register a visible growth and youth needs to be encouraged to explore new paths of skills formation and to be open to new training opportunities offered by formal and non-formal education.*

Keywords: education, labour market, youth employment/unemployment, skills & competencies

JEL Codes: J21, J24, J64

1. Introduction

The young generation face today various challenges and one with the highest impact on their lives is the integration on the labour market after graduation. It is a widely accepted fact that social validation of youth education is mandatory, after graduation young people should find jobs in their field of specialization where they can use all skills and competencies acquired during education. Society expects the young generation to participate in sustaining economic growth, being the driver of progress and the most productive and creative cohort of the active population.

The Sustainable Development Goal 8 referring to "*promote sustained, inclusive and sustainable economic growth, full and productive employment and decent work for all*", urge the international community to: (i) substantially reduce the proportion of youth not in employment, education, or training (NEET); and (ii) develop and operationalize a global strategy for youth employment.

At the global level, youth labour markets face several important challenges: the global economy remains sluggish as geopolitical tensions, social tensions, and global trade barriers have dragged on growth. Recent epidemics carry the potential to further slow economic activity. These developments are particularly

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detrimental to youth as their employment prospects, relative to older workers, are more sensitive to economic downturns [ILO,2020].

EU statistics reveal that in 2020 were 47,1 million persons aged 15-24 years old, of whom 2.3 million were unemployed of which 45% are female. This gives a youth unemployment ratio of 4.8 %[1]. Looking at the age structure of the young population, at 15 years old, almost 100% of the EU population are still at school. As young grow older, many enter the labour market, becoming employed or unemployed. Not all young people make this transition at the same age therefore one can see a gradual rise in the number of young people in the labour market.

Some of the young people kept their interest in education even when they have entered the labour market, others move out of education and also stay outside of the labour market. There are situations in which education and labour market participation overlap and this phenomenon occur at any age, but is far more frequent in the younger age group because that reflects their transition from education to the labour market. Sometimes, employment is subordinate to education, the case of students who work for a few hours a week. Other young people are employed and enrolled in a formal education program at the same time (eg. apprentices) or they study after work to obtain a diploma. Looking at the youth unemployment rate for the age group of 15-24, in 2019 at EU-27, were 2.8 million unemployed persons aged 15-24 and 18.2 million persons of that age group in the labour market, according to the EU labour force survey. This gives a youth unemployment rate of 15.1 % (Fig. 1).

Discussing the youth employment topic implies taking into consideration the impact of technological advances on youth labour markets. That means analyzing both opportunities and risks for youth in terms of job destruction and creation, the use of digital technology to improve labour market programmes, and sharing productivity gains.

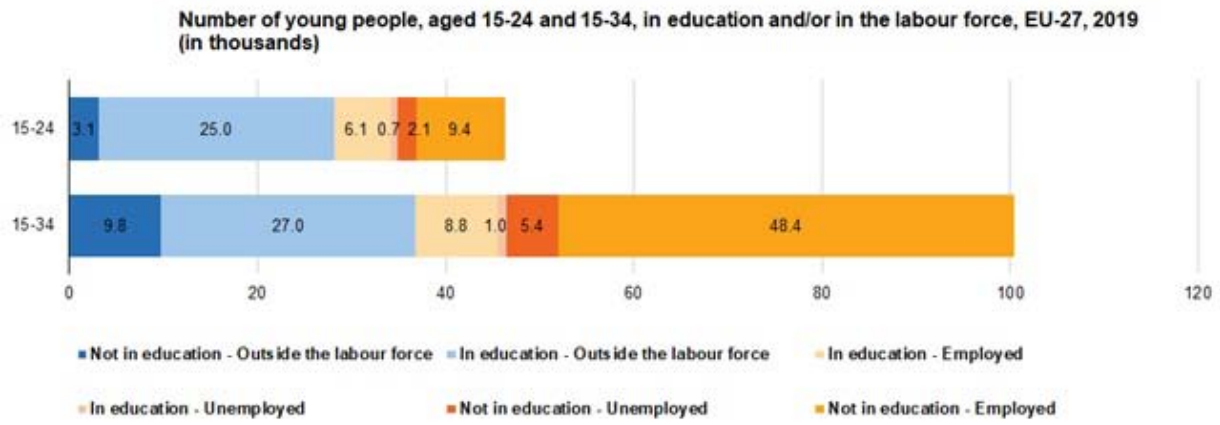

Fig.1. EU-27 Young people in education and/or labour force
(source: Eurostat, EU Labour Force Survey)

The EU unemployment rate was 8% (April 2021) and young people affected was (aged under 25 years) 17.1 % more than people aged 25 -74 (4.8 %) and has a high impact on people with low levels of education in particular: the unemployment rate among those with a low level of education attains 12.1% and only 4.3% for those having tertiary education.

[1] Data provided by the EUROSTAT

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At EU-27 level, youth unemployment has been seen as a major issue that needs a tailored approach, therefore a wide range of policies have been developed targeting: education and training institutions, measures for the creation of a work environment conducive to higher activity rates, and higher labour productivity.

So, one can conclude that young people are more at risk of long-term unemployment and of having difficulty breaking into the labour market.

Being the most promising category of the active population, young workers have to be taken into consideration adequately, at the policy level with special measures to support their transitional situation on the labour market and also to be encouraged to invest time in their long-life education that could offer them higher flexibility on the labour market on times of crisis.

Also, a report released by the World Economic Forum (WEF,2016), mentioned that some job categories will decline, while others will register a visible growth. Jobs in the field of business and financial operations will grow significantly, while routine-based jobs, such as in offices and administration, will sharply decline. New occupations and fields of specialization are expected to emerge in cutting-edge industries.

More than half of Europe's workforce will face significant transitions. Automation will require all workers to acquire new skills. About 94 million workers may not need to change occupations but will especially need retraining, as technology handles 20 percent of their current activities. While some workers in declining occupations may be able to find similar types of work, 21 million may need to change occupations by 2030. Most of them lack tertiary education(Smit, et al, 2020).

Newly created jobs will require more sophisticated skills that are already scarce today. It is foreseen that other occupations will become obsolete over the coming years up to 2030. Major skills disruptions are already evident: 35% of nowadays's core skills will have changed by 2030. The analysis of the top 10 skills in 2015 and 2020 shows that, while complex problem solving still occupies the first position, second and third positions will no longer be held by coordinating with others and by people management, but, instead, by critical thinking and creativity. In 2015, the same organization, together with Boston Consulting Group, released another report on *New vision for Education* (WEF, 2015). The study offers a more thorough analysis of the skills needed by a job candidate to compete in the twenty-first century. The buzzword seems to be non-routine, both interpersonal and analytical skills.

Recent developments in the labour market, at the global scale and inside the EU, reveal an ugly truth: youth unemployment is one of the most significant societal challenges of the twenty-first century.

Recently, EU Youth Strategy 2019-2027 has been introduced with Eleven European Youth Goals, among them quality employment set as one of the objectives. Therefore is time that every EU country, Romania as well, to make considerable efforts to achieve these goals. Young human capital needs to be "nourished", protected by appropriate policies, and empowered with skills and competencies that are matching the labor market requirements.

2. Research Objectives and Methodology

The research has been developed based on statistics available on Eurostat[2] and the Romanian National Institute of Statistics[3]. A descriptive statistical analysis has been conducted to reveal major trends and impact factors**.** The first research objective is to describe the youth unemployment phenomenon in Romania,

[2] https://ec.europa.eu/eurostat
[3] www.insse.ro

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looking at major trends, impact factors and highlighting the governmental and EU interventional support. A critical analysis is performed to identify and explain the various causes of youth unemployment and to develop solutions and recommendations meant to equip young people with the skills required for the jobs.

A second research objective is to assess Romania's capability to address youth employability issues related to the new trends in job creation and/or decline and the educational opportunities to be created. Examples of projects dedicated to youth employment are presented as initiatives to support access to the labour market and to decrease unemployment among young people.

2.1. Romania's economic landscape

Economic globalization has led to a more connected world with a far-reaching impact on production arrangements, international trade, and foreign investment, economic growth, labor market, and many other sectors of the economy.

However, the *global trends of the past decade* have shown continuous economic growth (Fig 2), the euro-zone economies have also experienced economic growth (Fig.3) but the rhythm decreased from 2015 to 2018 as a consequence of the influence of internal unfavorable factors, quite different as an origin.

Romania's economy had experienced slow growth in the past five years (WB, 2020), the annual variation of GDP indicates a relative recovery during 2014-2017 with an important decrease in 2018. Looking at Romania's performance, according to the same indicator, one can see steady growth with a significant pick in 2017 of 7,1% annual growth rate.

Romania's economic growth model is based on consumer spending which can affect the country's ability to reach EU living standards sustainably. The 2008-2009 economic crisis affected the world economy and as a consequence, the Romanian economy registered a negative GDP annual growth rate (Fig. 3).

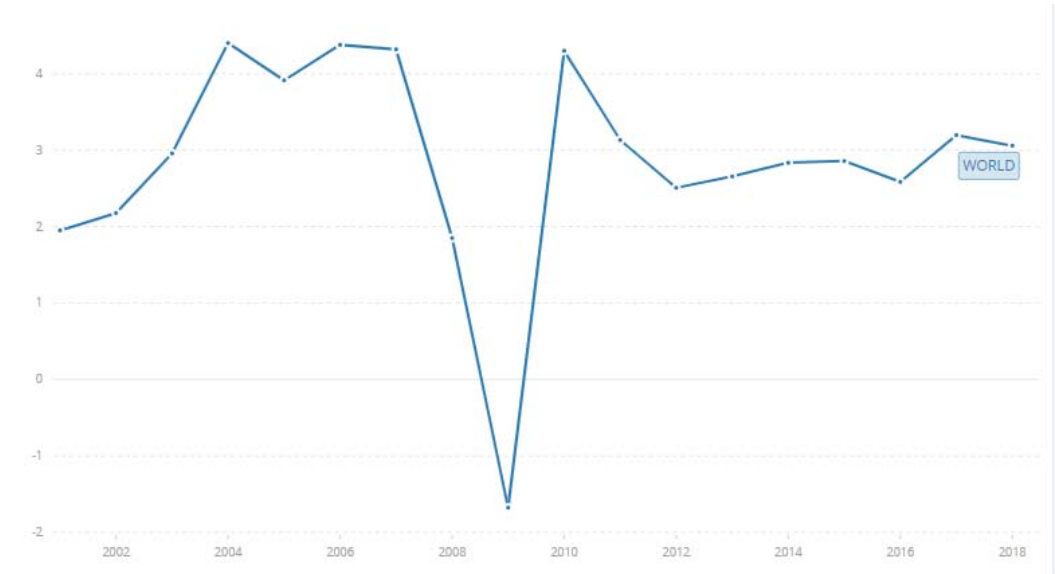

Fig. 2 World GDP growth (annual %)
(Source: World Bank Database)

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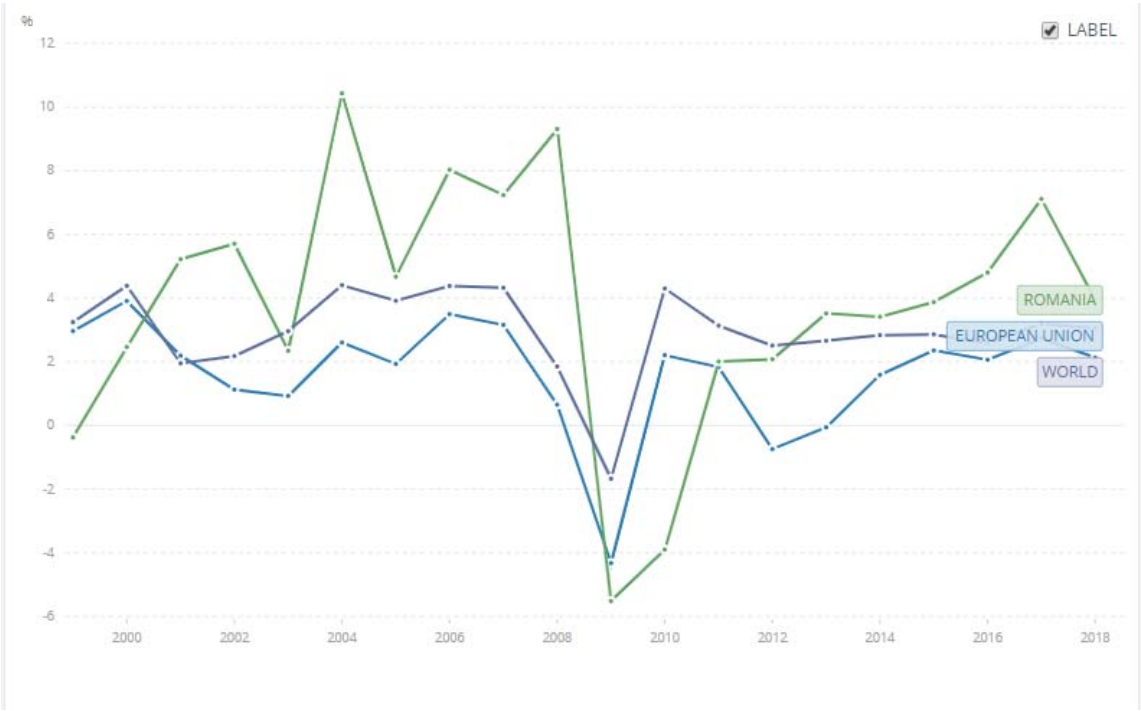

Fig. 3 GDP annual growth rate – Romania in comparison to EU and World
(source: World Bank Database)

The world crisis generated economic downsizing, unemployment, with unprecedented figures in youth unemployment in the European region and Romania share the same trends. The euro-zone economy has been rather resilient being supported by the labour market revival. The employed population has raised, the highest EU employment rate (for persons aged 20 to 64) since 2005 was recorded in 2019 at 73.1 % and the unemployment rate has dropped recording the lowest value since 2008 (Eurostat, 2021).

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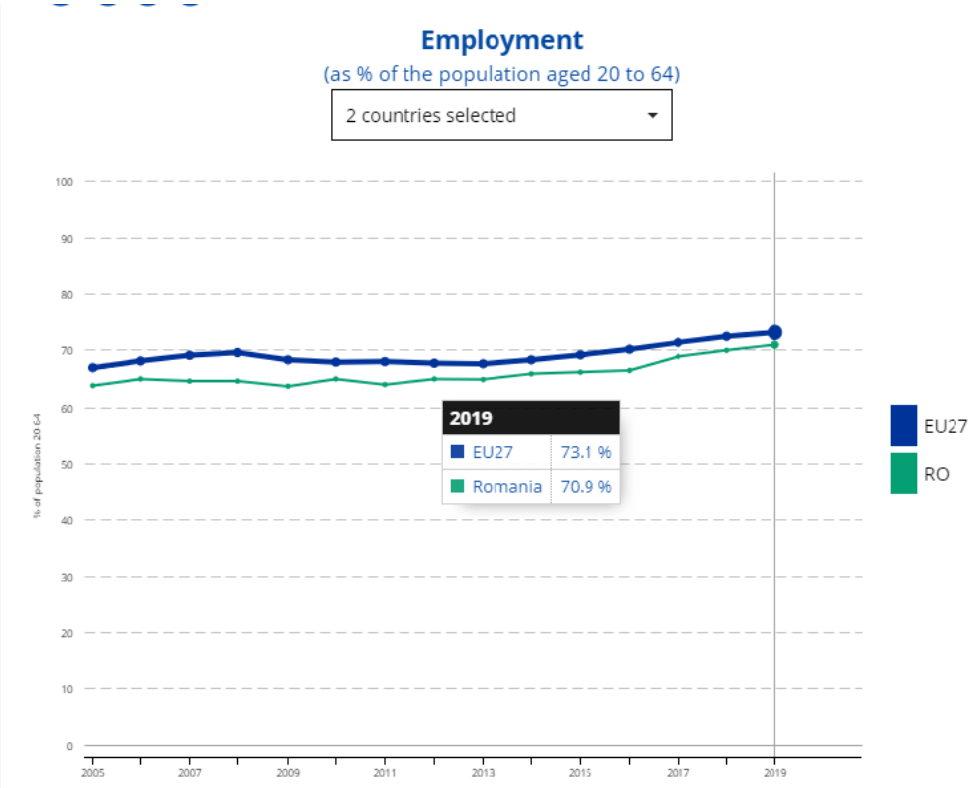

Fig.4 Employment (total, female, male, youth and senior), 2005-2019 (% of the population aged 20 to 64)
(Source: Eurostat)

The evolution of Romania's GDP indicates a slow growth in the past years (Fig. 5) with some industry sectors growing faster than others (services comparing with industry).

In 2018, the structure of the gross domestic product by activity sector (Fig. 6) was:

- services had the highest contribution to GDP formation with a percentage of 57.1% of the total;
- industry contributed with 23.6% to GDP formation positioning in second place;
- construction represented 5.4% to GDP formation ;
- and agriculture, forestry, and fishing contributed 4.3% to the GDP.

Agriculture represents 4.3% of Romania's GDP and employs 22% of the country's active population [WB, 2020]. The main resources and agricultural production in Romania are cereals, sugar beets, and potatoes. However, production remains very low in comparison with the country's potential capacity (more than one-third of the land is arable).

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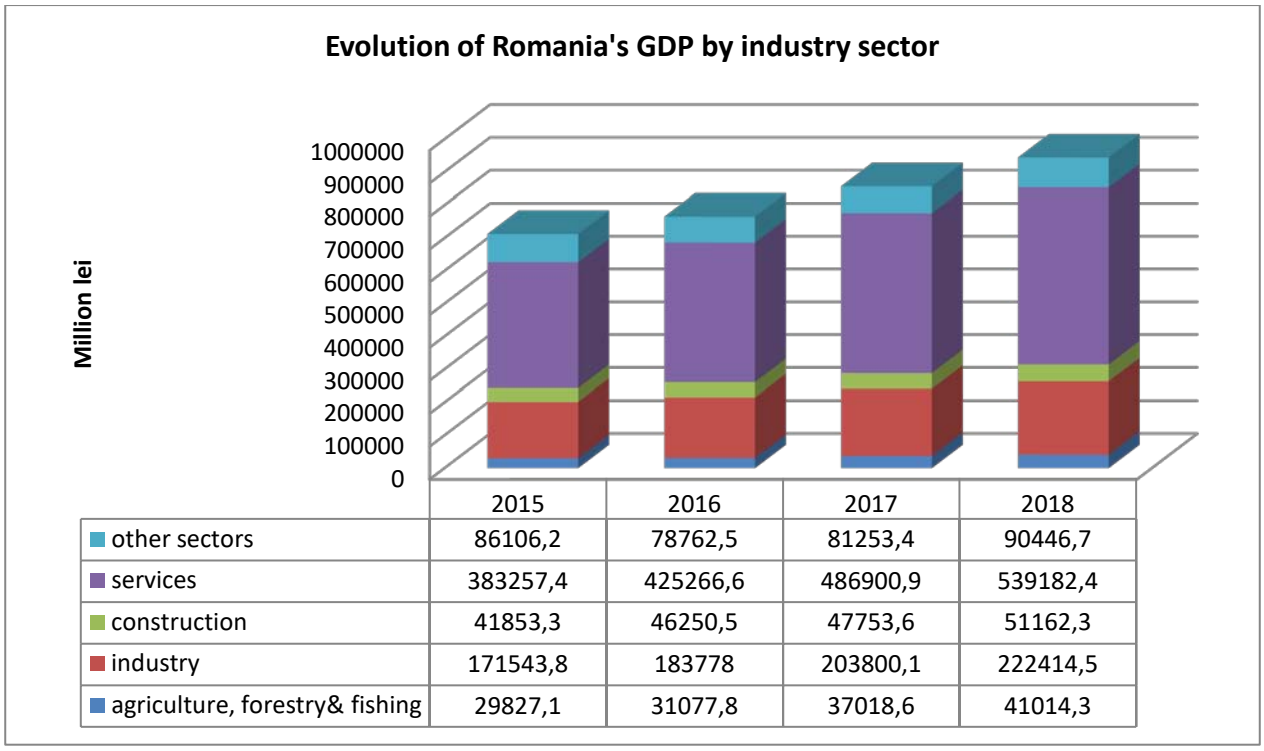

	2015	2016	2017	2018
other sectors	86106,2	78762,5	81253,4	90446,7
services	383257,4	425266,6	486900,9	539182,4
construction	41853,3	46250,5	47753,6	51162,3
industry	171543,8	183778	203800,1	222414,5
agriculture, forestry& fishing	29827,1	31077,8	37018,6	41014,3

Fig. 5 Romania's GDP trends by industry sector
(Source: authors' contribution based on National Statistics)

About 25% of the country is covered by forest (especially around Transylvania), and the logging industry is developing very fast and is generating significant ecological concerns. Romania has a limited energy dependence thanks to coal, oil, gas, and uranium reserves.

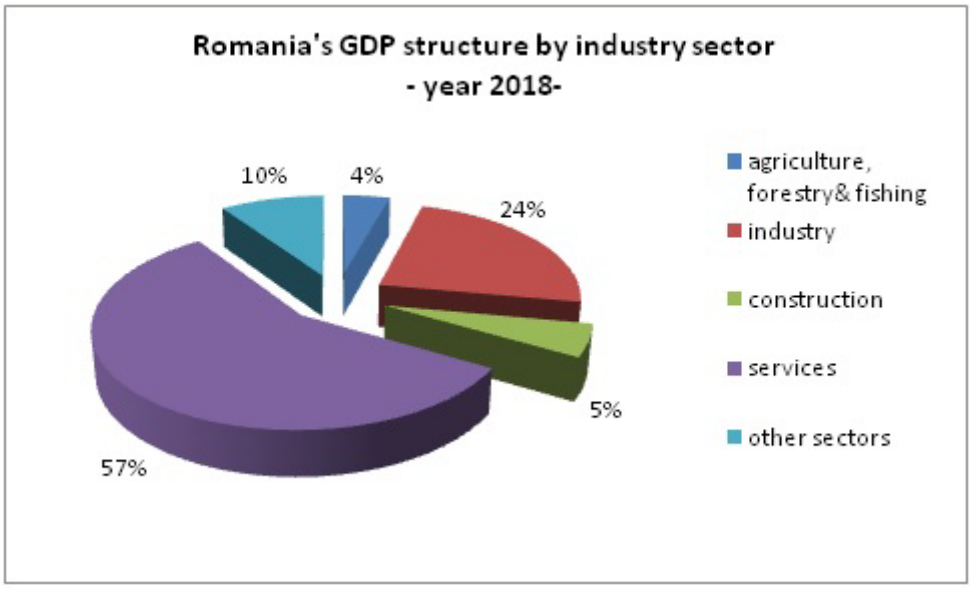

Fig. 6 GDP Structure by industry sectors in 2018
(source: authors' contribution using the INSSE data)

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The GDP structure indicates a consistent contribution of the services sector (from 53,8% in 2015 to 57,1% in 2018), followed by industry(eg. manufacturing, etc.) of which contribution declined from 24% in 2015 to 23,6 % in 2018. It seems that Romania's economy is mainly centered on the services sector, representing 57% of the GDP, and employs nearly 48% of the nation's workforce. The technology sector has also seen immense growth in recent years, due to the emergence of a high-qualified workforce whose cost is lower than the European average. Romania's ICT sector reached 6.2% of GDP in 2017 and the ICT services exports exceeded EUR 4.5 billion in 2018 (Ciucea et al., 2019).

Looking at Romanian industry sector evolution, one can see that the agricultural sector represents a basic branch of the national economy that has significant economic and social importance and implications. With an agricultural area of nearly 16 million hectares, Romania could be (after Poland with 17 million hectares of the agricultural area) the second largest producer of agricultural products in the CEE region. Romania has the biggest agricultural area of the EU and is among the ten big players in world exports of grain and corn, but the agricultural sector is facing difficulties as poor mechanization and land fragmentation, the lack of capital and irrigations as well as lack of professional training of the agriculture workers. Within the structure of agricultural production, crop production is prevalent, with a 70.3% share in the total production in 2018, as compared to 28.3% for animal production and 1,4% for agricultural services.

2.2. Romania’s labour market characteristics

Romania performs poorly on most of the indicators of the Social Scoreboard supporting the European Pillar of Social Rights. The high economic growth has translated into better job prospects and increased household disposable incomes. However, Romania still has a high number of early school leavers and, although decreasing, a high number of young people not in education, employment, or training. This raises concerns about equal opportunities and access to employment. Romania has not yet achieved a mature social dialogue, and its Social Scoreboard performance indicates a critical situation on reducing poverty (EU, 2019).

The labour market is under increasing stress. The lowest unemployment rate in a decade (3.8 % in 2018), a declining labour force, and persistent skills shortages have brought Romania close to full employment, which makes recruitment difficult and drives wage growth. Employees’ earnings are low compared to the EU average but the strong growth since 2016, also driven by hikes in the minimum wage and public-sector wages, risk putting pressure on competitiveness if not accompanied by corresponding productivity increases.

On June 1st, 2021, Romania's usually resident population was 19,111 thousand inhabitants, of which 10,0 million women (51.1%). The population is 56.4 % urban and 43.6% rural. In 2021, the economically active population was 9.069 thousand persons (decreasing as compared to the previous year), out of which 96,6% belonged to the working-age group (15-64 years).

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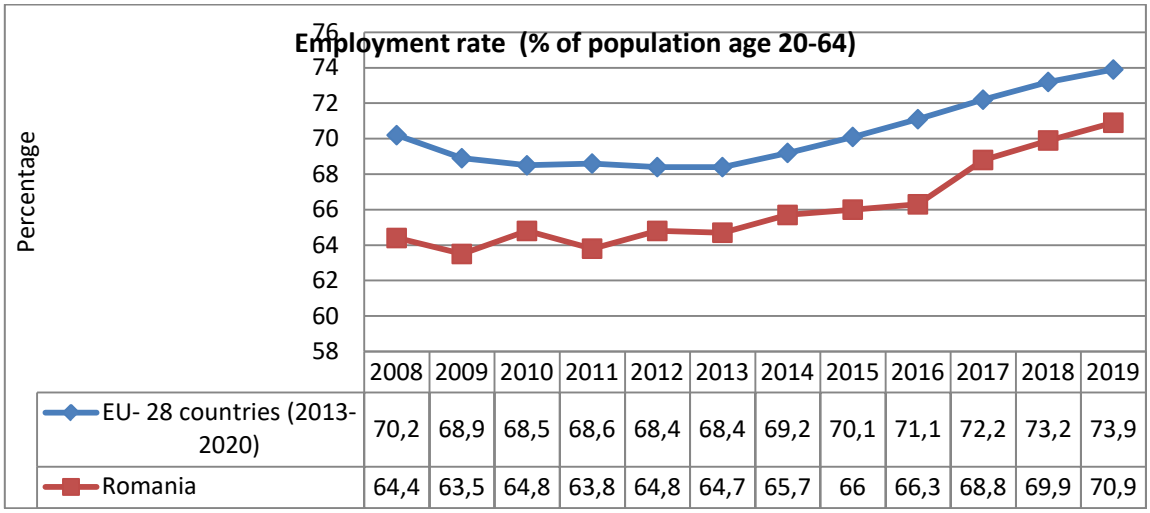
Table no.1 Economically active population, employment, and unemployment
-thousands of persons-

	2015	2016	2017	2018
Economically active population - total	9159	8979	9120	9069
Female	3916	3834	3936	3883
Urban	5013	4962	4994	4955
Employment - total	8535	8449	8671	8689
Female	3687	3643	3777	3748
Urban	4662	4684	4769	4769
ILO[1)] unemployed - total	624	530	449	380
Female	229	191	159	135
Urban	351	278	225	186

[1)]*according to the international definition of the International Labour Office*

The economically active population is 57.2 % male and 54.6 % are situated in the urban area. Employment increased over recent years, reaching 9,008 thousand in 2021, 8,689 thousand persons in 2018 (as compared to 8,671 thousand persons in 2017, and 8,449 thousand persons in 2016).
The number of unemployed registered with the National Agency for Employment (ANOFM) had a downward evolution since 2015, reaching 380 thousand persons at the end of 2018 and 354 thousand persons in 2019. The registered unemployment rate showed the same evolution during 2015-2018 (accounting for 5.0% at the end of 2015, 4.8% in 2016, 4.0% in 2017, falling to 3.3% at the end of 2018).
The evolution of the employment rate is presented in Fig.7 Romania in comparison to EU-28 countries in 2008-2019, and the trend is similar.



	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
EU- 28 countries (2013-2020)	70,2	68,9	68,5	68,6	68,4	68,4	69,2	70,1	71,1	72,2	73,2	73,9
Romania	64,4	63,5	64,8	63,8	64,8	64,7	65,7	66	66,3	68,8	69,9	70,9

Fig.7 Employment rate trend
(source: authors contribution using EUROSTAT data)

In 2010, the European Council adopted the Europe 2020 strategy in an attempt to reinforce the EU economy. One of the strategy's main targets is to raise the employment rate of the population aged 20-64 to

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at least 75%, and it is almost achieved, Romania having a 73.1% employment rate at the end of 2019 (Eurostat, 2020). At the EU-27 level, the gender employment gap has decreased since 2005 but the employment rate in 2019 was still 11.7 %. higher for men than for women, in Romania the men employment is 13.8 % higher than women employment. Until 2002, most of the employment was in the rural area. Beginning with 2003, most of the employed persons had their permanent residence in the urban area (54.9% in 2018). This category of employees prevails among employed persons (74.8% in 2018). The level of educational attainment affects employment rates considerably. The employment rate of persons (aged 20-64) who had completed education at a high level, i.e. short-cycle tertiary, bachelor's, masters or doctoral levels (or equivalents) (ISCED levels 5-8) was 84.8 % at EU level and 89.2 % in Romania in 2019 (Fig.8).

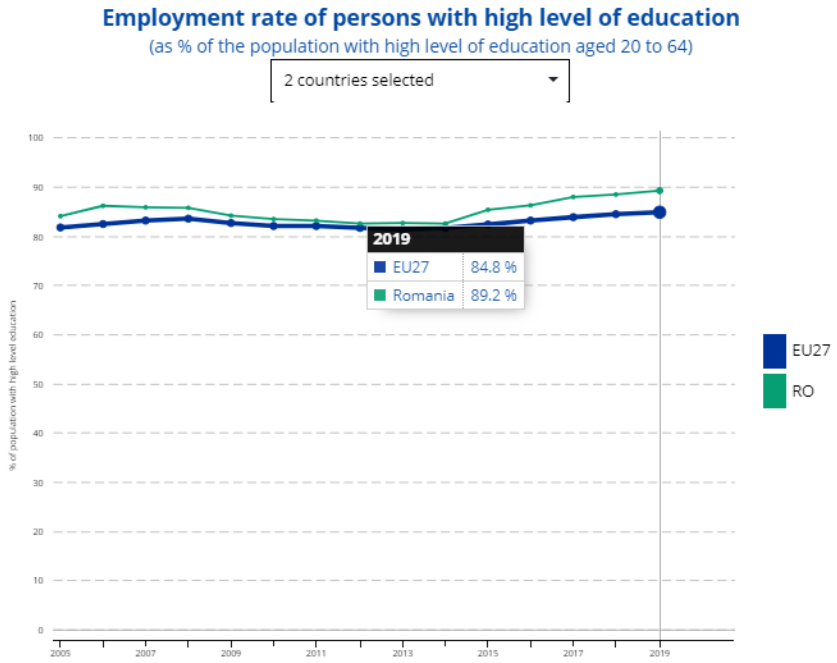

Fig.8 Employment rate by level of education, 2005-2019
(% of the population with low/medium/high level of education aged 20 to 64)
Source: Eurostat

In the attempt to decrease unemployment in EU countries, in the post-crisis period, the European Commission in 2012 made a set of proposals for measures to boost jobs through a dedicated employment package. The proposals among others targeted the demand-side of job creation, encouraging hiring by reducing labor taxation and supporting business start-ups. Moreover, the proposals aimed to identify economic areas with potential for job creation, such as green economy, health services, and ICT.

Unemployment rates in Romania vary significantly across regions. The capital region and the metropolitan areas in the Vest and Nord-Vest are service-driven regions that offer better labour market opportunities and attract more qualified workers. In contrast, in the regions with a manufacturing economic base, the urban industrial centers attract mainly unqualified workers from the neighboring rural areas. The impressive economic growth Romania has been experiencing during the last few years has put increasing pressure on employers to find skilled workers to expand their businesses but the latest official data show that Romania is far from being considered to be in a severe "workforce crisis" situation. According to official data, workforce shortage is concentrated in some areas like services (3.4 percent job vacancy rate in Q4

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2018), transport (1.9 percent), and IT (1.8 percent), a consequence of the fact that much of the economic growth in Romania is the product of a consumer bonanza, stimulated by years of wage-led growth government policy. In fact, Romania ranks among the EU member states with low job vacancy rates despite claims of a widespread workforce crisis. The number of unoccupied jobs in Romania rose by 4,147 year-on-year, to 58,810 in the last quarter of 2018.

Despite all these European and national measures, In the last quarter of last year, 16.2 percent of young people in Romania were considered unemployed, compared with a national unemployment rate of 4.2 percent, according to fresh official data.

2.3. Romania – youth unemployment

In Romania, the unemployment is unequally distributed among regions, ranging from 9.9 % in South-West Oltenia and 8.9 % in South-Muntenia to 4.7 % in Bucharest-Ilfov and 3 % in the North-East region (the best performer in 2016). This situation can be explained by the economic development quite different from a region to another. The industry sectors have unequal development across the country and therefore for some categories of young employees finding a job in their field of expertise in the same region they live in can be difficult. Those who are unemployed for a long period are individuals who find it difficult to find a job and need special and personalized assistance to enter the labour market.

In the period 2008-2017, Romania continues to register a high inactivity rate (32.7 %) compared to the EU average (26.7 %). The reduction in the inactivity rates of men (-19 %) exceeded both the general and the women's rates (−7 %), resulting in a significant gender gap of almost 20 % in 2017[Vasilescu, 2019].

The previous recession shows that young people who have left education are hit harder economically and the recent COVID-19- related economic downsize is confirming the same situation. Young people being in this situation are working in sectors that have been worst affected by economic shutdown(eg. retail, hospitality, tourism) . It seems that in time of crisis young people are suffering the most: job insecurity, cuts in their wages, low level of support in shifting jobs or industries. The risk is very high, and the first signals are not encouraging. Eurostat data from March 2020 show that while the unemployment rate of the general population increased by 0.1%, from 6.5% to 6.6%, the youth unemployment rate increased by 0.4%, from 14.8% to 15.2%. Eurofound's survey shows that in this initial phase of the pandemic crisis, young people in the EU have been hit just slightly harder than the rest of the population in terms of labour market participation: 6% said they had lost their job permanently, against 5% of other age groups. But numbers were higher in Bulgaria, Hungary and Portugal, with more than 10% of young workers reporting permanent job loss. Additionally, and in line with other age groups, 23% have lost their job temporarily, and 16% fear that they will lose their job in the next three months. Nearly half (49%) of young workers said that their working hours had reduced since the onset of the COVID-19 crisis. This is in line with other age groups, even though many more young people, 43%, started to telework during the outbreak, against 34% of other age groups [Eurofound, 2020].

Unemployment statistics (see Fig 9) across the EU reveal the fact that youth unemployment is a serious problem in all countries. Young people experience numerous difficulties at entering the labor market, most of them coming from the skills and competencies mismatch with employers' requirements. Also, in

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times of crisis, young employees are the first to lose their jobs, therefore are the most vulnerable category of the active population that needs consequent policy interventions.

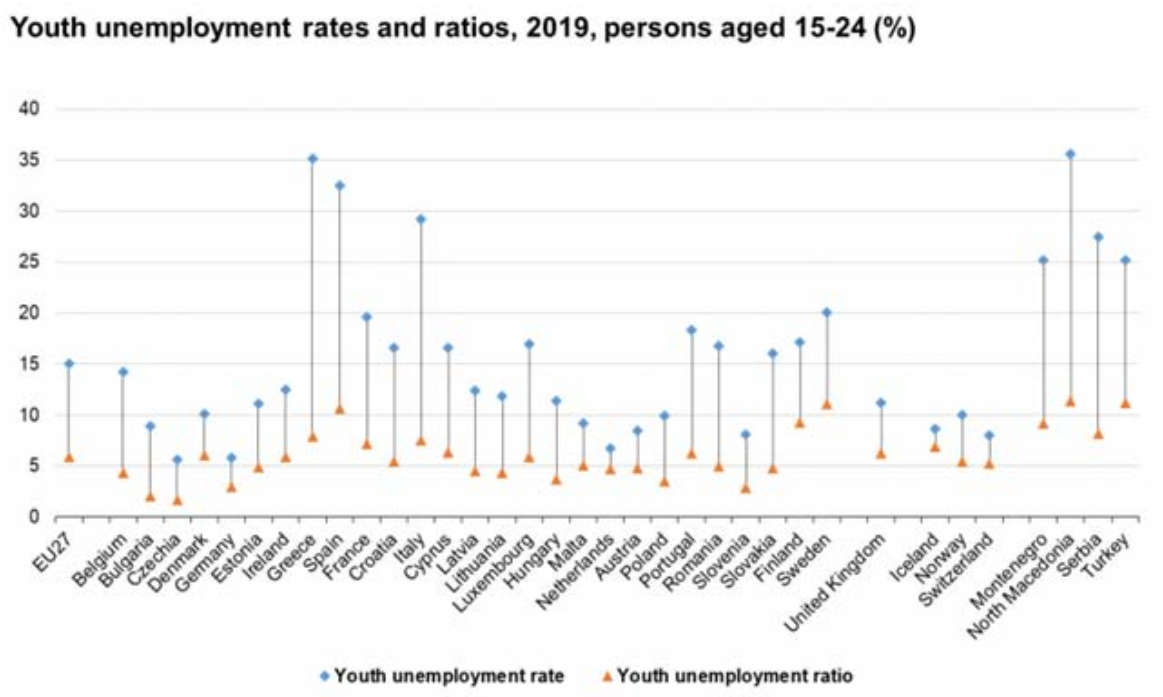

Fig. 9 Youth unemployment across EU-27 countries
(source: Eurostat lfsa_urgan, yth_empl_140)

An integrated policy framework to support young people in securing decent jobs in the current context is critical for the future socio-economic progress of Romania. Policies are required to generate a sufficient number of decent jobs, to equip young people with the skills required for those jobs, to ensure that they enjoy social protection and have rights at work.

World Bank data show the trend of the youth unemployment rate in the past 10 years (Fig.10) and since 2015 is decreasing significantly, which is very encouraging.

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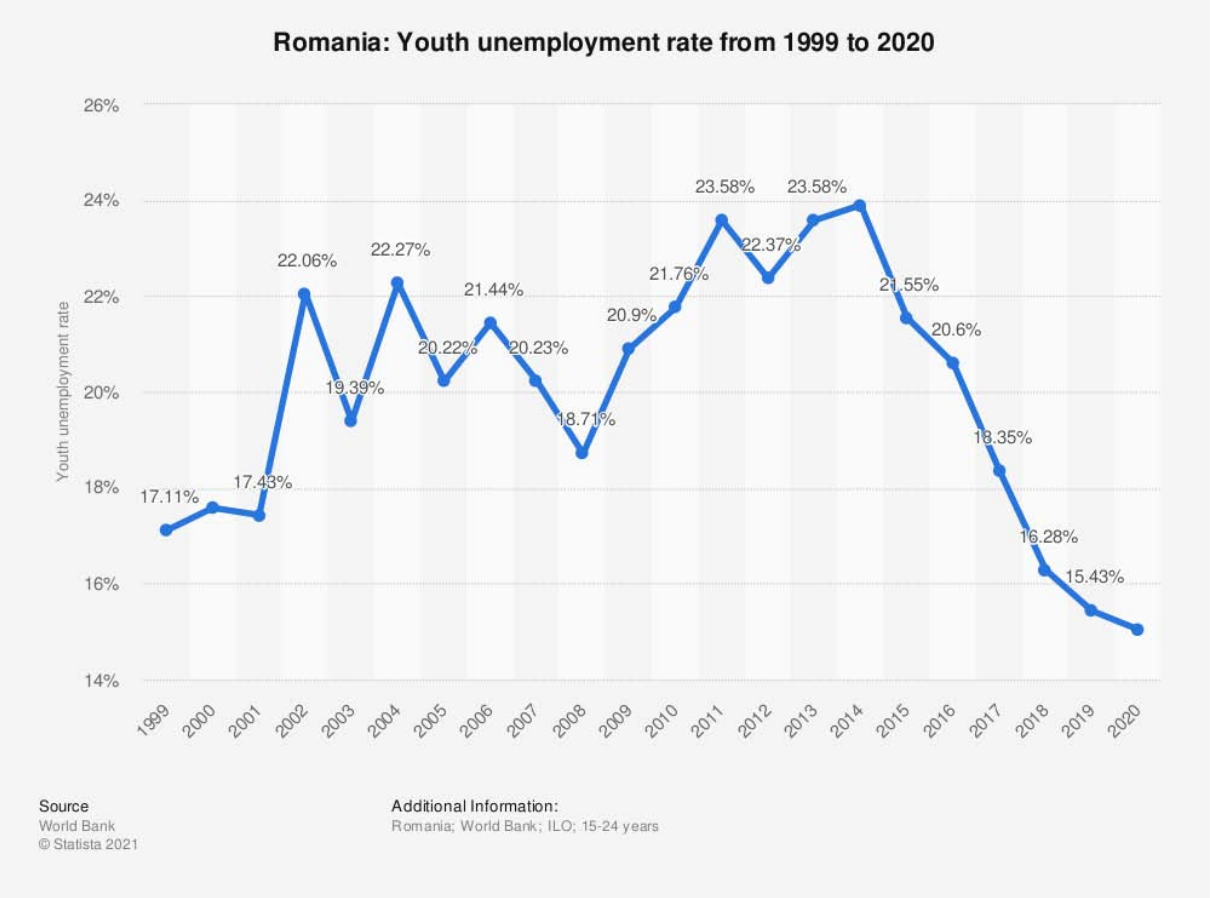

Fig 10. The evolution of youth unemployment in Romania
(*source: World Bank, Survey name: World Development Indicators, worldbank.org.released at Dec.2020)*

Young people are facing various difficulties accessing the labor market, some of them seek support to overcome them, others are caught into the NEET situation[4], being the most vulnerable category of the active population.

Globally, in 2020, more than one in five (22.4%) young people aged 15-24 are neither in employment, education, or training (NEET), and two out of every three of these NEETs (67.5%) are young women (ILO,2020)

Young NEETs continue to represent a problem in Romania despite some recent improvements (Fig. 11 and 12).

[4] NEET = not in employment, education or training and is used to refer to the situation of many young persons aged between 15 and 29 years old.

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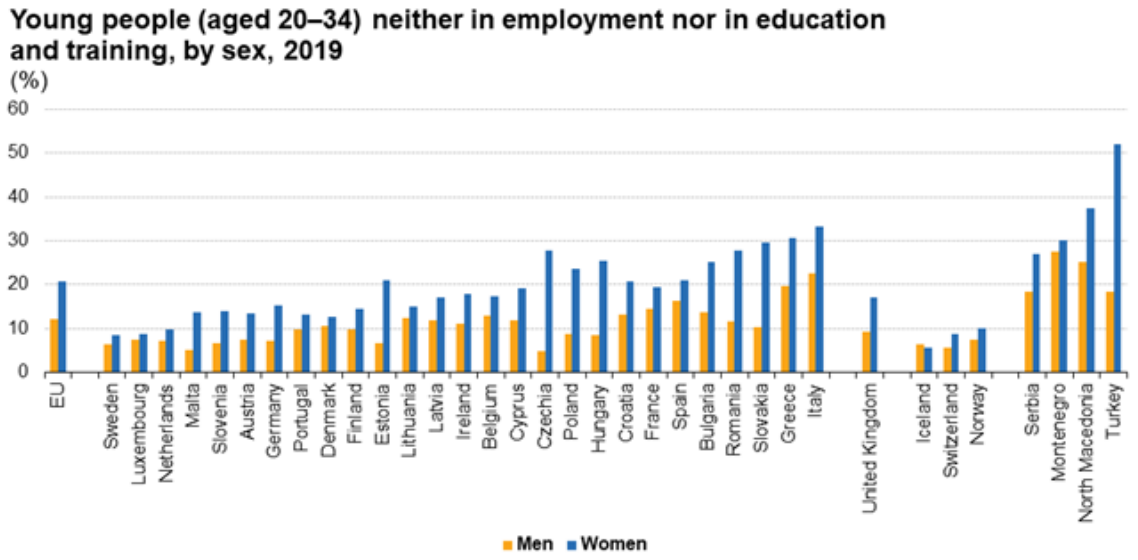

Fig. 11 The NEET statistics, per country
(source: Eurostat online data code edat_lfse_20)

The share of NEET has increased following the economic crisis at the EU level and in Romania as well but has started to decrease since 2015, dropping from 20.9 % to 16.6 % in 2020, driven by the measures taken at the national level (Tabel no 2). Nevertheless, it exceeds the 2020 EU average (13.7 %). The Romania NEET statistics show a decreasing trend from 2016 (20.9% -the peek) to 2020 (16.6%) but at a slow pace (Fig.13). The NEET decreasing level has been driven by the reduction of early-leavers from education. In 2020, the NEETs with upper secondary and post-secondary non-tertiary education count 15.1% compared with only 8,2% having tertiary education(Fig. 13). However, according to the World Bank, the main reasons for leaving school are financial (high non-fee costs of participation), pedagogical (low quality of education), and personal (lack of motivation, etc.)

Tabel no.2 The evolution of NEETs in Romania compared to EU average (%)

	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020
European Union - 27 countries (from 2020)	15,4	16,0	16,1	15,7	15,2	14,5	13,7	13,1	12,6	13,7
European Union - 28 countries (2013-2020)	15,4	15,9	15,9	15,4	14,8	14,2	13,4	12,9	12,5	:
Romania	19,5	19,3	19,6	19,9	20,9	20,2	17,8	17,0	16,8	16,6

Source: Eurostat (EDAT_LFSE_20)

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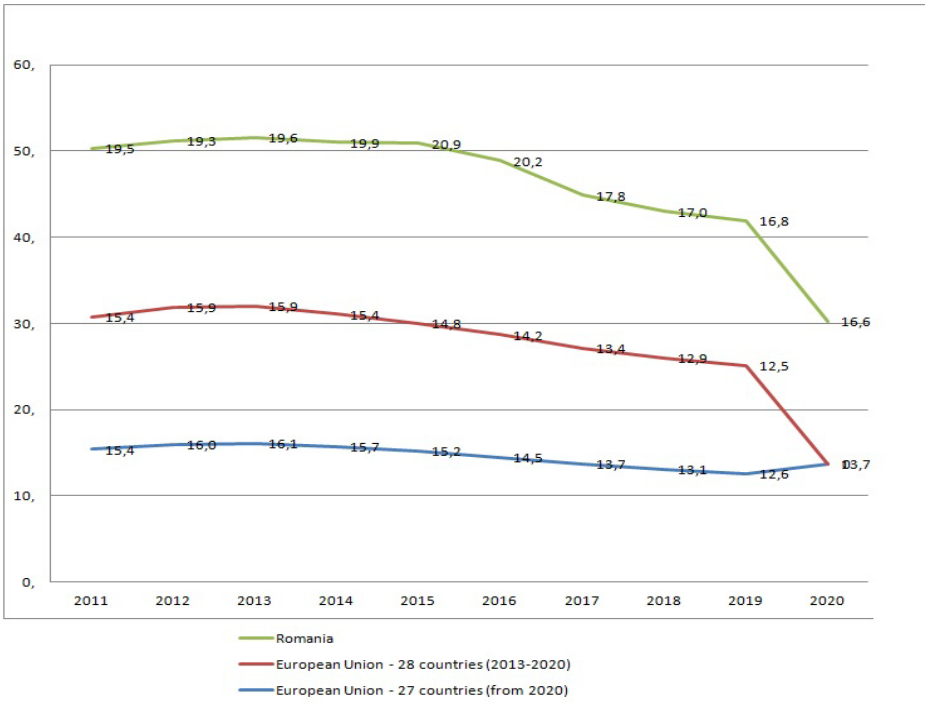

Fig.12 The NEET evolution (%) in Romania compared to EU-27(EU-28)
(source: authors' representation based on Eurostat data, EDAT_LFSE_20*)*

The unfavorable labor market for young people in Romania generates a specific interest from governmental institutions (ANOFM[5]), studies have been made to analyze the situation of young people who fit NEET demands, meaning those "*not in employment, education or training* ". The analysis is based on data obtained during field research. The research used both a qualitative approach (one focus group with young people) and quantitative (questionnaire-based research) and the results of this analysis are presented in a report, part of the NoNEETs project. The research revealed that the NEET category meets many obstacles in trying to find a job. So they are not provided credibility and the necessary trust to demonstrate that they are competent to perform their work seriously and responsibly. Moreover, the study revealed the main barriers to access labour market, as follows (Ceausescu&Gug, 2014):

- the disparity between jobs and everyone`s qualifications,
- the lack of experience in the labor market. Other obstacles that they have encountered are
- insufficient remuneration,
- family problems
- lack of legal documents to be signed upon completion of the probationary period

A more recent study (Vasilescu &Epure, 2016) demonstrates that the young NEETs who completed tertiary education face barriers related to the mismatch between skills and competencies acquired and employers' requirements for current vacancies existing on the labor market. Employers are investing less in training programs dedicated to their new young employees, preferring those who already have experience in the field. Also, even though workforce mobility in the EU is encouraged, young Romanian with tertiary education are less mobile than their peers having secondary education.

[5] ANOFM – National Agency of Labor Force Occuancy

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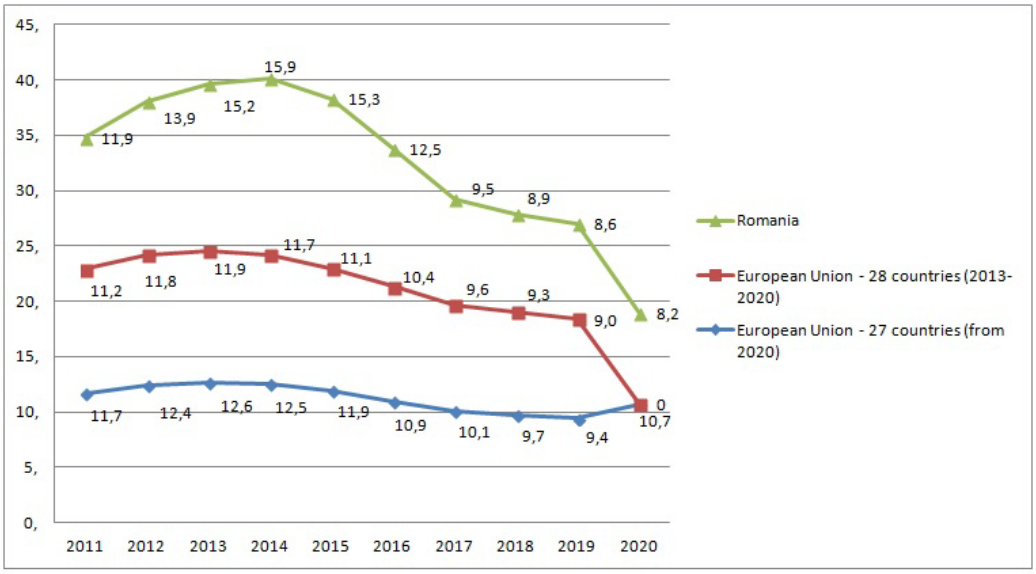

Fig. 13 The NEETs evolution - young people with tertiary education
(*source: authors' representation based on Eurostat data* EDAT_LFSE_21)

The level of education plays an important role in decreasing NEET percentage, young Romanian with tertiary education is only 8.2% compared with the total NEET of 16.6 % in 2020. So, investing in education can be seen as a solution to overcome the labour market access barriers. Romania has the lowest number of young people who graduated tertiary education in all EU countries, and it needs to make considerable efforts to overcome the existing gap and to meet the 2030's target(Fig. 14).

In 2018, tertiary attainment for the 30-34 age group — measured as a European benchmark— declined to 24.6% from 26.3% in 2017. This is significantly below the EU average of 40.7% and below Romania's national Europe 2020 target of 26.7%. Gross enrolment rates have not only remained low but have been decreasing since 2009 (European Commission, 2018).

The study exploring causes of NEET in Romania reveals that 90% of respondents mentioned that bonuses offered to institutions and companies are insufficient to keep them motivated to keep their jobs. Also, most young NEET people (80%) believe that studies bear high importance and have expressed interest in the further study rather than an immediate job, but financial difficulties are leading some of them to work instead of studying (Ceauşescu &Gug, 2014).

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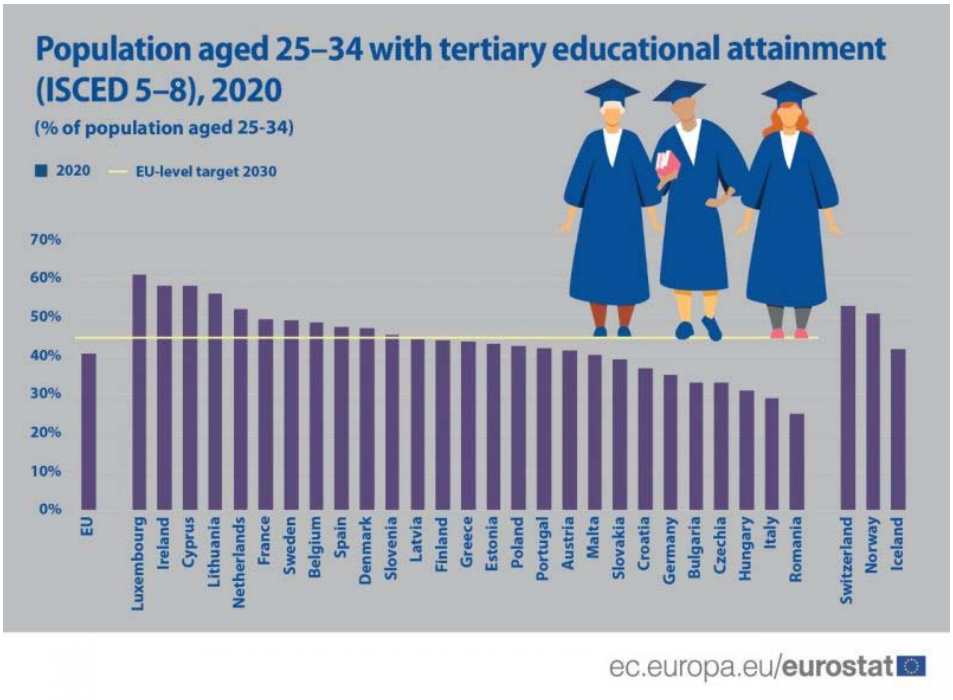

Fig. 14 EU young population with tertiary education, breakdown per countries
(source: EUROSTAT – tertiary education statistics)

The Romanian NEETs composition has been also explored by Eurofound in research conducted in all EU member states (Fig. 15).

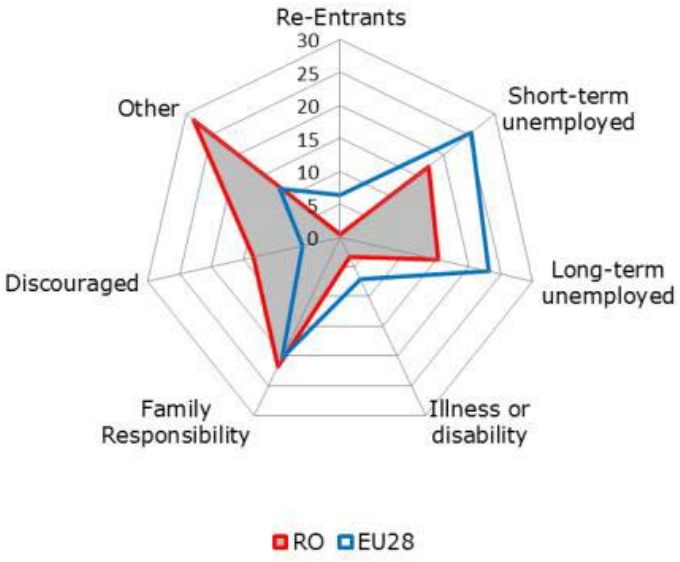

Fig. 15 Romania's NEET composition, 15-29 years old
(Source: Eurofound – Exploring the diversity of NEETs: country profiles)

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Therefore, policy-makers should take into consideration developing special funding schemes dedicated to young people interested to complete tertiary education and that is in line with Romania's objective to reduce the gap of tertiary education attainment compared to the other EU member states.

"Investing today in the employment of young people means investing in the present and future of our societies, " said Guy Ryder, ILO Director-General and we agree with it.

Unfortunately, in Romania, the investment in education remains low in EU comparison, and funding mechanisms to support equity are weak. In 2017, general government spending on education was equivalent to only 2.8% of GDP, significantly below the EU average of 4.6% and the lowest percentage in the EU (EU Education and Training Monitor, 2019). This low level of funding reflects both the underfunding of education policies at national and local levels and Romania's strong GDP growth in 2017. Traditionally, underinvestment is particularly felt in pre-university education.

In this context, ensuring that graduates possess high-quality labour market-relevant skills remains a challenge. The ICT sector is expected to continue to grow in the coming years but will face labour shortages; skills shortages also exist in the health sector, in skilled trades, engineering, transport, and distribution (Manpower Group, 2015; Cedefop 2017; Cedefop 2018). Employers report that graduates often lack soft skills but possess good, though overly theoretical knowledge (World Bank, 2018).

Despite all difficulties, the employment rate of recent tertiary education graduates is high and increasing (89% in 2018, EU average: 85.5%). For example, Romanian authorities have developed a methodology to track whether graduates occupy jobs requiring a higher education degree in their field of study, a tracking system for graduates is not in place. Also, for the moment, a global or sectoral assessment of skills needs is lacking (European Commission, 2019). For these specific reasons, the 2019 country-specific recommendations also call on Romania to '*improve skills, including digital, notably by increasing the labour market relevance of vocational education and training and higher education*' (Council of the European Union, 2019).

Looking at employers' requirements one can identify some important skills and competencies that prevailed. The highest demand for IT skills required is office suits literacy, which is not surprising as this still is the primary communication channel dictated by the professional work environment. The incremental importance of working within software development environments shows the growing need to bring this topic closer to a broader population of future talent, which may be explained by the increased automation within the BPO industry. ICT professionals belong to high shortage occupations for Romania according to Skills Panorama CEDEFOP. First, high-skilled graduates are mainly employed abroad ("headhunting" of tertiary education graduates is particularly widespread). The share of ICT specialists with tertiary education (EQF levels 5-8) decreased mainly due to external mobility for better jobs. Second, updates in learning curricula do not keep up with technological advancements. Third, there exist outdated teaching methods and a scarcity of trained teachers. Fourth, there are low levels of non-cognitive skills that are required to boost entrepreneurship and efficient management (risk assessment, strategic approach, etc.). Besides, pre-university education (second level and post-second) does not deliver the necessary skills for graduates to be employed in the sector. There is a need for supplementary training on the job and lifelong learning courses. Young people need support in their efforts of looking for employment, but the role of schools, universities ends at graduation. What happens next? Is the question that needs answers coming from various actors such as employers, youth organizations, training providers etc.

In Romania, one in five young people is not in employment, not in education, or other training programs (NEET), which means that it is a waste of the labor force that is not contributing to the country's GDP growth. Therefore, we believe that interventions to improve access to youth in the labor market are necessary

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and can produce good results. The recently released systematic review on "Interventions to improve the labour market outcomes of youth" (Kluve et al. 2018) identified 113 rigorous evaluation reports to include in its meta-analysis, 74 of which have been released since 2010. The main findings of the review were also encouraging: overall, youth employment interventions can produce positive job and income effects for young people(ILO, 2018).

Supporting young people entering the labour market has been done by different actors that have implemented youth policies, EU-funded projects, and training companies acting as intermediaries in the process. Some of these initiatives are detailed below.

- National Agency for Employment - ANOFM – started in May 2019 the implementation of a 60 months-project dedicated to NEETS youth – ACTIMOB 3 RMPD „Activation and mobility for NEETs youth" – providing training, consultancy to a special target group of young people. The projects aim to support 11.146 young people seeking employment
- Romanian Agency for Regional Development (public authority) – South Muntenia implemented the project „NoNEETs – Permanent Training and Assessment Programme to NEETs Young Adults for their inclusion in the labour market and EU society" from Nov.2013 – Oct.2015, financed by LifeLong Learning Program[6]
- Adapt2jobs – a 18 months (2014-2015) project financed by the POSDRU – Romanian program for the development of human resources – aims to redesign academic curricula according to labour market requirements (Epure et al., 2015). A representative sample of employers has been interviewed to identify the basic skills and competencies required for the young graduates seeking their first employment.
- LifeInJobs[7] offers recruitment and selection for companies, leasing of personnel, training for candidates and trainers (psychological testing, job description, CV, preparation for interviews etc). The training courses offered are: Time management, Efficiency in communication, Work ethics, Leadership.
- Centrul Roman de Politici Europene (www.crpe.ro) (Engl. Romanian Center for EU policies) – developed projects dedicated to youth entering the labor market, a recently implemented project refers to Social Entrepreneurship.

Also, Romania relies on EU support to manage youth-related issues. The Youth Employment Initiative (YEI) is one of the main EU financial resources to support the implementation of Youth Guarantee schemes until 2023. Typically, the YEI ensures the funding for projects aiming to develop: apprenticeships, traineeships, job placements, further education leading to a qualification, etc. The YEI supports the implementation of the Youth Guarantee. Under the Youth Guarantee, Member States should put in place measures to ensure that young people up to the age of 25 receive a good quality offer of employment, continued education, an apprenticeship, or a traineeship within 4 months of leaving school or becoming unemployed.

The EU launched it in 2012 to provide support to young people living in regions where youth unemployment was higher than 25%. In the years 2021-2023 there is an opportunity for the Member States to increase their YEI and European Social Fund resources to help young people affected by the coronavirus crisis thanks to the additional EU funding available under the Recovery Assistance for Cohesion and the Territories of Europe (REACT-EU) initiative.

[6] https://www.adrmuntenia.ro/proiectul-noneets-destinat-tinerilor-neincadrati-pe-piata-fortei-de-munca-a-ajun/static/882
[7] http://www.lifeinjob.ro/en/index.php

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3. Results and Discussions

Youth unemployment needs to be addressed with coherent and effective policies meant to facilitate youth access to labour market, to support youth efforts to attain tertiary education which makes them less vulnerable to crisis, to reduce NEETs through targeted measures. Romania has important gaps to overcome especially in education, a sector which is heavily underfinanced compared with other EU countries. Investing in teachers' training, modernizing curricula through discussions with employers on what skills are needed, developing new training opportunities leading to new qualifications are some good investments assuring better access to labour market and, in the long run, an increase in youth productivity and economic prosperity for our nation. Several initiatives have been identified, policy-makers developed strategies and instruments to support their implementation, but the lack of continuity and an insufficient GDP's allocation to education kept the youth unemployment problem on the agenda of each new government.

A wide range of projects have been implemented and are still under implementation targeting the vulnerable category of youth unemployed. All these projects have two basic components: counseling & career advice and training. The success of each project is measured through the final results, eg. a significant decreasing rate of youth unemployment. But, to generate significant improvements, all these initiatives public or private, need to take into consideration young people's needs and being able to suggest tailored measures.

The main questions that arise are:

1. Do we have good knowledge about the needs of the people we are trying to support?
2. Do we understand why certain conditions, such as youth unemployment, exist?
3. Do we have a clear objective of what we want to achieve?
4. Are we building on existing experience and evidence when designing our training course to fulfill this objective?

Therefore we suggest a clear and systematic approach to youth unemployment issues. It is desirable to have a step-by-step approach, each step should be supported with adequate resources and the efficiency of measures should be monitored constantly.

Step. 1 Diagnosis – Understanding the labour market constraints faced by young people. A national survey on "*Job seekers' perception of labour market entry barriers/constraints*" will reveal the real problems and findings will empower policy-makers to address in a targeted manner to most acute ones using budgetary allocation more efficiently. Also, based on the country report's findings, a set of entry barriers that young job seekers need to overcome can be identified. Assessing the local labor market allowed a better understanding of what employers are looking for in terms of skills, competencies, personality types of entry-level employees. Matching information from both, the curricula can be modernized accordingly, emphasizing the practical aspects which enable youth to perform better in seeking and getting a job, such as better communication skills at interviews, or drafting CV with highlights on specific skills that help them better.

Step 2. Who needs what? Set up a mechanism able to facilitate the stakeholders' consultation – a survey for example to be conducted periodically among employers for a better understanding of what are their current requirements for entry-level jobs. What and when internships can be provided and how employers can be incentivized to made employment offers to the best young interns. Based on consultation results, publically available, the private or public initiatives will emerge, educational offers tailored to solve talent scarcity existed at locally or nationally level. Why? Well, because labour supply can be defined as the attributes that determine young people's employability – education, skills, health, cognitive abilities, etc. – and their ability to access productive employment (ILO, 2018).

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Step.3 - Elaborate targeted policies able to solve current problems. Policies implementation should be monitored using simple and powerful tools. Experienced trainers, HR specialists, and academics should work together in designing short-term/long-term policy recommendations depending on what is relevant for the labour market. Targeted policies required a more effective budgetary allocation, which means better spending of public money.
Step 4 – Feedback mechanism to report the results – any stakeholder being able to easily identify what was effective and what was not. The next round of policy measures will be more targeted, more effective, and less expensive.

Romania developed and implemented policy measures aimed at increasing employability and further promoting greater participation in employment among the younger generation. These policy initiatives targeted three main categories: measures related to education, employment-related measures, and measures to facilitate the transition from school to working life. The educational policies mainly include measures to prevent early school leaving and reintegration measures for those who come back to school. In this regard, measures to support youth employment are represented by republishing the law claiming apprenticeship work through subsidized support, employment for young graduates, a viable and competitive job market for graduates, training courses, retraining or reconversion courses provided for free to people listed in the County Employment Agencies. These measures were financially supported but unfortunately, to our knowledge, consistent studies have not been conducted to evaluate their efficiency level.

Moreover, the Romanian Government adopted the concept of "youth guarantee" that young people are given within four months since becoming unemployed, the so-called good quality offer to fill a job; the specific objectives and directions of activity of the National Strategy for Youth Policy 2014 - 2020 aiming to improve youth participation in the labor market and develop the capacity of young people to find suitable jobs according to their professional training and skills.

4. Conclusions

Youth unemployment is a phenomenon with various causes and it is the responsibility of the government to identify them, evaluate the chances to eliminate or diminish their influence, and take action through effective policies. Romania needs young talented people able to build their future in the homeland, having a significant contribution to economic growth, and enjoying good employment conditions and personal welfare. Policy-makers should act responsibly today and be aware of the consequences of their policies for the next generations to come.

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Factors Hindering Quality Performance in Construction Projects: An Empirical Study

Rawaa Hijazi[1]

Abstract. *The construction industry is crucial for the economy of any country. Learning from failure is important to reach effective quality performance in construction projects. This will, in turn, contribute to the development of the construction industry and the country as a whole. Although quality is an important criterion in project management success, it receives less attention than cost and time in project management literature. Moreover, critical success factors (CSFs) are identified more often than critical failure factors (CFFs) in construction literature. Hence, there is still a lack of attention on critical failure factors affecting quality performance in construction projects. The construction industry is full of uncertainties, especially in the current era of COVID-19 Pandemic. This adds to the necessity of studying critical failure factors in the construction industry. This study aims to identify the critical factors that have an adverse effect on quality performance in construction projects, address their relative importance, and suggest ways to attain good quality performance in construction projects. Based on the literature review, an initial list of failure attributes of quality performance in construction projects was prepared. Then it was refined based on suggestions from experienced professionals in the construction industry in the Jordanian context. A questionnaire was distributed to experts in the construction industry. The responses were analyzed using Statistical Package for the Social Sciences (SPSS). The analyses used here are factor analysis and tests of its appropriateness. Using these analyses, the most critical factors that impede quality performance in construction were identified and ranked. The study revealed that the most influencing failure factors are the managerial factor, the culture and environment factor, and the contractor factor.*

Keywords: Failure Factors, quality performance, construction projects, factor analysis

JEL Codes: L- Industrial Organizations

1. Introduction

The construction industry is complex and associated with uncertainty (Mahamid, 2020). There are many causes of uncertainty in construction projects, such as the performance of construction parties, resources availability, and contractual relations (Abd El-Karim et al., 2017). The uniqueness of construction projects, the highly competitive environment, and the challenges facing the construction industry give rise to many problems, such as delays, conflict, and deficiency of a quality assessment system (Bitamba and An, 2020). The quality of construction projects affects the development of the construction industry (Vadivel et al., 2016).

In general, project management success is measured according to cost, time, and quality. The three criteria have been known as the “iron triangle” (Larsen et al., 2016). Besides, scholars recognize it as a “triple constraint” (Anoop et al., 2016). Moreover, in the golden triangle people are placed at the center of the iron triangle; because people help maintain a balance among cost, time, and quality (Abiodun et al., 2017).

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Quality in construction refers to customer's satisfaction within a specified budget (Modi et al., 2017). A number of scholars affirmed the importance of quality in projects. Time and cost are the primary areas of focus in project management, while quality is a secondary one (Jha and Iyer, 2006). Construction projects and quality cannot exist without each other (Modi et al., 2017). Focusing on quality will result in guiding the project management toward a strategic viewpoint (Ganesh, 2016; Jugdev and Müller, 2005). It is essential to guarantee quality due to the high cost of buildings (Davidkumar and Kathirvel, 2015). Quality is one of the vital factors in any construction project. Besides, poor quality leads to problems in cost, time, and safety (Modi et al. ,2017), which in turn influences the construction industry and the country's economy (Abd El-Karim et al., 2017).

To improve the effectiveness of construction projects, CSFs and CFFs have been studied by a great number of scholars. For a project to be successful, it is necessary to understand the CSFs right from the beginning (Ranawat, et al., 2018). Rockart was the first to use the term 'CSF' in the context of project management in 1982 and defined it as "those factors predicting success on projects" (Sanvido et al., 1992 in Chan et al., 2004). The CSFs were developed from CFFs which were defined as "the deficiency or lack of various critical factors" (Pinto and Mantel, 1990). Learning from failure is important for all engineering works (El-sokhn and Othman, 2014; Pol and Konnur, 2017). Moreover, Kisavi and Ngugi (2019) pointed to the crucial importance of project performance which is achieved through avoiding the project's failure. In the United States of America (USA), several educational resources have been developed for nearly a decade to make it easier for engineering students and practicing engineers to learn from failures (Delatte ,2010).

Managers avoid discussing failure circumstances for different reasons. So, knowledge about failures in construction is not well organized (Ortega, 2000). Although a number of scholars have studied Critical factors of the construction industry in different developing countries, there is still a lack of empirical evidence on these factors within the developing countries. Besides, the results are limited to the countries in which such studies have been conducted (Toor and Ogunlana, 2008). There is a lack of studies on CFFs affecting the quality performance of construction projects in the Jordanian context. To cover this gap, the current study attempts to identify and evaluate such factors in the Jordanian context.

2. Research Elaboration

2.1. Problem

The main problem of this study is the deficiency of studies on CFFs affecting the quality performance of construction projects in the Jordanian context.

2.2. Objectives

Towards covering the gap mentioned above, the study aims to attain the following objectives:

- Firstly, identifying factors impeding the quality performance of construction projects and addressing their relative importance.
- Secondly, providing project managers and other construction stakeholders with useful recommendations, in consideration of the study results, to reach a good quality performance in construction projects.
- Finally, providing scholars with fruitful insights for future studies.

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2.3. Importance

The study importance stems from the following:

- This study will cover a gap in the literature on studies of CFFs in one of the developing countries.
- The importance of the realm of study; the construction industry is pivotal for the economy of any country.
- The study will enrich the understanding of CFFs influencing quality in construction projects.
- The study will add to the cumulative science by providing scholars with important insights for further researches.

3. Literature Review

There exists a considerable body of literature on critical factors in projects. Scholars have studied critical factors in projects in diverse manners. Some scholars have prepared a list of critical factors without grouping them (Othman and Mydin, 2014). On the other hand, other scholars have aggregated critical factors in groups (Babalola and Ojo, 2016). Moreover, some scholars have ranked the critical factors by the degree of importance (Babu, 2015). Others have not studied the relative importance of critical factors (Othman and Mydin, 2014). The focus in some studies has been on CSFs (Pol and Konnur, 2017), while others have focused on CFFs (Santoso and Gallage, 2019). Besides, few studies have recognized both types, i.e., CSFs and CFFs (Jha and Iyer, 2006). Concerning the measures, some studies have covered the three main performance measures, i.e., time, cost, and quality (Oke et al., 2016). Others have covered two measures, such as: quality and cost (Zehro and Jkhsi, 2020), cost and time (Abd El-Karim et al., 2017) or one performance measure, for example, cost (Iyerand Jha, 2006), quality (Jha and Iyer, 2006). Some scholars have recognized critical factors in the construction industry theoretically from literature (Chan et al., 2004). On the other side, critical factors are identified empirically using questionnaires (Davidkumar and Kathirvel, 2015). Some studies investigated critical factors in Construction projects in general (Santoso and Gallage, 2019). Other body of literature studied critical factors in Joint venture construction projects (Mba and Agumba, 2018), or Home building construction (Zehro and Jkhsi, 2020), or road construction projects (Kisavi and Ngugi, 2019).

Scholars have identified lists of critical factors affecting quality performance in construction projects. For instance, Singh and Sharma (2020) drew attention to the significant areas in which critical factors are usually identified such as employees and skills, functions, methods, and technologies.

A study by Irfan et al. (2019) on a random sample from different developing countries, revealed a negative relationship between stakeholder conflicts and quality in construction projects.

Dorcas et al. (2019) found construction mistakes, use of unskillful labors, destitute checking and inspection, destitute motivation system, destitute management commitment and leadership styles, deficiency of good quality construction materials, restriction of finance, and weak timely supervision as the most significant factors that influence projects' quality in Nigeria.

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Santoso and Gallage (2019) identified the top 10 critical factors affecting the performance of large construction projects in Sri Lanka, namely large project scope, site management by the contractor, complication of the project, poor planning and scheduling of activities, weakness of experience of the contractor, schedule suspensions, unstable government policies regarding the project, imprecise cost estimates, construction errors and quality issues of completed work, and imprecise time estimates.

Sheikh et al. (2019) findings indicated that the significant factors that influence the process quality of building projects in Pakistan during the construction phase are the selection of a suitable contractor, the presence of a feedback system, and the quality of shop sketches received from subcontractors.

A study conducted by Kusi et al., (2018) in the Nepalese context indicated that the main two failure factors were the lack of knowledge and commitment of the contractor on construction quality and overall quality culture and working environment.

In the Indian context, Ganesh (2016) classified the main causes of reduced quality in building projects into four groups, namely capable labor absenteeism, material deficiency, rework, and meager supervision. Project design cost, project complication, deficiency of resources, quality of equipment, and raw materials in the Nigerian construction industry were pointed out by Oke et al. (2016) as factors of poor quality performance of consultants.
The results of Shanmugapriya and Subramanian (2015) indicated that leadership and process-related problems are the most distinctive factors of quality performance in construction projects in India.
El-sokhn and Othman (2014) identified twenty-one project failure factors from literature review and classified them according to project stage, project player, and the failure factors source.
Othmanand and Mydin (2014) pointed out that the main failure factors in housing projects are inadequate communication, poor information, insufficient controls, shortage of technical skills, and deficient feedback leading to repetitive errors.
A study in India by Jha and Iyer (2006) revealed that conflict among project participants, adverse socio-economic environment, disturbing climatic condition, PM's obliviousness and lack of knowledge, imprecise project conceptualization, and offensive competition during tendering are the CFFs affecting the quality performance of projects.
An earlier study by Atkinson (1999) indicated that most defects in construction projects are due to human error.

4. Methodology

Based on an extensive review of various pieces of literature on factors of poor quality performance in construction projects in different developing countries, an initial list of failure attributes was prepared. Since the selected attributes were from studies in countries other than Jordan, the initial list was introduced to seven experienced professionals in the construction industry in Jordan to

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refine it. As a result, a final list of 25 failure attributes was developed. A questionnaire-based survey approach was used. Through email and direct distribution, responses were collected from experts in the construction industry, who work either for consultancy services or for contractors. A five-point Likert scale was used, with 5=strongly agree, 4=agree, 3=neutral, 2=disagree, and 1=strongly disagree. A total of 171 responses were received. The responses were analyzed using SPSS software. Factor analysis was conducted to reduce the list of failure attributes to a meaningful smaller number of factors and to address their relative importance them.

5. Results and Discussion

5.1 Tests of Appropriateness

Before performing Exploratory Factor Analysis (EFA), it is necessary to conduct tests of the appropriateness of factor analysis for factor extraction. Kaiser-Meyer-Olkin Measure of Sampling Adequacy (KMO) and Bartlett's Test of Sphericity was conducted. KMO value is 0.802, which is considered meritorious indicating that the distribution of data is adequate for conducting factor analysis. Besides, the significant value for Bartlett's Test of Sphericity is 0.000, which is less than the significant level 0.05, so it indicates that the data are approximately multivariate normal and acceptable for factor analysis.

5.2 Failure Factors Extracted by Factor Analysis

Factor analysis was conducted on 25 attributes to attain a smaller number of expressive factors and to rank them based on their relative importance. The extraction method used was Principal Component Analysis (PCA). Varimax with Kaiser Normalization was the rotation method used. Factor loadings (±0.5) or greater were taken into consideration since they are significant (Hair et al, 2010:135). Five failure factors were extracted. Names were assigned to the factors according to the attributes contained within them. The extracted failure factors, variance explained by each of them, cumulative variance explained and rank are shown in Table 1.

Table 1. Total Variance Explained and Rank

Failure Factor Number (Name)	**Variance explained**	**Rank**
Failure Factor 1 (Managerial)	18.92%	1
Failure Factor 2 (Culture and Environment)	13.76%	2
Failure Factor 3 (Contractor)	12.56%	3
Failure Factor 4 (Labor and Technology)	10.88%	4
Failure Factor 5 (Client)	10.61%	5
	Cumulative Variance Explained = 66.73 %	

Extraction Method: Principal Component Analysis

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It can be seen from Table 1. that the variances explained by the five failure factors are 18.92%, 13.76%, 12.56%, 10.88%, and 10.61% respectively.
Variance explained by each factor is an indication of its relative importance (Zikmund et al., 2008:596). Thus, the five factors are ranked in descending order as follows: managerial, culture and environment, contractor, labor and technology, and client. In total, the five factors explain 66.73 % of the variance. This is equivalent to R square in multiple regression analysis (Zikmund et al., 2008:596) and indicates that the researcher has 66.73 % of the information in the 5 factors that are in the original 25 attributes.

The extracted failure factors, the attributes included in each of them, and their loadings are presented in Table 2.

Table 2. Failure Factors Structure

Failure Factor Description	Loading
Failure Factor 1 (Managerial)	
Conflicts between project manager (PM) and top management	0.829
Conflicts between PM and other outside stakeholders such as sub-contractor and owner	0.765
Suspending important decisions	0.738
Unawareness of proper planning tools and techniques by PM	0.728
Poor monitoring and feedback tools	0.637
Negative attitude of PM and project participants	0.601
Disorganized resources allocation	0.594
Failure Factor 2 (Culture and Environment)	
Overlooking the project quality objectives to achieve schedule and cost	0.721
Conflicts among team members	0.668
Tendency to pass on the blame to others	0.664
Unfavorable political and economic environment	0.576
Unfavorable social environment	0.563
There is no adequate consideration of the quality issues during contractor's selection	0.558
Too many constraint codes discourage contractor in implementing quality	0.547
Failure Factor -3 (Contractor)	
Lack of awareness of contractor about benefits of implementing quality management tools in construction.	0.729
Inadequacy of understanding of contractor about construction quality	0.707
Scantiness of understanding of contractor that cost of poor quality is much higher than that of operating process.	0.639
Destructive competition among contractors at tender stage	0.630
Failure Factor 4 (labor and Technology)	
Insufficient investment in advanced technology	0.898
Shortage of adequate training	0.752

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Scarcity of skilled labor	0.634
Extreme rotation of the labor in construction organizations	o.581
Failure Factor 5 (Client)	
Insisting on speedy processes by client while issuing tender	0.730
Mismatch in capabilities of client and designer	0.727
Dearth of client commitment to quality	0.727

Rotation Method: Varimax with Kaiser Normalization

The failure factors extracted in this study along with the most distinguishing attributes Comprised in them are described below.

Failure Factor 1 (Managerial)
The attributes of failure factor 1 in Table 2. are mainly related either to PM or to top management. Thus, it is labeled as a managerial factor. Attributes included in this factor are ranked in descending order according to loading. Loading indicates the strength of the relationship between each attribute and the failure factor. (Zikmund et al., 2008,594). So, conflicts between PM and top management, conflicts between PM and other outside stakeholders, and suspending important decisions are the top three attributes in factor 1. If PM and top management work with a team spirit and positive attitude, the desired quality is achieved. Moreover, the management should give priority to crucial decisions, apply appropriate planning and monitoring tools, and allocate resources professionally.

Failure Factor 2 (Culture and Environment)
Attributes under failure factor 2 are linked to a quality culture and external environment. So, it is named culture and environment. Quality objectives should be given the same importance as schedule and cost objectives. Besides, it is essential for people in projects to put conflict aside. Moreover, a culture of being responsible should be disseminated instead of passing blame to others. The external environment is full of risks and challenges, especially during this era of COVID-19 Pandemic. To be able to cope with the dynamic political, economic, and social environment, flexible plans should be prepared at an early stage of the project life cycle with risk management embedded in them. Also, it is important to consider quality issues during contractor selection and to reduce constraint codes to encourage contractors to implement quality.

Failure Factor 3 (Contractor)
The contractor is assigned as a name for failure factor 3 since attributes within it revolve around the contractors. If contractors lack awareness and understanding about the importance of construction quality and the consequences of neglecting quality in construction, it hinders quality. In addition, destructive competition at the tender stage affects quality adversely. The selection of a low bidder usually leads to poor quality performance in projects. Quality performance in construction projects is enhanced if contractors increase their awareness about construction quality, about the costs of poor quality, and about the welfares of implementing quality management tools in construction. Moreover, if destructive competition is replaced with a positive one, it is well for all parties and quality performance in construction.

Failure Factor 4 (labor and Technology)
Attributes in failure factor 4 describe labor and construction technology. This factor includes insufficient investment in advanced technology, shortage of adequate training, scarcity of skilled

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labor, and extreme rotation of labor in construction organizations. If construction organizations invest in advanced technology, provide suitable training for labor, and reduce rotation of them, it has a progressive effect on the quality performance of construction projects.

Failure Factor 5 (Client)
It can be observed from Table 2. that insisting on speedy processes by the client while issuing the tender, mismatch in capabilities of client and designer, and dearth of client commitment to quality fall under the last factor. They are associated with the clients. That is why a name (Client) is assigned to this factor. It is obvious that the client may hamper quality performance in construction projects. The client should allow for a suitable time to attain high-quality performance. Besides, the client should be more committed to quality. Moreover, the designer should be able to understand the client's needs and interests as well as being able to convert them into a communicative and satisfying design.

The findings of this study are relevant to the ones concluded in the literature. For instance, Jha and Iyer (2006) study results revealed that conflict among project participants; adverse socio-economic environment, PM's obliviousness, negative attitude of PM and project participants, holding crucial decisions in abeyance, and offensive competition during tendering are among the major factors that adversely affect project quality performance.
Besides, four out of the five extracted factors in the current study overlap with the ones observed by (Kusi et al., 2018) as factors leading to poor quality performance in construction firms. Kusi et al. (2018) ranked four factors in descending order according to importance as follows: the awareness and commitment of the contractors in construction quality, overall quality culture and the working environment, assistance from client and workforce, and construction technology and working system. However, the rank of these factors in the current study is different. Moreover, the results of the current study reveal a fifth new factor, which is the managerial one.
Recalling that in the golden triangle people are central due to their vital role in maintaining a balance among cost, time, and quality (Abiodun et al., 2017), the human element in this study loads significantly in the five extracted factors as presented in Table 2. This also coincides with the findings of Atkinson (1999).
Moreover, it can be observed in Table 2. that conflict attributes have very high loadings; conflicts between PM and top management have a loading of 0.829. Further, the loading of conflicts between PM and other outside stakeholders such as sub-contractor and owner is 0.765. While 0.668 is the loading of conflicts among team members. This result is in line with the findings of Irfan et al. (2019) study which revealed that stakeholder conflicts in construction projects affect quality adversely. At this point, a vital issue stems which is the necessity of studying the root causes of conflicts in construction projects. Irfan et al. (2019) study is a useful one in this realm. It was pointed out that the main cause of conflict in construction is the lack of communication between construction stakeholders. Also, it was recommended to use
advanced collaborative technologies which can aid in developing communication in construction.

6. Conclusions

In this study, 25 attributes for reduced quality in construction projects are aggregated in five failure factors by means of factor analysis.

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Regarding the relative importance of the extracted factors, results revealed that the most influencing factors are the managerial factor, followed by the culture and environment factor, and then the contractor factor. The labor and technology factor and the client factor are less significant than others.

A quality performance is important to the success of construction projects. In this study, some of the previous conclusions from the literature are re-established. The crucial factors influencing the quality of construction projects basically revolves around the human resource. The human role is significant in all factors including the fourth factor, which is technology and labor.

Among the 25 attributes that constituted the five factors, "conflicts between PM and top management" is found to be the most distinctive attribute within the managerial factor. Whereas, "overlooking the project quality objectives to achieve schedule and cost" is established as number one under the culture and environment factor. Besides, "lack of awareness of contractor about benefits of implementing quality management tools in construction" is the major attribute in the contractor factor. While "insufficient investment in advanced technology" is the most recognized attribute within the labor and technology factor. Finally, "insisting on speedy processes by the client while issuing tender" is the most significant client-related attribute.

7. Recommendations

Based on conclusions drawn in this study, all stakeholders in the construction industry in the Jordanian context are recommended to be aware of and concentrate on avoiding failure factors that impede quality performance in construction projects. By doing so, quality performance in construction projects can be improved, and consequently, the construction industry can be developed.

8. Future Scope

This study was conducted on construction projects in general. Future research could identify CFFs in a specific type of construction project such as joint venture projects. Moreover, further research could be conducted to identify CFFs of construction projects and classify them based on the different stages of the project life cycle. Additionally, CFFs in different contexts could be identified in further research. What is more, the root causes of conflict, which is a distinctive attribute in the current study, could be studied in further research.

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Happiness in Italy: An empirical Analysis

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Abstract. *This paper provides empirical evidence on the determinants of happiness in Italy over the last 20 years. We investigate the correlation between happiness and several distinct socio-economic factors using individual data on Italian households obtained from the Survey on Household Income and Wealth. In addition to the usual demographic factors and income, we also consider the role of wealth and the comparison income effect. We find strong evidence of a North-South divide in happiness. In fact, our results indicate that in Southern Italy (i) males are happier than females and (ii) people are happier when their income is above the reference group income (and viceversa), i.e., there is a statistically significant symmetric comparison income effect. Further, we also study the role of additional dimensions of economic behavior, such as risk aversion and impatience, and the role of social factors, such as trust in people and interest in politics. We find that less risk-averse and less impatient individuals are happier than others and that greater trust in people and being interested in politics make people happier too.*

Keywords: Happiness, Income Comparison Effect, Risk aversion, Trust, Impatience

JEL Codes: I31

1. Introduction

In the hedonistic approach, happiness comes from avoiding suffering and from seeking pleasure in a perspective that emphasizes material goods. On the other hand, according to the eudaemonic approach, happiness entails satisfying and realizing one's true nature through a commitment to society and intellectual fulfillment. Aristotle believed that the possibility of living a happy life requires much more than mere pleasure: civil commitment, love, and friendship. Wealth and material goods are only a means to this end. The eudaemonic approach is also evident in Kant's ethics based on the idea that there is a universal moral duty that leads individuals to perform virtuous actions and therefore to happiness.

Happiness becomes a central topic in the economic debate around the 1970s when it began to be more and more evident that an analysis based on preferences only may not always provide good insights on subjective well-being related. New approaches have begun to consider some measure of personal ``satisfaction'' as an indicator of individual well-being and as a measure of a country's welfare. In macroeconomics, Di Tella et al. (2001) considered the relationship between happiness and the state of the economy considering 12 European countries. Their empirical findings suggest that happiness grows monotonically with the increase in income, changes in happiness are correlated with fluctuations in GDP, recessions create psychological damage - in addition to the increase in unemployment and the fall in GDP, and, finally, the welfare state seems to work as a compensatory force where higher unemployment benefits are associated with greater national well-being.

In a seminal paper, using cross-sectional data Easterlin (1974) shows that there is a robust correlation between income and happiness so that those who experience better economic conditions are on average happier than the others. Unfortunately, using time series data for several countries the positive

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association between income and happiness is found to be neither general nor robust: the richest countries are not always the happiest ones. Further, using data on surveys carried out in the US between 1946 and 1970 he finds that even though per capita income has increased by more than 60%, the share of people who believe they are "very happy" and "fairly happy" has not increased proportionally, but it has remained virtually constant. Therefore, happiness seems to depend very little on income fluctuations that may occur during a lifetime.

Since then, a huge literature on the demographic and socio-economic determinants of happiness/subjective well-being has grown (see, for instance, Dolan et al., 2008, and MacKerron, 2012, for comprehensive reviews of the literature). In addition to income, several dimensions of economic and social life have been found to exhibit some correlation with happiness. Among the established determinants of happiness, we have individual characteristics such as age, health, gender and education, the working status and conditions, the attitudes towards the others such as, for instance, the type of relationships, trust, volunteering, political engagement. A recent review by Lane (2017) summarizes the main findings of the relationship between happiness and some further dimensions of economic behavior such as selfishness, trust, reciprocity, risk, and time preferences.

In this paper, we provide a comprehensive analysis of the determinants of happiness in Italy using 7 waves of data from the Survey of Italian Households' Income and Wealth (SHIW). Scoppa and Ponzo (2008) carried out an empirical investigation on happiness using 2 waves of this survey (those conducted in 2004 and 2006) exploring the effect of income, wealth, and the usual socio-demographic factors. Sabatini (2014) explores the relationship between health and happiness for a single Italian province (Trento) finding that happiness is correlated with reported health status. Ferrante (2017) considers data from the 2006 SHIW wave and finds that the relationship between age and happiness may depend on the level and the type of education. Using data from several SHIW waves, Ruiu and Ruiu (2019) find that education has a positive effect on happiness and that the divergence between aspirations and achievements has a negative one, more so for individuals with higher levels of education. This result highlights the role of reference or comparison group in determining individual subjective well-being. Using a stochastic frontier approach, Bonanno et al. (2020) investigate differences in well-being across Italian regions providing a ranking of these regions in terms of efficiency scores. It turns out regions located in Northern Italy are, in general, closer to the efficient frontier than the others. The plan of the paper is as follows: the next section describes the data and the methodology. Next, we discuss the empirical results considering both the average marginal effect of specific regressors and the predicted probability of happiness. We consider regressors associated with economic conditions, demographic characteristics, social attitudes, and risk and time preferences. Some concluding remarks are left to the final section.

2. DATA AND METHODOLOGY

We consider data at the individual level from 7 waves of the Survey of Italian Households' Income and Wealth (SHIW) from 2004 to 2016. SHIW is carried out every two years by the Bank of Italy and it provides data on social, demographics, and economic characteristics of about 8,000 households for a total of almost 20,000 individuals[2] (
).

The dataset contains individual data on gender, age, civil status, households' composition, employment, educational level as well as detailed information on income and wealth (both financial wealth and real assets). Starting from 2004 the following question on happiness has been asked in each wave:

[2] http://www.bancaditalia.it/statistiche/tematiche/indagini-famiglie-imprese/bilanci-famiglie/index.html

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"*Considering all the aspects of your life, how happy would you say you are? Please score on a scale from 1 to 10, where 1 means "extremely unhappy" and 10 "extremely happy," and the intermediate numbers serve to graduate the response.*"

The relative frequency of answers is graphed in Figure 1 (left panel), where four waves only are considered for clarity. There is substantial stability of happiness levels across time with a mode either at a reported level of 7 (2004 and 2008) or 8 (2012 and 2016). The right panel reports the distribution of happiness for a representative year (2016) where average happiness is equal to 7.03 with a standard deviation of 1.88, median happiness is 7 and about 70% of the respondents indicate a level of happiness between 5 and 8 (included).

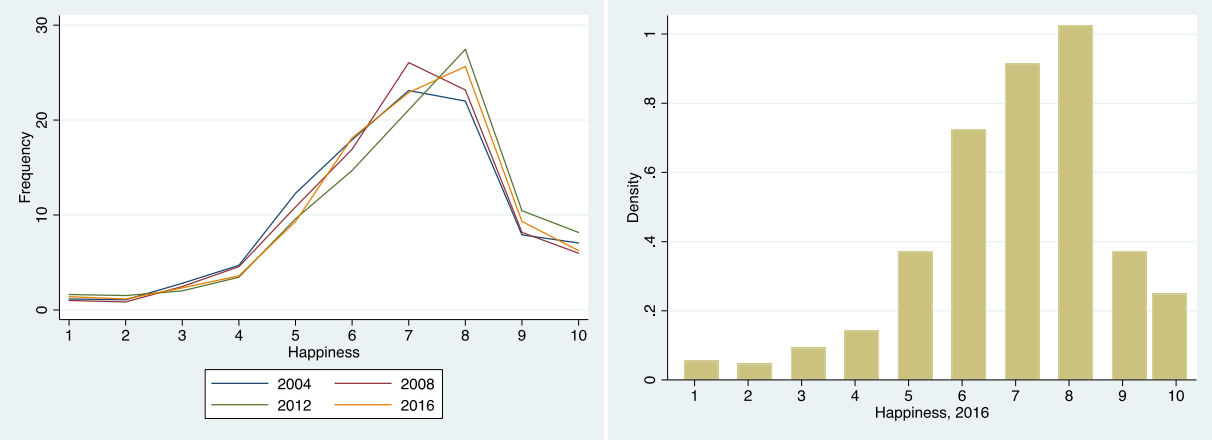

Figure 1. Distribution of reported Happiness, selected years

Table 1 reports the mean and the standard deviation of the main demographic and socio-economic variables that will be used in the regression analysis. For instance, females represent 43.5% of the sample and a college degree is the highest level of education obtained by 10.6% of respondents while a high school diploma by 31.6%. The average income is around 35000euros and the average wealth, which is rarely available in happiness studies, is about 260000euros (nominal variables have been deflated by the GDP deflator).
The average family size is 2.35. People living in Northern Italy make up 45.9% of the sample, those living in Southern Italy are about 32%. Only 10% of people live in big cities and the rest equally split into small and medium-sized cities. Retired are 45.6% of the sample, unemployed slightly less than 5%.

Given the ordinal nature of the dependent variable, *Happiness*, the empirical analysis will be carried out using the ordered Probit model. This approach assumes that there exists an underlying continuous latent happiness level, say y^*, which is linearly related to a set of regressors, say x, as follows $y^* = x'\beta + u$, where β is a vector of parameters and u is the error term. The response mechanism is such that reported happiness is equal to j for $j=1, \ldots, 10$, such that

$$
\begin{aligned}
&y=1 \quad if \quad && y^* = x'\beta + u \le c_1 \\
&y=2 \quad if \quad && c_2 < y^* = x'\beta + u \le c_3 \\
&\ldots \\
&y=9 \quad if \quad && c_8 < y^* = x'\beta + u \le c_9 \\
&y=10 \quad if \quad && y^* = x'\beta + u \ge c_9
\end{aligned}
$$

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where the *c*'s represent a set of cut-off points discretizing the continuous latent y^* into *10* observed ordered categories. Therefore, the observable variable *y* takes 10 distinct values (1, 2, …, 10) and its probability distribution is given by

$$Prob(y=1|x) = Prob(y^* \leq c_1|x) = Prob(x'\beta + u \leq c_1|x)$$
$$Prob(y=2|x) = Prob(c_1 < y^* \leq c_2|x) = Prob(x'\beta + u \leq c_2|x) - Prob(x'\beta + u \leq c_1|x)$$
$$\dots$$
$$Prob(y=9|x) = Prob(c_8 < y^* \leq c_9|x) = Prob(x'\beta + u \leq c_9|x) - Prob(x'\beta + u \leq c_8|x)$$
$$Prob(y=10|x) = Prob(y^* \geq c_9|x) = Prob(x'\beta + u \geq c_9|x)$$

Assuming that the error term *u* is distributed as a standard Normal random variable gives the ordered Probit model. The parameters β and the cut-off points c_j, *j=1, …,9,* can then be estimated by Maximum Likelihood and inference can be conducted in the usual way. Differently from OLS, where the coefficients can be interpreted as marginal effects, estimated coefficients from ordered Probit models must be interpreted with care. In particular, a positive coefficient implies that an increase in the (associated) regressor determines an increase in the latent variable which, in turn, lowers the *prob(y=1|x)* and increases the *prob(y=10|x)* (the reverse applies for a negative coefficient). Nothing can be said on the probabilities associated to the intermediate categories by simple inspection of the estimated coefficients. Average marginal effects will be used for this purpose.

3. ESTIMATION RESULTS

3.1 Age and Gender

Several determinants of happiness are considered in this empirical investigation. The discussion starts by considering the usual socio-demographic determinants and income which also allows assessing the effect on the happiness of income comparisons across reference group. Estimation results for the ordered Probit model for these basic specifications are reported in Table 2 (all regressions include year dummies, cut-off points are not reported).

We start with the estimation results for the basic specification in column (1), where we only include socio-demographic variables and dummy variables for income quintiles, notice however that most comments apply in general. Estimated coefficients from ordered Probit models cannot be interpreted as marginal effects, as it would be the case when using OLS, but their sign can be used to predict the effect of a change in the relevant regressor on the probability of the lowest and highest outcome, i.e., the lowest and highest level of stated happiness. Age, gender, education, employment status, city size, macro-region and income have a statistically significant effect on happiness, as well as wealth and reference income in the broader specifications (Col (2)-(5)). In particular, females have a higher (lower) probability of being in the lowest (highest) bracket of reported happiness. The reverse occurs for people living with their partner or sons and attaining higher levels of education has a monotonically increasing effect on happiness. This same pattern occurs when we consider income quintiles suggesting that moving from the first to higher quintiles will increase (decrease) the probability of reporting the highest (lowest) level of happiness. This latter result is in line with the intuition and the empirical evidence that, in cross-sectional data, happiness increases with income. Similar remarks apply to other regressors si that, for instance, living in smaller cities increases the probability of reporting the lowest level of happiness and decreases the probability of reporting the highest one. Moving to Southern Italy has a statistically significant effect with a negative sign indicating that the probability of being unhappy would increase and the probability of being happy would decrease. A more detailed picture of the correlation between happiness and specific regressors can be obtained by looking at the average marginal effects and at the predicted probability of reporting a specific level of happiness. Average Marginal Effects (AME) for females are reported in Figure 2, left panel. It is clear how females face a higher probability of reporting levels of

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happiness below the median level, i.e., more precisely in the range 1-6, and a lower probability of reporting levels of happiness in the range 8-10, i.e., above the median level of 7. The right panel of Figure 2 display the predicted probabilities of reporting some selected levels (less than or equal to 2, median, and greater than or equal to 9) of happiness as a function of age. The solid line indicates that the probability of reporting the median level of happiness is less than 20% for twenty years old individuals, it slowly increases up to 40 years old, and then it flattens from there on at slightly less than 25%. Similarly, the dashed line shows that the probability of reporting the two highest levels of happiness (9 and 10) starts at more than 30% and monotonically decreases with age up to 60 years when it flattens at more than 10%. As for the probability of reporting the lowest levels of stated happiness (dash-and-dotted line), apart from being rather small, it (very) slowly increases as age increases up to 60 years, and then it flattens.

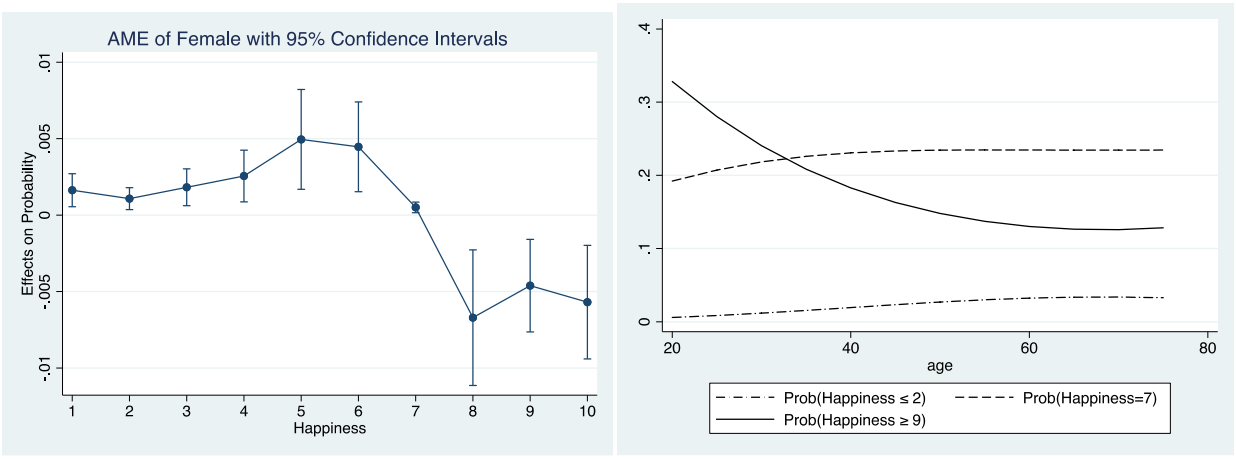

Figure 2. AME of Female (up) and predicted probabilities of Happiness as a function of age (down).

3.2 Wealth and comparison income effect

Table 2, Col. (2)-(5), reports estimation results for alternative specifications of the basic regression model where, in addition to income, we explicitly include an individual's wealth and we study the presence of the so-called income comparison effect. In column (2) we include wealth quintiles, whose coefficients exhibit a positive and increasing magnitude and are statistically different from zero. Further, we notice substantial stability in the coefficients associated with the regressors included in the previous specification (col. (1)). As an effect of the inclusion of wealth, the coefficients associated with income quintiles decrease in magnitude even though the sign, pattern, and statistical significance are unchanged.

In Columns (3)-(5), we investigate the role of relative income, i.e., the income of a reference group, as a determinant of happiness. In the current analysis, the reference group is defined as the group of individuals living in the same macro-area (either North, Center or South), with the same educational level and with age in the (-5, +5) range. The average (log) income of the reference group is then included as a separate regressor in col. (3) and the difference between own (log) income and (log) reference income is further included in col. (4). Reference income is not statistically significant in col. (3) but the distance between own income and reference income is significant at the 1% level in col. (4). This result is in accordance with the intuition that individuals whose income is above the latent reference group income face a higher probability of reporting the highest level of happiness, after controlling for their own position in the income distribution.

Following Ferrer-i-Carbonell (2005), in col. (5) we also consider the possibility of asymmetric effects of deviations from group reference income. To this end, the regressor *poorer* is defined as the difference between reference income and own income whenever this difference is positive and zero otherwise, while the regressor *richer* is defined as the difference between own income and reference income if the difference is positive and zero otherwise. The general idea of the asymmetric effect is that individuals are less happy when their income is below reference income while they are not necessarily happier when

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their income is above reference income. Recall that, from col. (3) and col. (4), we know that reference income does not significantly affect reported happiness while the distance between the individual's income and the reference group income has a positive effect. The interpretation is that a positive (negative) difference between the individual's income and the reference group would increase (decrease) the probability of reporting the highest level of happiness. Further, according to Ferrer-i-Carbonell (2005) income comparisons do exert an asymmetric effect and, in fact, from col. (5), we have that (i) the estimated coefficient of *poorer* is significant and negative, i.e., poorer people get less happy when their income is below the reference income and (ii) the estimated coefficient of *richer* is also significant and positive, i.e., richer people get happier when their income is above the reference income. However, differently from the findings in Ferrer-i-Carbonell (2005), not only do poorer individuals exhibit lower subjective well-being when their own income is lower than that of the reference group income but also richer people are happier when their own income is greater than reference group income. Thus, there is no asymmetric effect of departures from the group reference income. AMEs for *richer* and *poorer*, reported in Figure 3, provide a detailed picture of the effect of income comparisons on happiness (again, notice the differential effect below and above the median level of happiness).

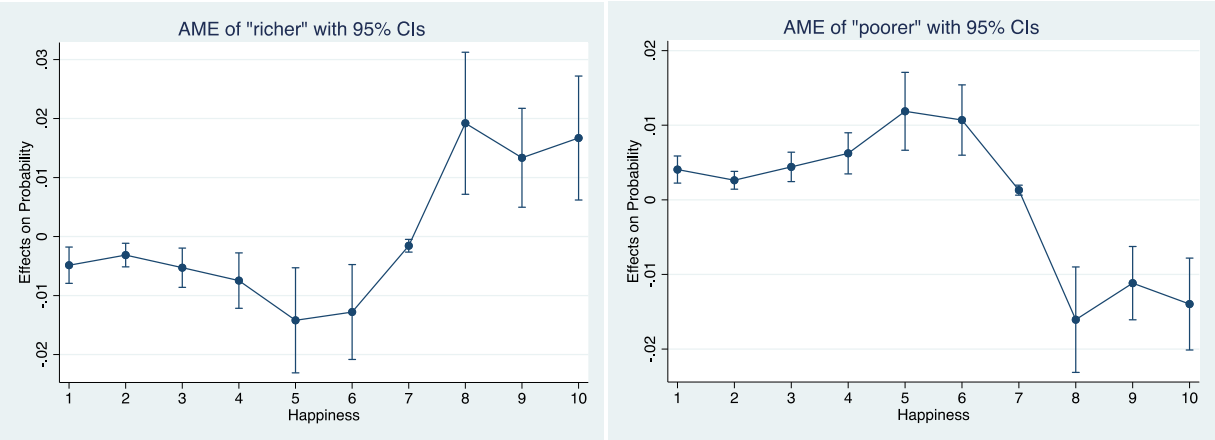

Figure 3. AME of "poorer" (left) and "richer" (right).

3.3 North-South divide

Results in col. (1) suggest substantial differences in reported happiness across Italy. Southerners display significantly lower levels of happiness with respect to people living in Center or Northern Italy. It may be therefore interesting to further investigate the issue of a possible North-South divide in reported happiness by estimating separate regression models for each of the three Macro-regions. Results are reported in Table 3 (year dummies and cutpoints are always included but not reported). Some differences are noticeable: first, the effect of gender on happiness does not appear to be stable across Italy, there is no effect in Northern Italy, a mildly significant negative effect in Center Italy, and a statistically significant negative effect in Southern Italy. Thus, the overall negative effect for Females found in Table 2 seems to be driven by Southern Italy. Similarly, living a medium-sized or in a large city has a negative effect while living with a partner and attaining higher educational levels exert a stronger positive effect for Southerners. More interesting is the effect of departures from the reference income group. There is no comparison income effect in Northern and Central Italy whereas, on the other hand, there is a sizeable and significant effect in Southern Italy so that when the reference income is higher (lower) than own income, the less (more) satisfied is the individual. Overall, we have not only significant differential effects of the demographic variables on happiness across macro-regions but also a specific comparison income effect in Southern Italy.

3.4 Health, type of work, and civil status

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We now move to analyze some further dimensions which might be correlated with happiness such as health conditions, type of work, and civil status. For the latter, we distinguish between married, divorced, and widowed to study the possible impact of living alone after an adverse life event. As for the type of work, we separately consider unemployed, blue-collar workers, white collars and retired with self-employed as the excluded category. Finally, health conditions are obtained by the following question:

"I would now like to talk about the health of the household members. How would you describe the state of health of (excellent, good, fair, poor, very poor) at the end of …?"

Starting with perceived health status, from col. (1) in Table 4, we notice a steady decrease in the estimated coefficients of reported health as the perceived health conditions worsen, which is in accordance with the intuition that happiness is negatively affected by bad or worsening health conditions. Predicted probabilities for the two lowest, median, and the two highest levels of happiness are graphed in Figure 4 (left panel). We notice how the predicted probability of reporting the median level of happiness (solid line) is stable in the Excellent-Fair range and it falls significantly as health conditions deteriorate. A decreasing pattern occurs for the highest levels of happiness (dashed line), the reverse is true for the lowest level of happiness where the probability of the two lowest levels of happiness increases as perceived health worsens. Overall, these results are following the intuition that good (bad) health conditions affect positively (negatively) subjective well-being.

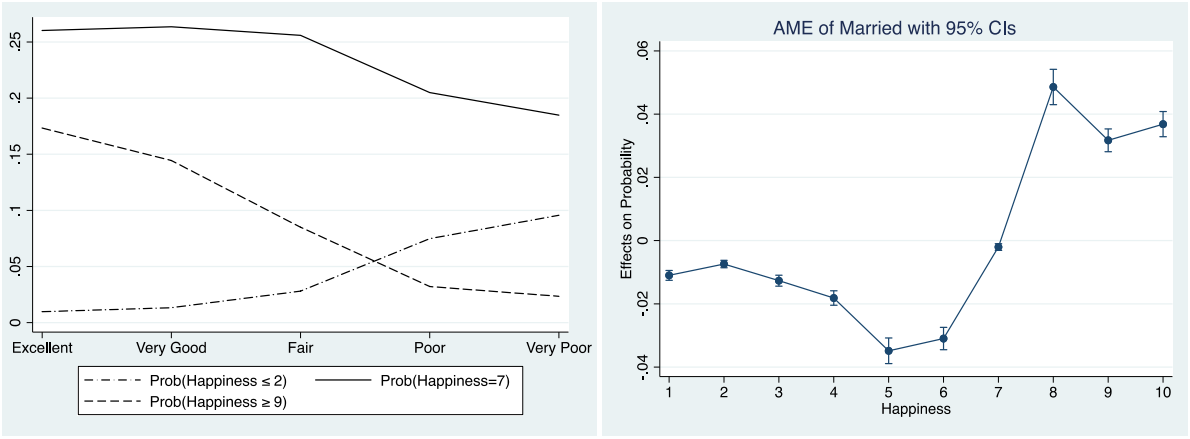

Figure 4. Prediction of Happiness as a function of perceived Health status and AME of Married.

Table 4, col. (2) and (3), report results for the effect of the civil status and the type of work. AME for married people is reported in Figure 5 (right panel). Married people (which includes people living with a partner) face a higher probability of being happier and a lower probability of reporting the lowest level of happiness, suggesting that being alone has a negative effect on happiness whereas, on the other hand, a marriage or a stable relationship exert a positive effect on happiness. A reverse pattern can be observed for people being in a relationship. As expected, divorced and widowed individuals experience a significant fall in happiness with respect to the people living with a partner. As for the type of work, white-collar workers are significantly happier than blue-collars or self-employed ones as is the case for retired ones. Finally, as expected, unemployment has a negative effect on subjective well-being.

3.5 Time, risk preferences, and social attitudes

Specific factors related to individual time and risk preferences and social attitudes which may possibly affect happiness appear in distinct waves of the survey. In particular, time preferences, interest in politics are investigated in 2004, risk preferences in each wave since 2004, trust in people in 2010.

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A separation between individuals willing to bear some risk and those willing to bear none can be recovered from the following question.

When managing your financial investments, would you describe yourself as someone who looks for:

- *Very high returns, regardless of a high risk of losing part of your capital*
- *a good return, with reasonable security for your invested capital*
- *a reasonable return, with a good degree of security for your invested capital*
- *low returns, without any risk of losing your capital*

While there might not be consensus on what the term "high", "good" and "reasonable" mean in financial investments in that different individuals may have a different interpretation or feel about them, there is no ambiguity in the last option where there is "no risk" of losing the invested capital. Therefore, we label as "risk-averse" those who choose this last answer. Table 5, Col. (1), reports regression results when the dummy for "risk aversion" is included. We notice the negative and statistically significant coefficient which implies that people less willing to take a risk have a higher (lower) probability of reporting the lowest (highest) level of happiness. AME for risk aversion is graphed in Figure 5 (top left graph). In general, the AME is rather small which is in accordance with the literature reviewed in Lane (2017). The Mood Maintenance Hypothesis (Isen and Patrick, 1983) would suggest that a positive mood induces more risk-averse behavior while the Affect Infusion Model (Forgas, 1995) would suggest a reverse result so that positive mood leads to risk-seeking behavior. The empirical evidence is mixed so that, for instance, Guven and Hoxha (2015) report results in favor of the Affect Infusion Model while Kamstra et al. (2003) findings are in favor of the Mood Maintenance Hypothesis as are our results from the SHIW survey on Italy.

There are some empirical papers on the correlation between happiness and time preferences. For instance, Guven and Hoxha (2015) provide some evidence on a positive effect of mood on happiness in that happier people are more patient. Howevere, there is little empirical evidence on a direct effect of impatience on happiness even though Stutzer and Meier (2016) find that self-control problems affect negatively happiness. Preliminary insights on the effect of the time preferences (or impatience) of individuals on happiness can be obtained considering the following question:

Imagine you were told you had won on the lottery the equivalent of your household's net annual income. The sum will be paid to you in a year. However, if you give up part of the sum you can have the rest immediately. To get the money right away would you give up 5 percent of this sum?

1. *Yes*
2. *No, I'd wait a year to collect the whole amount*

where we label as "impatient" an individual who is willing to give up some amount of money in exchange for the immediate availability of a sum. From col. (2) in Table 5 we observe a negative and statistically significant coefficient suggesting that impatient people face a greater probability of reporting the lowest level of happiness. AME can be found in Figure 5 (top right graph).

Whether there is a correlation between trust in people and happiness is an interesting issue to be investigated. In the 2010 wave, the following question on trust in people has been posed:

"Please consider the following statement: "It is always all right to keep money you have accidentally come into possession of even when it would be possible to return it to the rightful owner (say, if you find

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a wallet with the owner's documents)". How strongly to you agree, on a scale from 1 to 10 where 1 means "totally disagree" and 10 means "totally agree"? The intermediate scores serve to graduate your response."

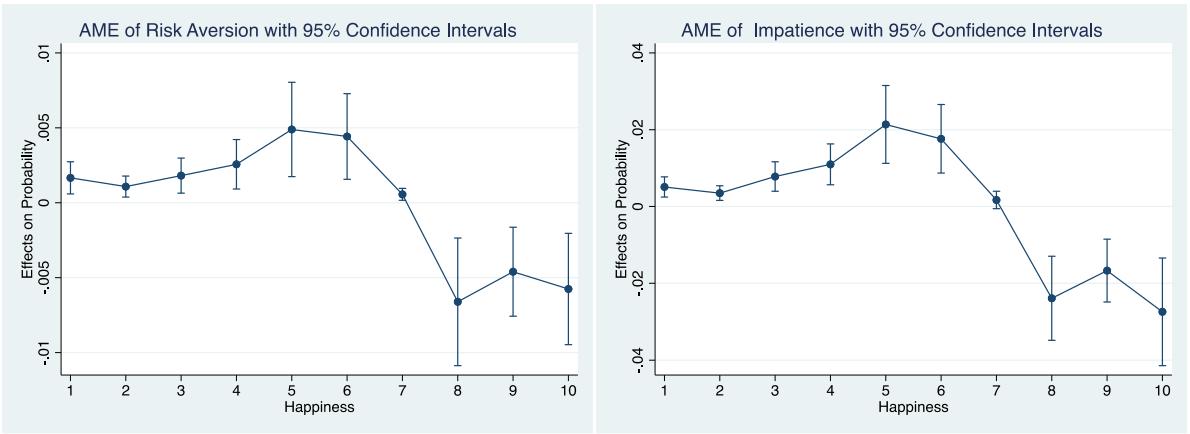
Regression results for the normalized answers in the (0, 1) interval can be found in col. (3). The positive and statistically significant coefficient indicates that as trust increases the probability of the lowest level of happiness decreases and, at the same time, the probability of the highest level of happiness increases. These findings are in accordance with the experimental and non-experimental literature on the effect of trust on happiness, see, for instance, Kuroki (2011) and Lu et a. (2019). The effects on the intermediate levels of happiness can be obtained by looking at the AME in Figure 5 (bottom left graph).

Finally, is interest in politics correlated with happiness? This can be assessed by considering the following question:

"How interested are you in politics?

1. *Very*
2. *Fairly*
3. *Not very*
4. *Not at all"*

On the one hand, we aggregate "Very" and "Fairly" and, on the other hand, "Not very" and "Not at all" to differentiate those who are interested in politics from those who are not. Col. (4) reports the estimated results when a dummy variable for interest in politics is included and AME can also be found in Figure 5 (bottom right graph).



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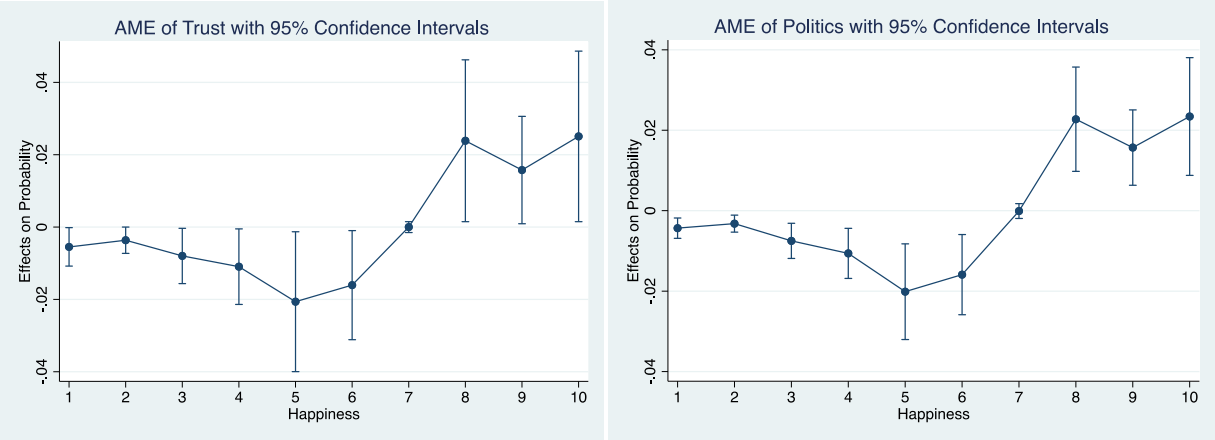

Figure 5. AME of Risk aversion, Impatience, Trust and Politics

5. Conclusion

In this paper, we study the determinants of happiness in Italy over the period 2004-2016 using individual data. We examine the correlation between happiness and several distinct socio-economic factors. We consider the usual demographic variables, and we also consider the role of wealth and the comparison income effect. We find strong evidence of a North-South divide in happiness so that, for instance, (i) gender is correlated with happiness and (ii) asymmetric comparison income effect is found to be statistically significant in Southern Italy only. We also provide a study of the role of additional dimensions of economic behavior, such as risk aversion and impatience, and the role of social factors, such as trust in people and interest in politics. We find that less risk averse and less impatient individuals are happier than the others. Further, we also find that higher trust in people and interests in politics make people happier too.

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Appendix no.1

Table 1. Descriptive Statistics, SHIW 2004-2016

Variable	Mean	StdDev	Variable	Mean	StdDev
Happiness	6.868	1.838	Unemployed	0.046	
Age	59.198	16.337	Retired	0.456	
Female	0.435		Small Town	0.443	
Married	0.567		Medium Town	0.458	
Widowed	0.194		Large Town	0.099	
Divorced	0.087		North	0.459	
No education	0.049		Center	0.219	
Primary education	0.244		South	0.323	
Junior High School	0.283		Household size	2.357	1.254
High School	0.316		Income	35240.55	31403.79
College	0.106		Wealth	261666.7	491926.7

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Appendix no.2

Table 2. Basic Specifications SHIW 2004-2016 (robust SE in parenthesis)

	(1)	(2)	(3)	(4)	(5)
Age	-0.0444***	-0.0477***	-0.0457***	-0.0388***	-0.0386***
	(0.0031)	(0.0031)	(0.0035)	(0.0033)	(0.0033)
Age^2	0.00032***	0.00034***	0.00034***	0.00028***	0.00028***
	(0.00003)	(0.00003)	(0.00003)	(0.00003)	(0.00003)
Female	-0.050***	-0.050***	-0.049***	-0.047***	-0.048***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Married	0.328***	0.331***	0.328***	0.323***	0.323***
	(0.018)	(0.018)	(0.018)	(0.018)	(0.018)
Junior High School	0.109***	0.102***	0.105***	0.141***	0.138***
	(0.023)	(0.023)	(0.024)	(0.024)	(0.024)
High School	0.205***	0.187***	0.196***	0.263***	0.262***
	(0.024)	(0.024)	(0.029)	(0.026)	(0.026)
College	0.285***	0.260***	0.270***	0.367***	0.367***
	(0.031)	(0.032)	(0.041)	(0.035)	(0.035)
Unemployed	-0.390***	-0.395***	-0.390***	-0.344***	-0.363***
	(0.041)	(0.041)	(0.041)	(0.042)	(0.041)
Medium City	-0.131***	-0.128***	-0.131***	-0.130***	-0.132***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.016)
Large City	-0.059**	-0.049**	-0.057**	-0.060**	-0.059**
	(0.024)	(0.024)	(0.024)	(0.024)	(0.024)
Center	-0.012	-0.024	-0.012	-0.016	-0.014
	(0.019)	(0.019)	(0.019)	(0.019)	(0.019)
South	-0.176***	-0.185***	-0.171***	-0.208***	-0.207***
	(0.018)	(0.018)	(0.020)	(0.019)	(0.019)
Sons/Daughters	0.027*	0.029*	0.027	0.032*	0.033**
	(0.017)	(0.017)	(0.017)	(0.017)	(0.017)
II income quintile	0.298***	0.251***	0.298***	0.234***	0.238***
	(0.024)	(0.025)	(0.024)	(0.027)	(0.027)
III income quintile	0.429***	0.343***	0.427***	0.328***	0.334***
	(0.025)	(0.027)	(0.026)	(0.031)	(0.031)
IV income quintile	0.534***	0.424***	0.531***	0.398***	0.403***
	(0.027)	(0.030)	(0.028)	(0.037)	(0.036)
V income quintile	0.666***	0.522***	0.662***	0.479***	0.481***
	(0.030)	(0.034)	(0.031)	(0.045)	(0.045)
II wealth quintile		0.115***			
		(0.025)			
III wealth quintile		0.162***			
		(0.026)			
IV wealth quintile		0.216***			
		(0.027)			
V wealth quintile		0.249***			
		(0.031)			
log(ref. income)			0.020		
			(0.034)		
Log(income) – log(ref.income)				0.126***	
				(0.024)	
Richer					0.140***
					(0.045)
Poorer					-0.117***
					(0.026)
N	19675	19675	19666	19591	19675
Log-Likelihood	-36653.5	-36611.2	-36633.0	-36462.6	-36636.2
Pseudo R-squared	0.0457	0.0468	0.0457	0.0458	0.0461

Note: ***, ** and * stand for statistically significant at the 1%, 5% and 10% level, respectively.

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Appendix no.3

Table 3. North-South divide, SHIW 2004-2016 (robust SE in parenthesis)

	(1)	(2)	(3)
Age	-0.041***	-0.034***	-0.040***
	(0.005)	(0.007)	(0.006)
Age^2	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Female	-0.034	-0.057*	-0.060**
	(0.023)	(0.034)	(0.029)
Married	0.284***	0.314***	0.398***
	(0.026)	(0.039)	(0.032)
Junior High School	0.114***	0.155***	0.138***
	(0.036)	(0.050)	(0.040)
High School	0.224***	0.202***	0.341***
	(0.039)	(0.052)	(0.047)
College	0.238***	0.384***	0.533***
	(0.052)	(0.068)	(0.068)
Unemployed	-0.482***	-0.286***	-0.319***
	(0.072)	(0.088)	(0.059)
Medium City	-0.105***	-0.024	-0.242***
	(0.023)	(0.034)	(0.028)
Large City	-0.060*	0.011	-0.097**
	(0.034)	(0.056)	(0.042)
Sons	0.048*	-0.004	0.030
	(0.025)	(0.036)	(0.029)
II income quintile	0.256***	0.223***	0.189***
	(0.043)	(0.063)	(0.041)
III income quintile	0.368***	0.325***	0.273***
	(0.049)	(0.069)	(0.050)
IV income quintile	0.448***	0.422***	0.315***
	(0.055)	(0.079)	(0.064)
V income quintile	0.560***	0.525***	0.355***
	(0.068)	(0.093)	(0.085)
Richer	0.096	0.144	0.180**
	(0.065)	(0.102)	(0.084)
Poorer	-0.054	-0.114*	-0.202***
	(0.040)	(0.059)	(0.043)
N	9043	4324	6308
Log-Likelihood	-16286.4	-7999.0	-12184.5
Pseudo R-squared	0.0366	0.0444	0.0495

Note: ***, ** and * stand for statistically significant at the 1%, 5% and 10% level, respectively.

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Appendix no.4

Table 4. Health, type of work and civil status, SHIW 2004-2016 (robust SE in parenthesis)

	(1)	(2)	(3)
Age	-0.045***	-0.044***	-0.045***
	(0.007)	(0.003)	(0.003)
Age^2	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)
Female	-0.136***	-0.033**	-0.046***
	(0.037)	(0.016)	(0.016)
Married	0.470***	0.257***	0.338***
	(0.041)	(0.024)	(0.018)
Junior High School	0.121**	0.103***	0.119***
	(0.051)	(0.023)	(0.023)
High School	0.217***	0.196***	0.195***
	(0.053)	(0.024)	(0.024)
College	0.272***	0.270***	0.262***
	(0.070)	(0.032)	(0.032)
Medium City	-0.115***	-0.130***	-0.132***
	(0.035)	(0.016)	(0.016)
Large City	-0.154***	-0.059**	-0.061**
	(0.050)	(0.024)	(0.024)
Center	-0.048	-0.012	-0.012
	(0.040)	(0.019)	(0.019)
South	-0.041	-0.174***	-0.177***
	(0.041)	(0.018)	(0.018)
Sons/Daughters	-0.111**	0.045***	0.029*
	(0.046)	(0.017)	(0.017)
II income quintile	0.266***	0.296***	0.292***
	(0.052)	(0.024)	(0.024)
III income quintile	0.332***	0.425***	0.419***
	(0.055)	(0.025)	(0.025)
IV income quintile	0.472***	0.532***	0.520***
	(0.060)	(0.027)	(0.027)
V income quintile	0.559***	0.668***	0.652***
	(0.064)	(0.030)	(0.030)
Unemployed	-0.222**	-0.396***	-0.357***
	(0.100)	(0.041)	(0.044)
Blue Collar			-0.004
			(0.027)
White Collar			0.109***
			(0.026)
Retired			0.077***
			(0.027)
Good Health	-0.130***		
	(0.042)		
Fair Health	-0.468***		
	(0.059)		
Poor Health	-0.984***		
	(0.088)		
Very Poor Health	-1.132***		
	(0.158)		
Divorced		-0.071**	
		(0.033)	
Widowed		-0.150***	
		(0.030)	
N	4205	19675	19675
Log-Likelihood	-7640.9	-36641.5	-36640.6
Pseudo R-squared	0.0755	0.0460	0.0460

Note: ***, ** and * stand for statistically significant at the 1%, 5% and 10% level, respectively.

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Appendix no.5

Table 5. Time and risk preferences and social attitudes, SHIW 2004-2016 (robust SE in parenthesis)

	(1)	(2)	(3)	(4)
Age	-0.044***	-0.042***	-0.041***	-0.043***
	(0.003)	(0.008)	(0.008)	(0.009)
Age^2	0.000***	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Female	-0.047***	0.007	0.005	0.028
	(0.016)	(0.044)	(0.044)	(0.047)
Married	0.329***	0.438***	0.435***	0.455***
	(0.018)	(0.050)	(0.050)	(0.055)
Junior High School	0.108***	0.192***	0.187***	0.198***
	(0.023)	(0.062)	(0.062)	(0.064)
High School	0.200***	0.265***	0.256***	0.250***
	(0.024)	(0.064)	(0.065)	(0.069)
College	0.277***	0.206**	0.188**	0.129
	(0.031)	(0.082)	(0.082)	(0.091)
Unemployed	-0.390***	-0.147	-0.144	-0.220
	(0.041)	(0.138)	(0.138)	(0.155)
Medium City	-0.133***	-0.048	-0.039	-0.049
	(0.016)	(0.042)	(0.043)	(0.045)
Large City	-0.063***	-0.079	-0.086	-0.089
	(0.024)	(0.061)	(0.061)	(0.066)
Center	-0.010	-0.055	-0.045	-0.049
	(0.019)	(0.050)	(0.050)	(0.055)
South	-0.181***	-0.190***	-0.180***	-0.213***
	(0.018)	(0.049)	(0.049)	(0.052)
Sons/Daughters	0.029*	-0.034	-0.042	-0.040
	(0.017)	(0.046)	(0.045)	(0.050)
II income quintile	0.298***	0.228***	0.227***	0.169**
	(0.024)	(0.067)	(0.067)	(0.071)
III income quintile	0.426***	0.226***	0.231***	0.173**
	(0.025)	(0.069)	(0.069)	(0.073)
IV income quintile	0.529***	0.424***	0.433***	0.341***
	(0.027)	(0.073)	(0.073)	(0.077)
V income quintile	0.659***	0.610***	0.626***	0.563***
	(0.030)	(0.079)	(0.079)	(0.084)
Risk aversion	-0.048***			
	(0.016)			
Impatience		-0.192***		
		(0.046)		
Trust			0.185**	
			(0.088)	
Politics				0.175***
				(0.052)
N	19675	2739	2739	2427
Log-Likelihood	-36649.0	-5158.0	-5164.6	-4577.6
Pseudo R-squared	0.0458	0.0437	0.0425	0.0420

Note: ***, ** and * stand for statistically significant at the 1%, 5% and 10% level, respectively.

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Determinants of Inequality and Polarization of Expenditure Huseholds in Cameroon

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Abstract. *This paper analyzes the determinants of inequalities and the polarization of household spending in Cameroon between 2007 and 2014. To achieve this, it uses data from Cameroonian household surveys (ECAM III and ECAM IV). The breakdown of Oaxaca-Blinder (1973) and that of Duclos-Estéban-Ray (2004) developed by Araar (2008) show that the level of education, the socio-professional category and the size of the household are the factors that determine the disparity in expenditure per consumption unit between households. However, the rural environment, the Far North and North West Cameroon regions contribute more to intra-group polarization. Hence the interest in further promoting and improving educational policies, access to decent employment in areas in crisis and continuous awareness-raising actions for responsible motherhood.*

Keywords: Cameroon, Household expenditure, Inequalities, Polarization

JEL Codes: D10, O12, E24

1. Introduction

The real problems that influence the relationships between people in a society are those linked to the phenomena of inequality and polarization. Questions related to the increase in inequalities and to resolution measures are among the priorities of international organizations, governments and civil societies around the world. In order to reduce inequalities, the concepts of equity and social justice are generally used. The fight against inequalities is also essential to reduce extreme poverty, promote transformations aimed at sustainability, promote social progress, end conflicts and violence and develop inclusive governance (WB, 2017). Inequalities can be social, but also economic. Economic inequalities arise from a disparity between individuals or social groups relating to economic advantages and disadvantages. For Sen (1997), inequality can be defined not only as a measure of the gap, but also as a measure of the difference between real income and necessities. Regarding social inequality, Piketty (2005) defines it as the measure of a relative difference in the situation between individuals with regard to either endowment of human or physical capital, either income, or access to certain services that can be allocated by the market or by the public sector.

On the theoretical level, it is known that certain forms of inequality can transform into polarization. The definition of the latter concept is based on the formation of two or more sub-groups in society. Polarization increases if inequality within subgroups decreases and increases with increasing intergroup inequality. It is related both to the feeling of alienation that individuals feel from others and from groups that are distinct from them, and to that of belonging to a particular group. In terms of economic policies, following the work

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of Estéban et al. (1999), it is known that polarization levels (income or expenditure) can generate conflicts between the subgroups that constitute a society. The search for a low level of polarization in society thus rests on several foundations similar to those which seek a kind of equality. The concepts of inequalities and polarization are therefore linked and close to each other, but highlight different aspects of the allocation of the variable measured on individuals. How these variables evolve determines the perception that the population has of the dynamism of a society. It is in fact, «very different to live in a society where living conditions converge over time or in a society in which the situations of different social layers diverge more and more» (Maurin, 2007). The persistence of inequalities and polarization fundamentally raises the question of the efficiency of the economic system.

Among the social imbalances, income / expenditure inequalities are seen as the most widespread. Piketty (2005, Op.it), before tackling the issue of inequality, breaks down income in terms of wages, the income of self-employed workers (farmers, traders, liberal professions, etc.), pensions, other transfer income (family allowances, unemployment benefits, social assistance, etc.), and income from assets (dividends, interest, rents, etc.). The expenses of individuals being linked to their income which is not only due to salary but also to their non-salary activities.

It must be said that several theories explain the income disparities that can exist in a society. The human capital theory developed by Mincer (1958), Schultz (1960, 1961) and Becker (1962, 1993), according to which income disparity is not a reflection of the hierarchy of skills. For this, work is considered as a heterogeneous factor of production and age, sex, level of education supposed to qualify the level income of individuals. According to this theory, the level of household income depends on their abilities.

On the other hand, polarization generally refers to the disparity or divergence between objects, attracted by the different forces towards the main masses or more narrowly towards the poles. Thus, when the interests of social groups made up of households sharing the same socio-economic characteristics are mutually different, they can act to defend their causes and can thus lead to social conflicts. According to Araar (2009), the more the groups have more opposing interests, the greater the intensity of the conflicts. Inequality and polarization are two different but analytically complementary concepts. They highlight distinct aspects of the same distribution. Their respective evolutions can sometimes diverge for the same population. Polarization is conceptually based on criteria distinct from those generally used to approach inequality. For example, the Pigou-Dalton transfer principle on which the inequality measures are based is far from being relevant for the development of the concept and the polarization measures. The resemblance and dissimilarity between these two concepts have been the subject of several studies. By way of example, mention may be made of those of Gradin et al. (1999), d'Ambrosio and Wolff (2001) and those of Estéban et al. (2006). This work on polarization has led to the construction of indicators that are more or less inspired by those of inequality. It is shown that under certain conditions, the Estéban and Ray polarization indicator can behave like an inequality indicator.

Analyzing inequalities and polarization supposes showing their determinants. The literature on development economics has focused in recent decades on explaining the problems of inequalities, more specifically income inequalities (Ngouwouo, 2019) and the disappearance of the middle-income class which has reinforced polarization. A highly unequal and polarized society is a potential hotbed of tension because when the number of people with a low standard of living increases, they feel excluded from national well-being in terms of redistribution (Duclos, 2006). It is in this context that this study seeks to know the determinants of inequalities and polarization of household spending in Cameroon.

This study contributes in the literature in that, it uses two databases (ECAM III and IV) simultaneously to analyze the evolution and identify the determinants of inequality and the polarization of household spending

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in Cameroon. Then, it privileges the spatio-temporal dynamics and takes into account the polarization in the poverty study.

Away from this introductory section, the rest of this paper is organized as follows: section 2 examines the data and methodology, section 3 presents and discusses the results, while section 4 concludes.

2. Data and methodology

2.1. Geographic delineation, data source and study period

This study focuses specifically on Cameroon. The data used come from Cameroonian household surveys which gather information to quantify inequalities and the polarization of household income in Cameroon. These are precisely ECAMs 3 and 4 carried out in 2007 and 2014 respectively by the National Institute of Statistics (INS) of Cameroon. These data sources are the best suited and appropriate concerning the objectives of this research. They are felt and provide sufficient information on Cameroonian households and their income.

2.2. Analysis tools

In this study, a decision on the unit of analysis is required as well as measures of inequality and polarization that reflect the total distribution of expenditure. A good number of measures have been proposed in the literature to characterize polarization (Esteban and Ray, 1994; Wolfson, 1994; Tsui and Wang, 1998; Zhang and Kanbur, 2001) and inequality in the distribution of income (Kakwani, 1993; Glewwe, 1986; Fields, 1980; Theil, 1979; Sen, 1973; Shorrock's, 1984 and Litchfield, 1999).

However, we will proceed by a static decomposition by sub-group and the decomposition of inequalities developed by Oaxaca and Blinder (1973). Polarization measurements should be characterized by their local sensitivity to the interaction between alienation (intergroup heterogeneity) and identification (intra-group homogeneity). The polarization analysis will be done using the Duclos-Estéban-Ray (2004) class of measurements which addresses the problem of the Estéban-Ray (1994) measurement linked to the finite and discrete characters of the data uses and the Foster-Wolfson Index (1992). These measures are sensitive to the concentration of individuals around their respective expenses. This is what Duclos, Estéban and Ray (2004) called identification.

2.3. The decomposition of inequality measures

2.3.1. First decomposition of Oaxaca-Blinder

The decomposition of Oaxaca and Blinder (1973) developed below explains the average difference in the variable of interest between two groups (here, between the poor and the rich). This difference is broken down into a part linked to the differences in initial characteristics between the two groups and another part associated with the differences in the yields of these characteristics (here, by assumption, the parameters associated with the characteristics may be different for the two groups). Taking as our variable of interest, we have two groups: the poor and the rich. We assume that is explained by a vector of determinants, according to the following regression model:

$$Y_i = \begin{cases} \beta^p x_i + \varepsilon_i^p & so\ poor \\ \beta^r x_i + \varepsilon_i^r & so\ rich \end{cases} \qquad (1)$$

Where the vector of parameters β includes the constant term. In the case of a single independent variable, the rich are supposed to have a more advantageous regression line than that of the poor because each value of x is associated with them a value of beta. Also, the rich are assumed to have an upper average of x. From the above, the poor have a lower average value of y than the rich.

The difference between the mean values of y^r and y^p is equal to:

$$y^r - y^p = \beta^r x^r - \beta^p x^p \qquad (2)$$

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Where $x^r$and $x^p$are vectors of explanatory variables evaluated on average for the rich and the poor respectively. If we have for example, x1 , x2 and x3, we can write the following:

$$X^R - X^P = (\beta_0^R - \beta_0^P) + (\beta_1^R X_1^R - \beta_1^P X_1^P) + (\beta_2^R X_2^R - \beta_2^P X_2^P) + (\beta_3^R X_3^R - \beta_3^P X_3^P) \quad (3)$$
$$G = G_0 + G_1 + G_2 + G_3$$

In this procedure, the gap in y between the poor and the rich is considered to be due to: (i) differences in the constants (G0); (ii) the differences in x1 and β1 (G1); (iii) the differences in x2 and β2 (G2); (iv) the differences in x3 and β3 (G3).

Therefore, G1 could measure the share of the gap between the average expenditure (y) due to the differences in the sex of the heads of household (x1) and the differences in the effects of sex (β1). G2 could measure the share of the gap due to household size (x2) and the differences in side effects (β2). And G3 could measure the share of the education level of the head of household (x3) and the differences in the effects of the education level.

In the results, estimates of the difference in the gap can be obtained by substituting the means of sample x and the estimates of the parameter β in the equation (2). This substitution will be carried out in everything else but without being explicitly mentioned.

2.3.2. Second Oaxaca-Blinder decomposition

The first decomposition is more than sufficient for us. But we ask ourselves how much of the overall inequality or specification deviation of G1 or G2 or G3 is attributable for example to: (i) differences in x (sometimes called the explained component) rather than (ii) differences in β (sometimes called the unexplained component)?

The decomposition of Oaxaca-Blinder is an answer to this question.

Indeed, the difference between the two results could be expressed in one of two ways:

$$y^r - y^p = \Delta X \beta^p + \Delta \beta X^r \quad (4)$$

Where $\Delta X = X^r - X^p$ and $\Delta \beta = \beta^r - \beta^p$ or

$$y^r - y^p = \Delta X \beta^r + \Delta \beta X^p \quad (5)$$

We find that these decompositions are the same as the previous ones. In the first (4), the differences in the x's are weighted by the coefficients of the poor group and the differences in the coefficients are weighted by the x's of the rich group. While in the second (5), the differences in the x's are weighted by the coefficients of the rich group and the differences in the coefficients are weighted by the x's of the poor group. Either way, there is a way to compartmentalize the gap in outcomes between the poor and the rich in part due to the poor having low x- values compared to the rich, and part because, by assumption, they have worse values of β than the rich ones.

In equations 4 and 5, the decompositions can be seen as special cases of a more general decomposition:

$$y^r - y^p = \Delta X \beta^p + \Delta \beta X^p + \Delta X \Delta \beta \quad (6)$$
$$= E + C + CE$$

In this way, the average results could be as if coming from a difference in the endowments (E), a difference in the coefficient (C), and a difference resulting from the interaction of endowments and coefficients (CE). Equations 4 and 5 are special cases in which:

$$y^r - y^p = \Delta X \beta^p + \Delta \beta X^r = E + (C + CE) \quad (7)$$
$$y^r - y^p = \Delta X \beta^r + \Delta \beta X^p = (E + CE) + C \quad (8)$$

In short, we find that the first decomposition places the interaction in the unexplained part, while the second places it in the explained part.

2.3.3. Linked decomposition

The Oaxaca-Blinder decomposition may also be a special case of another decomposition. For this we have:

$$y^r - y^p = \Delta X[\Delta \beta^r + (I - D)\beta^p] + \Delta \beta[X^r(I - D) + X^p D] \quad (9)$$

Where I and D represent the identity and weight matrix, respectively. When x is an expense and not a vector, I = 1 and D is a weight. However, D = 0 in decomposition (7), D = 1 in (5). If x is a vector, we have:

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D = 0 (Oaxaca) (equation 4) (10)
D = 1 (Oaxaca) (equation 5) (11)
Moreover, Cotton (1988) proposed a formulation which suggests that the difference in the xs by the mean of the differences gives us:
Diag (D) = 0.5 (12)
Where Diag (D) is the diagonal of D. On the other hand, his counterpart Reimers (1983) suggested that one can weigh the coefficients of the vectors by the proportions in the two groups so that if f_r is the sample function in the rich group, we will have: Diag (D) = f_r (12)
Finally, a fifth decomposition was proposed by Neumark (1988) which uses the coefficients obtained from the regression of the grouped data, β^p:
$y^r - y^p = \Delta X\beta^p + [X^r(\beta^r - \beta^p) + X^p(\beta^p - \beta^r)]$ (13)

2.4. The decomposition of the polarization measurements

2.4.1. The breakdown of the Duclos-Estéban-Ray measure

The objective here is to show how certain socio-demographic characteristics such as the place of residence, the sex of the head of household, the level of education of the head of household and certain sectors of activity (formal and informal sectors) contribute to the total polarization. We rely for this on the methodology proposed by Araar (2008), who, in agreement with Runciman (1966), perceives the magnitude of relative deprivation as the difference between the desired situation and the current situation of a person (Hey and Lambert, 1980).
Thus, local alienation (a (x)) can be decomposed into expected deprivation (δ (x)) and expected surplus (σ (x)), and the DER measure according to Araar (2008) is then written:
$\boldsymbol{p_\alpha(f) = \int f x^{1+\alpha}[\delta(x) + \sigma(x)]dx = D + S}$ (14)
Where $\mathbf{D}=\int \boldsymbol{f x^{1+\alpha}[\delta(x)]dx}$ is the overall deprivation in the distribution, and $\mathbf{S}=\int \boldsymbol{f x^{1+\alpha}[\sigma(x)]dx}$ is the overall surplus in the distribution. When the distribution is symmetric or when the parameter α = 0, these two components are equal. But since the distribution of income is usually asymmetric, we can expect that D> S (Arrar, 2008). If we denote by f j the density function of group j and considering equation (14), the contribution of group j whose individuals have the level of well-being x to the DER index is as follows:
$\boldsymbol{C_j(x)=\frac{\pi_J(x)a(x)f(x)^{1+\alpha}}{\mu^{1-\alpha}}=\pi_J(x)c(x)}$
With $\pi_j(x)$ the proportion of individuals belonging to group j and having income x and $C(x)=\frac{a(x)f(x)^{1+\alpha}}{\mu^{1-\alpha}}$ the contribution of individuals with the level of well-being x to the index−1 α DER. Based on these local contributions from groups, the DER index can then be written: $p_\alpha(f) = \sum_j \int c_j(x)dx$. Starting from the algebraic decomposition of the Gini index, Arrar (2008) also shows that the DER measure can be broken down into intragroup and intergroup components.

3. Results and Discussions

3.1 The decomposition of inequalities

The explained variable is the expenditure per unit of consumption. Using a model similar to the regression model of Wagstaff, van Doorslaer, and Watanabe (2003), we have the following variables: a dummy variable for the sex of the head of household (SEXECM), the places of residence of the households (MILIEU), the CSP of the head of household, the level of education of the head of household (NIVINSCM), the marital status of the head of household (STATMACM), household size (TAILM), type of dwelling (TYPLOG) and area of residence of the head of household (ZONE). After using the welfare variable (DEPUC), we create a variable distinguishing the level of poverty that we call POOR which takes 0 when the household is poor and 1 otherwise.

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Table 1 : **Coefficient homogeneity test between groups**

Spend per unit of consumption	**2007** R-squared = 0.7135 Root MSE = 0.36821			**2014** R-squared = 0.7158 Root MSE = 0.42164		
	Coef	t_stat	p>|t|	Coef	t_stat	p>|t|
POOR	0.7740	11.49	0.000	0.8328	9.51	0.000
TAILM	-0.0343	-21.32	0.000	-0.0378	-18.79	0.000
_IpooXTAILM_1	-0.0196	-7.33	0.000	-0.0288	-8.57	0.000
MILIEU	-0.1735	-15.88	0.011	-0.2788	-19.45	0.000
_IpooXMILIE_1	0.0434	2.55	0.078	0.1618	7.71	0.000
ZONE	0.0031	1.76	0.000	0.0035	1.61	0.108
_IpooXZONE_1	-0.0082	-3.61	0.061	-0.0168	-5.91	0.000
SEXCM	0.0236	1.87	0.007	-0.0056	-0.36	0.715
_IpooXSEXCM_1	0.0486	2.72	0.000	0.0491	2.29	0.022
NIVINSCM	0.0669	11.64	0.000	0.1226	14.25	0.000
_IpooXNIVIN_1	0.0233	3.03	0.002	-0.0175	-1.47	0.143
STATMACM	0.0038	0.89	0.374	0.0169	3.25	0.001
_IpooXSTATM_1	-0.0101	-1.79	0.074	-0.0282	-4.22	0.000
TYPLOG	-0.0099	-3.29	0.001	-0.0302	-7.28	0.000
_IpooXTYPLO_1	0.0417	8.57	0.000	0.0768	10.72	0.000
CSPCM	-0.0162	-2.54	0.011	-0.0205	-2.67	0.008
_IpooXCSPCM_1	0.0242	2.94	0.003	0.0183	1.92	0.055
FORINCM	-0.0813	-3.42	0.001	-0.0701	-2.40	0.016
_IpooXFORIN_1	-0.0719	-2.42	0.016	-0.0701	-2.28	0.023
_cons	13.0245	256.70	0.000	13.3926	199.97	0.000
TEST	Testparm POOR_I* F(19, 10296)=1349.69 Prob > F = 0.0000			Testparm POOR_I*F(19, 8900) =1180.03 Prob > F = 0.0000		

Source: Authors based on data from ECAM 3 and 4

The FISHER F statistic for the ECAM 3 data, with 19 and 10296 degrees of freedom, is 1349.69 and its p-value is 0.00. Likewise, the FISHER F statistic for the data from ECAM4, with 19 and 8900 degrees of freedom is 1180.03 and its p-value is 0.00. This means that the Oaxaca-Blinder- type approach, which states that the coefficients of the regression are different, makes sense in this context since the null hypothesis of homogeneity of the parameters is rejected at the 1% threshold. And Prob> F = 0.0000 proves that the retained equations explain the model very well.

The next step will be to perform the Oaxaca Decomposition Test. We then obtain four tables. The first block (Table 2) shows the average values of expenditure per consumption unit of the two groups and the difference between the two. Table 2 shows the contributions attributable to the differences in the initial endowments (E), the coefficients (C), and the interactions (CE).

The second block of the decomposition (Table 3) shows how the explained and unexplained portions of the gap between the poor and the non-poor vary depending on the decomposition used. The Oaxaca decomposition is D = 0 and D = 1. At D = 0.5 and f_r = 0.472 we have the cotton and Reimers decomposition respectively. And "*" the decomposition of Neumark.

Contrary to the usual results where it is the average values of the variables which largely explain the differences in well-being between the poor and the non-poor, Table 3 provides us with contrasting results for Cameroon.

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Table 2: First block of the decomposition

Poor = 0 Not poor = 1	**2007**	**2014**
High mean forecast (H):	13.598	13.952
Low average prediction (L):	12.499	12.701
Gross differential (R) {HL}:	1.099	1.251
- due to endowments (E):	0.223	0.324
- due to the coefficients (C):	0.830	0.930
- due to interaction (CE):	0.046	-0.003

Source: Authors based on data from ECAM 3 and 4

Table 3: Second block of the decomposition

D:	**0**		**1**		**0.5**		**0.472**		*****	
	2007	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**
Unexplained **(U) {C + (1-D) CE}:**	0.876	0.927	0.830	0.930	0.853	0.929	0.854	0.929	0.586	0.606
Explained **(V) {E + D * CE}:**	0.223	0.324	0.269	0.320	0.246	0.322	0.245	0.322	0.513	0.644
% Unexplained **{U / R}:**	79.7	74.1	75.5	74.4	77.6	74.3	77.7	74.3	53.3	48.5
% Explained **(V/R):**	20.3	25.9	24.5	25.6	22.4	25.7	222.3	25.7	46.7	51.5

(Source: Authors based on data from ECAM 3 and 4)

The results from the rich-poor regression equations show that between 2007 and 2014, the level of education of the head of household, his gender and his socio-professional category are the factors that determine the expenditure per adult equivalent among the non-poor. While among the poor, after the factors are selected, the marital status of the head of the household is added. The education level of the head of household contributes significantly to the well-being of both the poor and the non-poor. Estimation of the level coefficients of education and the sex of the head of household is significantly positive at the significance level of 1%, confirming that they do indeed determine inequalities. The increase in the well-being of the poor between 2007 and 2014 is greater than that of the non-poor, thus probably consistent with the fact that the poor are more sensitive to price changes in the markets. Appendix 4 below shows us that the average annual consumption of the poor in 2007 amounts to 12,499 CFA francs and in 2014 to 12,701 CFA francs, while for the non-poor, it goes from 13,598 CFA francs to 13,952 CFA francs respectively in 2007 and 2014. The overall difference in well-being between the poor and the non-poor in Cameroon has broken down: an unexplained component which is 0.830 in 2007 and 0.930 in 2014 representing respectively 75.52% and 74.34% of the difference in good -total being and the explained component which is 0.223 in 2007 and 0.324 in 2014 representing 20.30% and 25.90% respectively of the difference in total well-being. The explained difference is attributed to differences in household characteristics, while the unexplained difference is due to discrimination or pure bias.

In terms of endowments, in 2007, the value of household size, with a share of 7.0%, largely explains the difference in well-being between the poor and the non-poor. Then come respectively the place of residence

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of the head of household and his level of education. While in 2014, first the place of residence, with a share of 10.4% largely explains the difference in well-being between the poor and the non-poor, followed by the size of the household (9.6%) and the educational level (8.6%).
The results also show that the coefficient of the level of education is quite low while the effects of characteristics are important. This fact underscores the importance of achieving a higher level of education for household members, as it is the gap between the levels of education among poor households that turns out to be one of the main causes. Welfare gaps.
The main factors of bias linked to the well-being of the poor are the place of residence of the head of household, the size of the household and the level of education which respectively explain the discrimination for each factor of 6.3% and 10.4% in 2007 and in 2014, 7% and 9.6% in 2007 and 2014, 6.1% and 8.6% in 2007 and 2014 (Appendix 1).

3.2. Decomposition of the polarization of household spending in Cameroon

We highlight here the factors of the polarization of household expenditure in Cameroon according to the place of residence, the region of residence, the sex and the level of education of the head of household between 2007 and 2014. For this, we have by the decomposition of the DER measure ($\alpha = 0.5$) according to Araar (2008) used above.

3.2.1. Breakdown of polarization according to the environment and regions of residence of the head of household between 2007 and 2014

Let us first remember that, according to numerous studies, the rural environment is relatively poorer than the urban environment (Fambon, 2002; Chameni, 2010…).
The results reported in Table 5 allow us to show that even if the groups differ in the size of their population or their share of expenditure per unit of consumption, their level of polarization is relatively higher. Overall, between 2007 and 2014 the polarization index is between 12.7% and 14.0%. The intra-group component provides an absolute contribution to the polarization which is between 10.9% and 11.1% while the inter-group component goes from 14.2% to 15.22%. Rural areas have the highest level of deficit / surplus ratio and contribute the most to intra-urban polarization.

Table 5: DER decomposition (α = 0.5) according to place of residence

Pure polarization index between groups: α=0.5			2007	0.127				
			2014	0.140				
Component	Contribution absolute		Contribution relative					
	2007	2014	2007	2014				
Intra-group	0.109	0.111	0.435	0.423				
Intergroup	0.142	0.152	0.565	0.577				
Total	0.251	0.263	1.000	1.000				
Group	Population in %		By expenses in %		Index of polarization		Ratio R	
	2007	2014	2007	2014	2007	2014	2007	2014

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Urban	.37.0	44.5	55.2	64.4	0.232	0.238	0.964	0.946		
Rural	63.0	55.5	44.8	35.6	0.228	0.255	0.940	0.918		
	Polarization intra-group									
Group	Contribution absolute		Contribution relative		The component deficit D		Surplus S		Ratio D/S	
	2007	2014	2007	2014	2007	2014	2007	2014	2007	2014
Urban	0.037	0.054	0.149	0.051	0.039	0.051	0.042	0.052	0.923	0.989
Rural	0.072	0.058	0.286	0.134	0.138	0.134	0.032	0.027	4.327	4.902
Total	0.109	0.111	0.435	0.423	0.177	0.185	0.074	0.079	2.394	2.340

(Source: Authors based on data from ECAM 3 and 4)

The results in Appendix 2 show that between 2007 and 2014, regional polarization is higher in Adamaoua (located between 24.9% to 27.6%); the North (between 25.0% to 27.5%), the Far North (between 25.8% to 26.7%) and the North-West (between 24.8 and 26.2%) and that these regions are poorer in terms of expenditure per unit of consumption in relation to the proportions of the population. In addition, the northern regions have the highest deficit / excess ratio, in particular the Far North which contributes more to intra-region polarization (0.3%). This could justify the fact that following the phenomenon of Boko Haram, this region welcome more refugees who find themselves without a job or source of income.

3.2.2. Breakdown of polarization according to gender and the level of education of the head of household

Between 2007 and 2014, the polarization in the gender approach is almost similar. According to the DER measurement at $\alpha = 0.5$, the intergroup polarization is around 25.8% to 26.3%. But according to the deficit / excess ratio, it appears that men contribute the most to intra-group polarization (Appendix 3).

Finally, depending on the level of education of the head of household, the pure polarization between the groups is equal to 9.2% in 2007 and 11.4% in 2014. First, Table 6 below shows a decrease in the proportion of out-of-school populations and those with a primary level which leads to a drop in the share of expenditure per unit of consumption. But on the other hand, there is an increase in the proportion of heads of households with a secondary level, which goes from 32.1% to 34.4% and of those with a higher level (from 6.7% to 11.3%) for an increase in expenditure per year. consumption unit which goes from 39.1 to 40.3% and 15.6 to 23.7% respectively between 2007 and 2014. Then, the group of the out-of-school students records a higher level of polarization (26.6%) followed by those with a higher level (24.4%).

As a result, the intra-group component provides a rather low absolute contribution rate to the polarization which goes from 4.9 to 6.1% while the inter-group component has an absolute contribution to a polarization of around 20.2% depending on the level of education. The head of the household. The group of out-of-school students has the high deficit / excess ratio (6.61%) followed by the group of heads of household with a primary level (3.44%) which contributes the most to intra-group polarization. It can be said that the low level of pure polarization between the place of residence (8.0%) and the sex of the head of household (1.1%) results from the reduction of disparities and poverty as pointed out by Araar (2008).

Table 6: DER decomposition ($\alpha = 0.5$) according to the education level of the head of household

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Pure polarization index between groups: α=0.5			2007	0.092
			2014	0.114
Component	Contribution absolute		Contribution relative	
	2007	2014	2007	2014
Intra-group	0.049	0.061	0.197	0.233
Inter-group	0.201	0.202	0.803	0.767
Total	0.251	0.263	1.000	1.000

Group	Population in %		Expenses in %		Index de polarization		Ratio R	
	2007	2014	2007	2014	2007	2014	2007	2014
Unschooled	27.6		17.5		0.235		0.896	
Primary	33.6	23.4	27.8	12.9	0.224	0.266	0.972	0.866
Secondary 1st cycle	19.2	30.9	21.0	23.2	0.228	0.237	0.984	0.955
Secondary 2nd cycle	12.9	34.4	18.1	40.3	0.226	0.234	0.957	0.986
Superior	6.7	11.3	15.6	23.7	0.249	0.244	0.834	0.855

Polarization intra-group										
Group	Contribution absolute		Contribution relative		the component deficit D		Surplus S		Ratio D/S	
	2007	2014	2007	2014	2007	2014	2007	2014	2007	2014
Unschooled	0.013		0.051		0.066		0.011		5.720	
Primary	0.022	0.009	0.089	0.035	0.065	0.061	0.022	0.009	2.980	6.631
Secondary 1st cycle	0.009	0.019	0.034	0.071	0.029	0.066	0.017	0.019	1.710	3.448
Secondary 2nd cycle	0.004	0.030	0.017	0.112	0.014	0.050	0.014	0.034	0.990	1.464
Superior	0.001	0.004	0.006	0.015	0.004	0.008	0.010	0.016	0.388	0.474
Total	0.049	0.061	0.197	0.233	0.177	0.185	0.074	0.074	2.394	2.340

Source: Authors based on data from ECAM 3 and 4

4. Conclusions

In Cameroon, many factors determine inequalities and polarization. The results from the decomposition of Oaxoca-Blinder (1973) and the decomposition into sub-groups of the Duclos-Estéban-Ray measure (2004) as shown by Araar (2008) show the following factors: in general, for inequalities, the unexplained part of the model determines the disparities in household spending more than the unexplained part. This is explained by

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the phenomena which undermine Cameroonian society, namely corruption and the misappropriation of public goods which increase the disparity within the group of populations of the upper part of the expenditure. However, the level of education of the head of household and his or her CSP largely determine the disparity in expenditure per adult equivalent. In addition, the DER decomposition at $\alpha = 0.5$ shows that in Cameroon, the rural environment, the regions of Adamaoua, the North, the Far North and the North West contribute the most to intra-group polarization.

Thus, the results presented in this study have several implications in terms of the definition of public policies for reducing poverty, inequalities and the polarization of well-being as rural-urban as in the regions of the country. The first implication concerns the promotion of human and physical capital to improve well-being Cameroonians. For this, a particular look should be turned towards education because it is an essential tool for the reduction of poverty, inequalities and polarization. Second, this study reveals the importance that smaller households have on securing higher levels of well-being. So, an urgent need to reduce the fertility rate in Cameroon for an effective reduction of dependency. Third, particular importance is needed for improving income redistribution in the northern part of Cameroon in order to create a class of populations with more improved income for more inclusive growth.

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6. Appendixes

Appendix 1: **Third decomposition block**

To explained: **D=**													
VARIABLES	**E (D=0)**		**E**		**CE**		**1**		**0.5**		**0.472**		*****	
	2007	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**
TAILM	0.070	0.096	-0.109	-0.156	0.040	0.066	0.110	0.055	0.090	0.129	0.089	0.128	0.174	0.245
MIDDLE	0.063	0.104	0.071	0.213	-0.016	-0.049	0.047	0.018	0.055	0.079	0.055	0.080	0.133	0.172
ZONED	-0.003	0.005	-0.117	-0.003	0.007	0.023	0.004	-0.000	0.001	0.007	0.001	0.006	0.004	0.020
SEXCM	-0.000	-0.000	0.061	0.053	-0.000	-0.000	-0.000	0.074	-0.000	-0.000	-0.000	-0.000	-0.000	-0.000
NIVINSCM	0.061	0.086	0.048	-0.035	0.021	-0.012	0.082	0.003	0.072	0.080	0.071	0.080	0.139	0.156
STATMATCM	-0.001	-0.004	-0.027	-0.073	0.003	0.006	0.002	-0.009	0.000	-0.001	0.000	-0.001	0.002	0.001
TYPLOG	0.001	0.006	0.099	0.235	-0.006	-0.014	-0.004	-0.001	-0.001	-0.001	-0.001	-0.001	-0.002	-0.000
CSPCM	0.013	0.016	0.109	0.077	-0.020	-0.014	-0.007	0.002	0.003	0.009	0.004	0.009	0.013	0.024
FORINCM	0.018	0.015	-0.137	-0.137	0.016	0.014	0.035	0.028	0.026	0.021	0.026	0.021	0.052	0.039
_cons	0.000	0.000	0.774	0.756	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
TOTAL	0.223	0.324	0.830	0.930	0.046	-0.003	0.269	0.320	0.246	0.322	0.245	0.322	0.513	0.644

(Source: Authors based on data from ECAM 3 and 4)

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***Appendix 2** : Décomposition DER (α=0.5) selon la région de résidence*

Pure polarization index between groups: α=0.5			2007	0.062						
			2014	0.080						
Component	Contribution absolute		Contribution relative							
	2007	2014	2007	2014						
Intra-group	0.021	0.022	0.083	0.085						
Intergroup	0.230	0.241	0.917	0.915						
Total	0.251	0.263	1.000	1.000						
Group	Population in%		Expenses in %		Index of polarization		Ratio R			
	2007	2014	2007	2014	2007	2014	2007	2014		
Douala	11.5	14.8	19.4	25.2	0.234	0.238	0.891	0.881		
Yaoundé	10.2	13.2	17.1	20.0	0.230	0.245	0.874	0.911		
Adamaoua	4.3	5.4	3.3	5.0	0.249	0.276	0.911	0.925		
Center	8.3	6.2	6.6	5.5	0.224	0.247	0.924	0.922		
East	4.2	3.6	3.3	3.1	0.243	0.236	0.920	0.936		
Far North	14.8	14.9	9.1	6.8	0.258	0.267	0.847	0.795		
Littoral	4.1	3.2	3.7	2.9	0.229	0.231	0.941	0.903		
North	8.1	8.4	5.4	4.6	0.250	0.273	0.881	0.833		
North-west	10.9	9.6	9.0	6.1	0.248	0.262	0.952	0.895		
west	10.6	8.9	9.5	8.1	0.219	0.238	0.955	0.906		
South	3.2	3.2	3.1	3.1	0.236	0.246	0.942	0.940		
south-west	9.8	8.8	10.5	9.8	0.229	0.232	0.971	0.947		
	Polarization intra-group									
Group	Contribution absolute		Contribution relative		the component deficit D		Surplus S		Ratio D/S	
	2007	2014	2007	2014	2007	2014	2007	2014	2007	2014
Douala	0.006	0.002	0.014	0.023	0.010	0.013	0.015	0.020	0.666	0.665
Yaoundé	0.005	0.002	0.011	0.018	0.008	0.014	0.013	0.016	0.644	0.896
Adamaoua	0.001	0.000	0.001	0.003	0.009	0.010	0.002	0.004	3.776	2.503
Center	0.001	0.001	0.005	0.003	0.017	0.012	0.005	0.005	3.298	2.584
East	0.000	0.000	0.001	0.001	0.009	0.007	0.005	0.003	3.445	2.595
Far North	0.003	0.003	0.015	0.012	0.036	0.042	0.005	0.004	6.645	9.844
Littoral	0.000	0.000	0.001	0.001	0.007	0.006	0.003	0.002	2.624	2.320
North	0.001	0.001	0.005	0.004	0.019	0.022	0.003	0.003	5.653	7.170
North-west	0.002	0.002	0.010	0.007	0.023	0.023	0.006	0.005	3.562	5.012
west	0.002	0.002	0.009	0.006	0.019	0.016	0.008	0.007	2.507	2.437
South	0.000	0.000	0.001	0.001	0.005	0.006	0.002	0.003	2.062	2.188
south-west	0.002	0.002	0.009	0.007	0.015	0.013	0.008	0.008	1.767	1.562
Total	0.021	0.022	0.085	0.080	0.185	0.160	0.074	0.079	2.394	2.340

(Source: Authors based on data from ECAM 3 and 4)

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Appendix 3: Breakdown of the DER measure (α = 0.5) according to the sex of the head of household

Pure polarization index between groups: α=0.5			2007	0.016						
			2014	0.011						
Component	Contribution absolute		Contribution relative							
	2007	2014	2007	2014						
Intra-group	0.153	0.156	0.608	0.591						
Intergroup	0.098	0.108	0.392	0.409						
Total	0.251	0.263	1.000	1.000						
Group	Population in%		Expenses in %		Index of polarization		Ratio R			
	2007	2014	2007	2014	2007	2014	2007	2014		
Male	74.4	71.9	72.0	70.4	0.250	0.263	0.993	0.997		
Feminine	25.6	28.1	28.0	29.6	0.258	0.268	0.998	0.995		
Polarization intra-group										
Group	Contribution absolute		Contribution relative		The Component deficit D		Surplus S		Ratio D/S	
	2007	2014	2007	2014	2007	2014	2007	2014	2007	2014
Male	0.135	0.134	0.538	0.509	0.134	0.134	0.053	0.056	2.507	2.407
Feminine	0.018	0.022	0.071	0.082	0.043	0.050	0.020	0.023	2.098	2.180
Total	0.153	0.156	0.608	0.591	0.177	0.185	0.074	0.079	2.394	2.340

(Source: Authors based on data from ECAM 3 and 4)

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***Appendix 4*: Fourth decomposition block**

Top model						Bottom model						Put in common	
VARIABLES		**Coef.**		Avg..		Pred.		**Coef.**		Avg..		**Pred.**		**Coef.**	
		2007	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**	**2007**	**2014**
TAILM		-0.054	-0.067	3.485	3.310	-0.188	-0.221	-0.034	-0.040	5.521	5.730	-0.190	-0.226	-0.086	-0.101
MIDDLE		-0.130	-0.144	1.267	1.296	-0.165	-0.186	-0.173	-0.270	1.629	1.680	-0.283	-0.454	-0.367	-0.448
ZONED		-0.005	-0.098	6.295	1.140	-0.032	-0.111	0.003	-0.095	7.172	1.195	0.022	-0.114	-0.005	-0.164
SEXCM		0.072	0.043	1.252	1.258	0.090	0.054	0.024	0.001	1.254	1.266	0.030	0.001	0.076	0.022
NIVINSCM		0.090	0.108	2.951	2.713	0.267	0.292	0.067	0.125	2.040	2.023	0.137	0.253	0.152	0.225
STATMATC		-0.006	-0.012	2.390	2.416	-0.015	-0.028	0.004	0.016	2.644	2.637	0.010	0.043	-0.007	-0.004
MTYPLOG		0.032	0.048	2.242	2.760	0.071	0.134	-0.010	-0.032	2.378	2.938	-0.024	-0.093	0.017	0.001
CSPCM		0.008	-0.003	3.661	3.728	0.029	-0.011	-0.016	-0.020	4.494	4.550	-0.073	-0.090	-0.015	-0.029
FORINCM		-0.153	-0.149	1.682	1.729	-0.258	-0.258	-0.081	-0.078	1.908	1.918	-0.155	-0.149	-0.229	-0.206
_cons		13.799	14.287	1.000	1.000	13.799	14.287	13.025	13.530	1.000	1.000	13.025	13.530	13.957	14.579
Total	13.598				13.952					12.499	12.701				

(Source: Authors based on data from ECAM 3 and 4)

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Attractiveness and Difficulties of SMEs in Kazakhstan Economy

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Abstract:

Small and Medium Enterprises (SMEs) are the most important element of the market economy, which is vital for the development of countries. Today, SMEs largely determine the pace of economic growth, the structure, and the quality of the gross national product. These enterprises are most sensitive to changing economic conditions and affect the stability and dynamism of the development of the state economy in the market environment. Despite such efforts, there are a number of reasons preventing the development of SMEs operating in the country. The research methodology is based on a secondary analysis of the data collected within SMEs in Kazakhstan. Therefore, the main purpose of this study is to identify the current situation of SMEs and their problems for the economic development of Kazakhstan and to propose new solutions for attractiveness and finally, outcomes show that the Kazakhstan economy has not yet been able to prevent its dependence on energy resources exports. In addition to energy resources, institutions that promote the development of the private sector continue their activities within the framework of efforts to diversify the economy in Kazakhstan. When we analyze the reasons that prevent the development of small and medium-sized enterprises operating in Kazakhstan, we see that these reasons are the same in all sectors: incompatibility of tax laws, insufficient credit resources, formalities of tenders, and excessive pressures of audit authorities.

Keywords: SME, Economy Attractiveness and Kazakhstan,

JEL Codes: A11, F43 and L26

1. Introduction

Small and medium-sized enterprises are able to provide a more efficient and effective restructuring of the economy, as they do not need large investments and provide profit conversion quickly. The

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necessity of solving economic and social problems provides importance to small and medium enterprises in Kazakhstan (Syed et.al., 2012). According to official records, the share of all Kazakhstan enterprises today is 4/5, but the operating portion of them is 40%. In the Gross Domestic Product, the share of small and medium-sized enterprises is 25%, in developed countries this rate is above 50%, while the country's population is 60% employed in the private sector of the economy. The development of small and medium-sized enterprises and entrepreneurship are among the priority state policies of the Republic of Kazakhstan. The constant change in the market conjuncture causes these enterprises to not operate for a long time. In other words, these undertakings cannot respond to the growing needs of the market or the change of conjunctures in separate sectors. The purpose of this study is to identify the status and problems of existing SMEs for Kazakhstan's economic development and to bring new solutions.

The role of SMEs in the global economy continues to increase dramatically. According to the United Nations, in general, small and medium-sized enterprises in the world employ almost 50% of the working population and produce 33-60% of national products and services. In the developing country of Kazakhstan, starting from the development plans, the importance of SMEs in terms of the Kazakh economy in economic policies was underlined and some legal and institutional arrangements were made on this issue. The attractiveness and importance of SMEs in the whole world is increasing every day due to the employment and other social benefits it provides to the society (Chege and Wang, 2020; Roopchund, 2020; Al-Haddad et.al., 2019; Rotar et.al., 2019; Robu, 2013; Ramsden, 2010; Hu, 2010; Clay and Creigh-Tyte, 1994), as well as the dynamics it brings to the economy (Gherghina et.al., 2020; Tripathi, 2019; Mujahid and Begam, 2019; Iqbal and Rahman, 2015; Cravo et.al., 2012; Taiwo et.al., 2012; Dixit and Kumar Pandey, 2011; Cravo, 2010). Many countries see the strengthening and support of SMEs as a definitive solution to maintain the economy's existence in a healthy way and to achieve the targets stipulated in development. Small business plays an important role in the development of the economy of many countries. In the countries of the European Society (EU), the USA, and Japan, small and medium enterprises account for about 50% of the total number of employees. Their share in GDP exceeds 50%. In the economies of developed countries, large, medium and small enterprises operate simultaneously, and activities based on personal and family work are also carried out. The size of enterprises depends on the specifics of industries, their technological features, and economies of scale (Chege and Wang, 2020).

2. Overview of SMEs in Kazakhstan

Business development in Kazakhstan is a sector of the economy that is literally generated by reforms. The period of the birth of civilized business in the country can be called 1997, when the Decree of the President of the country dated July 7, 1997 No. 3589 "on priority and regional programs for supporting and developing small business in the Republic of Kazakhstan" was adopted. Today, in Kazakhstan, the development of entrepreneurship is also one of the priorities of the state economic policy, and the Government is striving to form a middle class and competitive dynamic business community focused on the creation of new high-tech industries with the highest added value. And although the indicators of entrepreneurship development in Kazakhstan differ significantly from those of developed countries to date, SMEs in the republic has managed to occupy a corresponding niche in the state economy(Chege and Wang, 2020).

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The Government of Kazakhstan has defined an SME as any enterprise with fewer than 250 employees. The differentiation between small and medium-sized businesses is based on annual asset values and the number of employees. Small businesses are those enterprises with annual assets lower than 1 million tenge and fewer than 50 employees. Medium-sized businesses have an asset value greater than 1 million tenge with fewer than 250 employees (Dosmagambet, et.al., 2019).

In 2020, the number of operating SMEs in Kazakhstan amounted to 1,327 thousand units by the end of the year. Estimations indicate that the share of registered and operating SMEs is 82.9%, which employ about 3.6 million people as of 1 January 2020, and the share of gross value added of SMEs in the GDP of the country was 28.2% in 2019. As of 1 January 2020, the number of operating SMEs increased by 10.4% compared to the corresponding date of the previous year. In the total number of SMEs, the share of individual entrepreneurs amounted to 65.5%, legal entities of small business - 18.6%, peasant or farm enterprises - 15.7%, legal entities of medium-sized enterprises - 0.2% (www.stat.gov.kz). The main indicators of the activities of SMEs are presented in Table 1. According to this, the number of operating SMEs increased by 9% compared to the corresponding date of the previous year and reached the figure of 1.320.605. The leader is traditionally Almaty, where over 185 thousand SMEs are registered. In second place is the Turkestan region - 119 thousand. Among them, the share of individual entrepreneurs amounted to 65.3%, legal entities of small business - 18.6%, peasant or farm enterprises - 15.9%, legal entities of medium-sized enterprises - 0.2%.

Table 1: Performance indicators of SMEs (January, 2020)

	Number of registered SMEs	Number of operating SMEs, units	Number of employed, people	Output of products (goods and services), mln. Tenge
Republic of Kazakhstan	1 601 081	1 327 742	3 312 457	26 473 049
Akmola	54 301	45 339	133 231	785 649
Aktobe	68 536	59 026	141 358	894 930
Almaty	143 379	122 205	252 095	1 367 731
Atyrau	57 502	49 796	136 144	2 385 604
Western Kazakhstan	50 553	42 714	114 990	1 510 142
Zhambyl	84 699	69 914	119 540	479 542
Karaganda	102 877	88 139	237 446	1 333 266
Kostanay	61 243	52 372	159 827	908 634
Kyzylorda	52 364	46 234	92 758	380 617
Mangystau	61 018	52 865	122 810	943 258
Pavlodar	52 924	45 373	133 615	745 716
North Kazakhstan	35 136	29 947	105 062	570 829
Turkestan	148 456	141 936	203 761	532 055
East Kazakhstan	104 660	88 784	231 733	1 037 218
Nur-Sultan city	166 945	134 248	374 559	4 886 210
Almaty city	276 599	189 540	609 168	6 870 957
Shymkent city	79 889	69 310	144 360	840 691

(Source: Kazakhstan National statistics)

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As of January 1, 2020, while the number of SMEs registered in Kazakhstan is 1.6 million, there are also registered but inactive companies. The number of inactive SMEs constitutes 273 thousand. In other words, this means that 18% of SMEs registered in Kazakhstan are not active. This is due to the extreme complexity of formal closure procedures for businesses, according to survey results with entrepreneurs (Atameken, 2016: 22).

In Table 2, differentiation is shown according to the sectors in which SMEs operate. It is seen that the highest number of SMEs in Kazakhstan is in the field of "Trade, automobile repair". However, it is stated that the highest number of employees is in the same area. The industrial sector contributes greatly to the production of goods and services. In other words, 21.9% of the total production of goods and services falls to the share of the industry sector.

Table2: Performance indicators of SMEs by type of economic activity

	Total	including			Number of employed, people	Output of products (goods and services), mln. Tenge
		legal entities in small business	individual entrepreneurs	peasants and farmers		
Republic of Kazakhstan	1 327 742	258 365	855 920	213 457	3 312 457	26 473 049
Agriculture	251 992	12 551	25 984	213 457	417 243	2 057 209
Industry	50 978	20 348	30 630		340 650	5 687 301
Mining and quarrying	3 022	2 837	185		33 891	1 996 328
Manufacturing industry	44 022	15 024	28 998		268 323	3 122 411
Power supply, gas, steam and air conditioning	1 306	969	337		18 327	435 909
Water supply; sewerage system	2 628	1 518	1 110		20 109	132 653
Construction	64 492	37 865	26 627		292 570	3 979 704
Wholesale and retail trade	441 993	82 502	359 491		974 283	6 597 328
Transport and warehousing	79 868	11 133	68 735		196 998	1 889 272
Accommodation and meals	34 193	5 349	28 844		125 396	378 519
Information and communication	18 197	7 789	10 408		60 021	859 837
Financial and insurance services	6 578	6 065	513		24 165	274 764
Real estate transactions	80 968	9 658	71 310		164 978	863 098

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Professional, scientific and technical activities	39 115	19 418	19 697	131 416	1 819 601
Activities in the field of administrative and ancillary services	36 879	13 451	23 428	156 529	755 149
Education	19 717	8 705	11 012	84 902	188 216
Health and social services	9 734	4 346	5 388	60 520	213 157
Art, entertainment and recreation	11 458	2 574	8 884	30 675	150 693
Provision of other services	181 580	16 611	164 969	252 111	759 201

Source: www.stat.gov.kz

3. Institutions Supporting SMEs in Kazakhstan

Due to its characteristic feature, the SME sector is sensitive to changes in the economic situation in the country. Therefore, to reduce the negative impact of the economic crisis on the development of Kazakhstan's entrepreneurship, the state took appropriate measures to support it. The regulatory framework for the development of entrepreneurship is being improved, moratoriums on business inspections have been introduced repeatedly, the activities of the Damu Fund are concentrated on the formation of an infrastructure structure for service support for entrepreneurship, including training. The main event of this year for small businesses was a tax amnesty, which entered into force on July 16, 2019. The essence of the changes is that penalties and fines will be written off for all debts. Amnesty covers debts formed before October 1, 2018.

So, small and medium-sized businesses will be able to pay taxes, and this is an important point in the matter of how to secure your business. The incentive to pay will be the cancellation of all debts. This will help to re-start legally doing business. Thus, the state allows small and medium-sized enterprises to start developing their business from scratch. This will inevitably lead to an increase in production volumes and an increase in the number of jobs, which will increase the level of welfare of the population.

The main condition of the 2019 tax amnesty in Kazakhstan is the repayment of the amount of the principal debt until December 31, 2019. The amount of “forgiven” fines is the same as on October 1, 2018. Penalties are deducted in the amount that is accrued up to the date when the principal debt was paid. Do not fall under the tax amnesty with oil companies and manufacturers of excisable goods, the price of which includes excise tax - indirect tax.

To support SMEs, various activities are carried out in Kazakhstan as well as all over the world, and they provide support by various state institutions and non-state institutions. Currently, 131 different organizations make up the support infrastructure for SMEs in Kazakhstan.

The types of institutions that support Entrepreneurship via State institutions and organizations, Non-state, non-governmental organizations, commercial institutions, and International institutions

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Depending on their functions, institutions support as follows State support in the establishment, operation, and development stages of the business should think about financial support, information and analytical support, support in education and skill development, and material and technical support which also need to follow and get support from "Damu" Business Development Fund Inc., Kazakhstan Development Bank Inc., "Kaznex" Development and Export Development Company Inc., National Innovation Fund Inc., Kazakhstan Investment Fund Inc., Engineering and Technology Transfer Center Inc. and other technoparks.

All organizations that assist in the development of entrepreneurship have advantages and disadvantages that arise with the influence of various factors. Unfortunately, some people want to maximize their interests when making decisions to support entrepreneurs.

4. Problems of SMEs and solution proposals

SMEs are the basis of the country's economies. SMEs, which have such an important task, still have some problems they face. Although the government and various institutions have supported it, these problems have not yet been resolved. These problems are more severe for our SMEs as globalization increases. The biggest factor in keeping the problems unsolved is that the needs, expectations, and problems of SMEs are not fully known. However, the Ineffectiveness of the rules accepted by the state in the fields of small and medium enterprises. The budget money allocated for the support of small and medium-sized enterprises is not fully utilized. The difficulty of opening their businesses to international markets continues. No clear system has been established in Kazakhstan that can achieve this. Due to the lack of specialists and financing, small and medium-sized enterprises cannot conduct marketing research in international markets. Growing of the shortage of trained staff. As a result of insufficient funding of science, the scientific potential power of small and medium-sized enterprises is decreasing. Production forms that show the technological sophistication of enterprises and require high science remain at very low levels. This negative process not only affects the science used in production directly but also prevents the introduction of new and high technologies to enterprises. The concentration of small and medium-sized enterprises in the informal (shadow) area. In Kazakhstan, the informal economy reached 21.3% of gross domestic product. On the other hand, small and medium-sized operators invest in real estate, especially land purchases, instead of expanding production and creating new employment places. In this way, operators avoid transparency and full taxation can not be realized. Investments in real estate and land, especially in urban areas, curb the investment process and freeze the capital required for production. This emerging trend also hinders the creation of the securities market. Low competitiveness of national entrepreneurship. The main reason for the low competitiveness is the excessive aging of the production vehicle-equipment-machine funds of the enterprises. Undoubtedly, the old production tools reduce the competitiveness of the manufactured goods, as well as the production efficiency of the workers. In recent years, this problem is taking a more prominent form. Because the number of low-quality goods produced by domestic enterprises is increasing in domestic markets. It is observed that domestic goods are of low quality and foreign goods fill our local market. Financial problems are among the most important problems experienced by SMEs. This is because “financing” is one of the most important factors for a business to operate. SMEs face many serious difficulties in ensuring this factor. This situation reflects negatively on their raw material supply, production, marketing, and training issues.

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Especially in periods of cyclical fluctuations, the resources of SMEs are extremely low. As a result of difficulties in collecting, cash shortage is experienced, equity is melted and expensive bank loans are used. As a result, SMEs, which have to use high-cost bank funds, are bankrupt because they cannot adjust the return rate on their current investments. In this case, the fact that SMEs have very limited capital brings with them many problems. Along with the capital problems, the financial information of the managers of SMEs is not sufficient and they do not employ trained personnel in this regard, which deepens the problem.SMEs do not have advanced technologies due to insufficient financing and have to spend intense labor with old technology. This situation reflects negatively on the quality of the goods they produce. Poor quality production hinders the sales power of SMEs and thus the competitiveness of large enterprises. It is not possible to export with the products made with old technologies and to compete in international markets.

Undoubtedly, digitalization should play an important role in stimulating the development of SMEs in Kazakhstan, the role of which is already noticeable, but it will grow immeasurably in the coming years with universal access to high-speed Internet (broadband access) and the development of information and communication technologies (ICT). This applies both to specific areas (say, “precision farming”, “smart cities”), and generally too small businesses. Availability of broadband Internet for the population of all Kazakhstan through fiber-optic links or mobile communications is one of the main conditions for the country's digitalization. Including the successful development of SMEs, because about 40% of the population of Kazakhstan lives in villages where so far most of the population does not have broadband access to the Internet.

4.2.Recommendations

Recommendations to the state:

1. There is a need to develop a comprehensive education system for entrepreneurship in Kazakhstan. This will both increase the number of new entrepreneurs and increase the chances of these entrepreneurs succeeding.
2. It is necessary to take steps to reduce monopolies that are held by large state companies. In this way, a healthy competition environment will be created between SMEs and SEEs.
3. Fighting corruption should continue to ensure equal conditions for market participants.
4. With the widespread use of various tools used in developed countries, financing opportunities and skis should be expanded for small and medium-sized enterprises.
5. Tax rates need to be reduced gradually. As a result, the registration of SMEs that are off the record will increase and a contribution will be made to the economy.
6. It is necessary to ensure effective coordination between institutions and organizations that support SMEs.
7. Communication between the state and the entrepreneur should be provided more effectively.

It is an inevitable necessity to establish long-term, rational, and efficiency-oriented policies for SMEs' current problems, especially their financial problems. These enterprises should be supported, supervised, and encouraged by making necessary legal arrangements by the State. It is beneficial for both state and private institutions to work in cooperation to overcome the problems in obtaining loans, establish credit reporting standards, ensure transparency, improve their technological infrastructure, and reduce tax and bureaucracy burdens.

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Recommendations to SME Managers as:

1) In order to run the business more effectively, the government should have information about the current support programs for SMEs. However, they should also benefit from free training programs for SMEs offered by the government.
2) In order to reduce the risks such as being unprofitable and bankrupt, the reopened businesses need to research the market to enter.
3) In order to run the business healthily and more effectively, it must have basic knowledge of legal, marketing, and accounting.
4) In order to compete against imported products in the domestic market, the need to improve the quality of domestic products is emphasized.
5) SMEs can compete with large enterprises by focusing their activities on developing new products and services and marketing. SMEs have the opportunity to follow strategies such as entering the market areas where large enterprises cannot enter and changing production areas by using their flexibility advantages, not the same product produced by large enterprises. Thus, SMEs will have found a wider range of action for themselves.

As the experience of the USA, Singapore and China have shown, the creation of open digital platforms (ODP) is a very effective tool for the development of SMEs, especially in the services and trade sectors. Three main types of ODP can be distinguished: E-gov or “electronic state” for all, the other two types are specialized - “State for business” and “Business for business” (B2B). The latter, as a rule, enable entrepreneurs to sell and buy goods and services and enter new markets. For example, these are the global giants Alibaba (China) and Amazon (USA), which are fighting for first place in the world in capitalization with Apple itself. And its absolute value - about 1 trillion US dollars, is only 20% less than Russia's GDP.

5. Conclusion

Kazakhstan has a land area equal to that of Western Europe but one of the lowest population densities globally and fast-growing markets of China and South Asia with those of Russia and Western Europe by road, rail, and a port on the Caspian Sea. The Kazakhstan economy has not yet been able to prevent its dependence on energy resources exports. In addition to energy resources, institutions that promote the development of the private sector continue their activities within the framework of efforts to diversify the economy in Kazakhstan. When we analyze the reasons that prevent the development of small and medium-sized enterprises operating in Kazakhstan, we see that these reasons are the same in all sectors: incompatibility of tax laws, insufficient credit resources, formalities of tenders, and excessive pressures of audit authorities. These reasons cause the formation of informal firms and an increase in the number of active firms in the registration of firms.

A large part of SMEs struggle with many problems and stay away from stable development and healthy functioning. Financing problems are the leading problems. The fact that they cannot follow the developments in the financial world closely, their auto financing opportunities are limited, their

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collateral problems in credit purchases, low credit volumes and high credit costs, their inability to enter the capital market, and other similar problems prevent SMEs from having strong financial structures and reduce their competitive power.

According to the experiences of developed countries, it is not possible to develop small and medium-sized enterprises to create new employment places, to fill the market with domestic goods and services, and to keep up with the developing technology, without the incentives and special measures of the state. These measures primarily include the purification of the economy from bureaucratic functioning; removing administrative barriers to entrepreneurship; reduction of informal capital; cascading out of profile activities of institutions and joint-stock companies, including the state capital, to small and medium-sized operators in the market; is to establish the necessary infrastructure to ensure the contribution of these enterprises to the innovation of the economy. Additionally, based on this research's results and further improvements based on new developments, a competitive business value in SME`s has been created, and several educational organizations topics will be developed to generate a qualitative paradigm shift and technological revolution by reaching the attention of key decision-makers and stakeholders in the Kazakishtan environment.

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Big Data Project -- Bank Marketing Campaign

Yiheng Wu

Abstract. *When I first looked at the database, I found it different and enjoyable. It is not only a real-life situation I can analyze but also a good chance for me to combine information I have learned in school with new information I learned through machine learning and form a path to the result. There are phrases I did not understand or have not even heard of but conquering them through and finishing four major machine models is beyond another level of achievement for me. I made lots of illustrations including graphs and tables to better represent how machine learning functions and how results are achieved.*

Keywords: Bank, Machine Learning, Marketing

JEL Codes: H, M

1. Introduction

The power of finance has long been inspirational to me. Understanding the usage and scope of money has been proven essential to this modern-day world. We, as customers, or as vendors, need to use money or other currency forms to transact benefits. Based on this public will, banks emerged in early history, along with other simple rules on saving and using money. Later, financial services such as deposits and loans emerged. According to the Oxford Dictionary, the modern explanation for the word “deposit” is “a sum of money placed or kept in a bank account, usually to gain interest”, whereas “loan” means anything that is borrowed and is typically expected to be paid back with interest. Moreover, starting as early as Medieval Ages in Great Britain, depositing valuables in banks was considered the safest way to save goods; time has passed and finally the Bank of Britain’s new identity as the “lender of last resort” was acknowledged. The Bank of Britain not only guarantees the identity of every commercial bank in the UK but also allows anyone to borrow and save money in the bank. (Pettinger, n.d.)

Inflation is a general rise in the price of goods and services over some time. It can be affected in different ways through policies introduced by the government, economic programs launched by a tycoon, or the financial habits people become accustomed to. In general, inflation causes money to lose value. Thereby, if the consumer price index rises, we would realize that our money has devalued. When we look at the inflation rate in recent years, shown in figure 1, it is between 1%~3%. In order not to lose money, we turned to promotions offered by financial institutions. Usually, banks offer a higher rate of return for investments than simply saving money in our accounts, allowing us to maintain the growth in our financial value by beating inflation. A loan is the opposite of a deposit, it means a special form of debt lent by a corporation. (Kagan, 2020)

Typically, banks attract customers by having a higher interest rate than the traditional liquid saving but still lower than the inflation rate. One way to achieve that is by offering a time/term deposit account which is a type of deposit account held by the bank where the money is locked up for some set period, ranging from

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one month to a few years. Different from a deposit, a term deposit generally means a fixed investment in the form of deposits and cannot be taken out before the term ends. By investigating the deposits and loans a person obtains, we can greatly understand the distribution of wealth in terms of gender, occupation, and other factors. It is exciting for me to investigate how other factors, including the results from past contacts and days between marketing campaigns, influence the acceptance of term deposits among customers contacted.

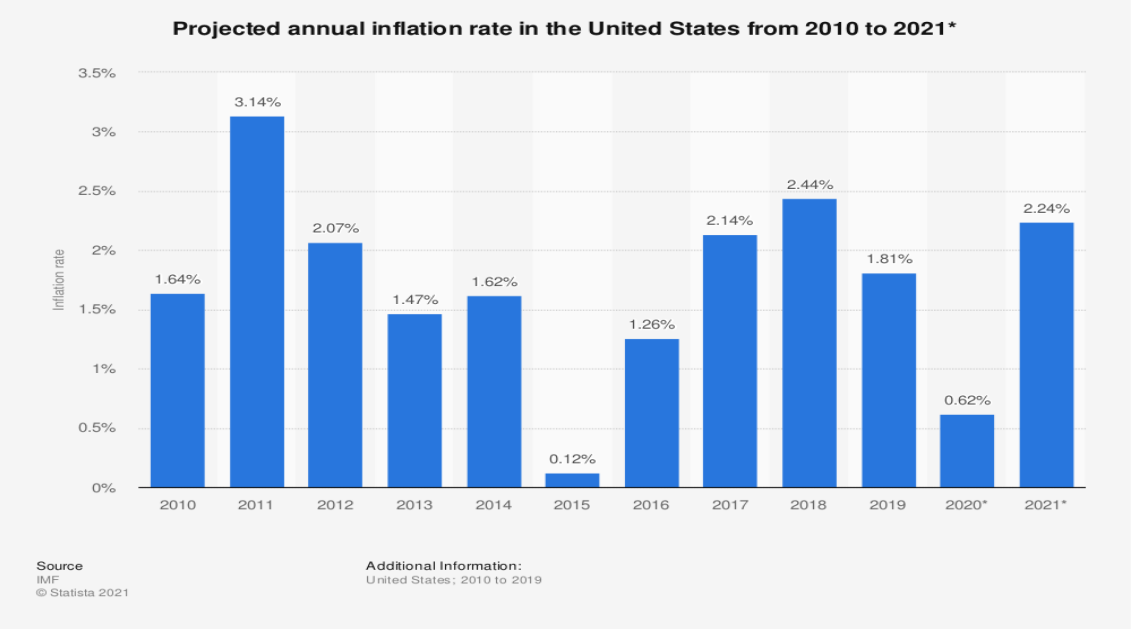

Figure 1. Projected annual inflation rate in the U.S. from 2010 to 2021 (Statista Research Department)

2. Research Elaboration

2.1. Data

I have done some research and found this tremendous dataset I adopted from a Portuguese banking institution under UC Irvine Machine Learning Repository. It has 16 predictor variables, as shown in table 1, and one outcome variable which is whether the client subscribed to the term deposit.

Table 1. A list of variables in the dataset

Variable	Data type	Description
age	numeric	Age of the client
job	categorical	Type of job
marital	categorical	Marital status

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education	categorical	Education level
default	binary	Has credit in default?
balance	numeric	Average yearly balance, in euros
housing	binary	Has a housing loan?
loan	binary	Has a personal loan?
contact	categorical	Contact communication type
day	numeric	Last contact day of the month
month	categorical	Last contact month of the year
duration	numeric	Last contact duration, in seconds
campaign	numeric	Number of contacts performed during this campaign and for this client
pdays	numeric	Number of days that passed by after the client was last contacted from a previous campaign
previous	numeric	Number of contacts performed before this campaign and for this client
poutcome	categorical	The outcome of the previous marketing campaign
Output variable	Data type	Description
y	binary	Has the client subscribed to a term deposit?

2.2. Exploratory Data analysis

To explore the data, A bar plot of the outcome variable with the counts of observations in each categorical bin is shown in figure 2. It shows that the dataset is unbalanced with about 89% of the outcome being “no” and 11% being “yes”. This can be addressed with various techniques during the machine learning phase. Figure 3 is a heatmap of the correlation matrix for numerical variables in the dataset. The color of the

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squares in the plot represents the magnitude of the correlation coefficient. No specific relationship had been found between different groups.

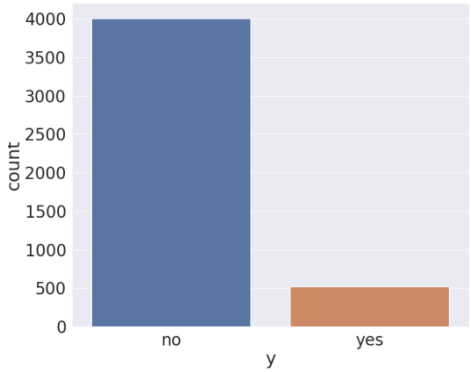

Figure 2. Countplot of the outcome variable “y”

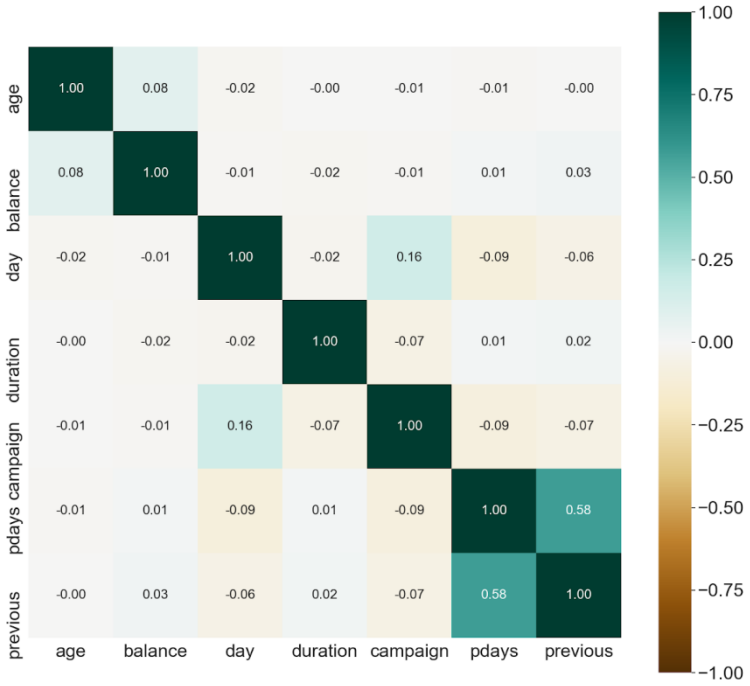

Figure 3. correlation heatmap of numerical features

2.3. Data preprocessing

To prepare data for the machine learning models, texts need to be converted into numbers. This is done by One Hot Encoding after combining less frequent values for the columns with high cardinality like “job”

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and “month”. Figure 4 shows the histograms of “job” and “month” before combining the less frequent values.

The histograms of each feature variable, shown in figure 5, were plotted using Seaborn’s “histplot” function after combing less frequent values which are lumped into “other”. In figure 5, the X-axis represents the data variable is divided into a set of discrete bins, whereas the Y-axis represents the population falling within each bin which is shown through the height of the corresponding bar. The observations within each bin are also color-coded by the outcome variable “y”, blue bars represent the clients who didn’t subscribe to a term deposit and pink bars represent the successful campaign cases. One other thing in the preprocessing step is to put all the numerical data on the same scale. Figure 6 shows the histograms of numerical columns after scaling. In figure seven, visualizing by the heatmap, no strong correlation exists between categories.

Figure 4. Distribution plot of variables “job” and “month” before combining less frequent values

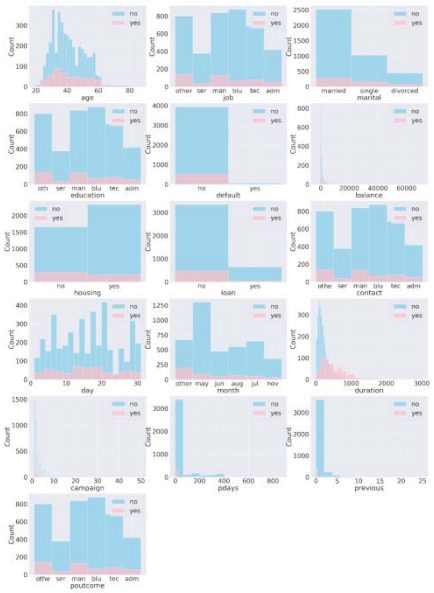

Figure 5. Distribution of each feature variable, colored by “y”

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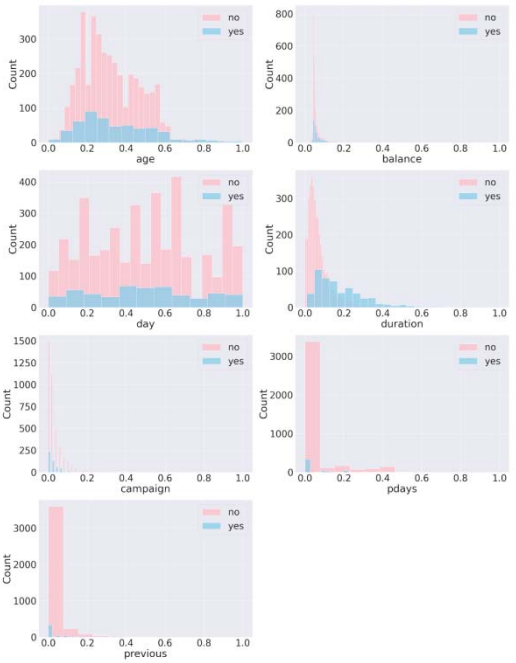

Figure 6. Distribution plot of numerical features after scaling

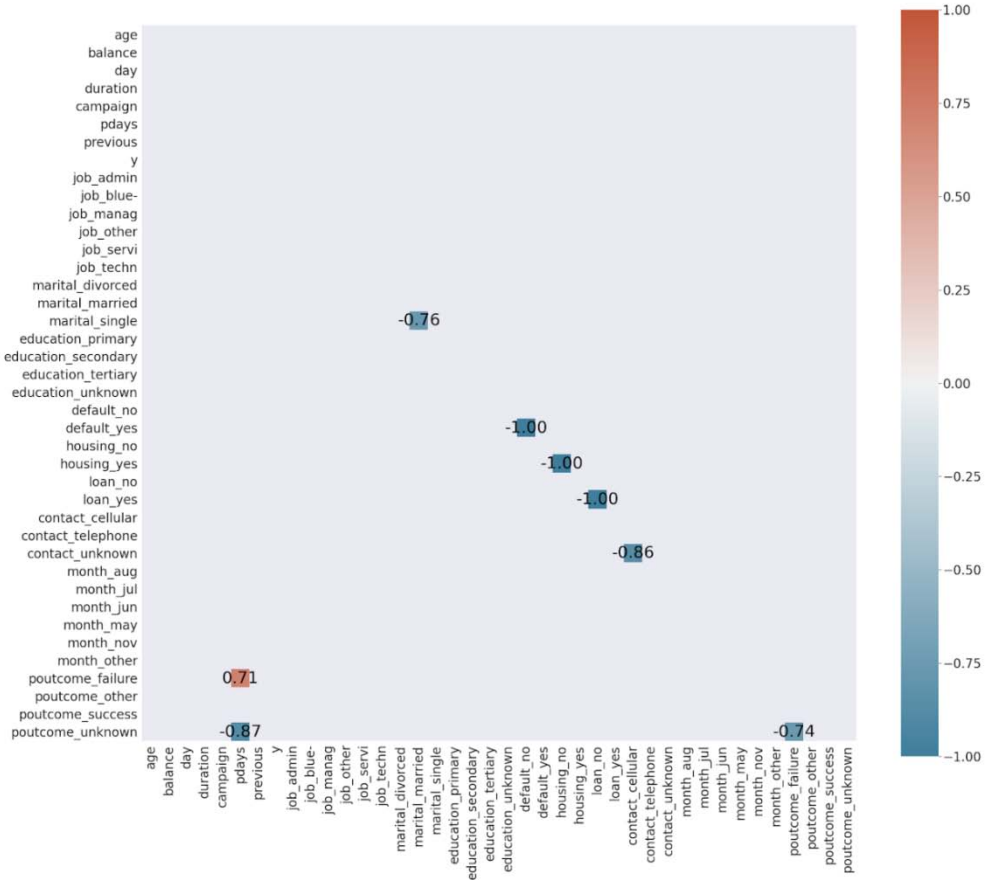

Figure 7. Correlation heatmap of all features after one-hot-encoding and scaling

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2.4. Machine Learning Models

1) Artificial Neural Networks

The first model used was the artificial neural network model, which is a machine learning model inspired by the human brain. The model is implemented through Keras from TensorFlow 2. Multi-layer perceptron (MLP) is the most common form of neural network. A sequential model is the easiest way to build an MLP classifier. Activation function Rectified Linear Unit (ReLU) for the hidden layers and Sigmoid function for output layer were used.

After we created the sequential model, we used the Stochastic Gradient descent (SGD) optimizer and "binary cross-entropy" loss function to compile the model with accuracy as the metric. (Gandhi, 2018) The model was trained for 30 epochs, each epoch means the data is being fed through the MLP once. In figure 8, we can see a general process of how the program trained the data, giving the input and generating the output. Figure 9 here we have an illustrative graph showing the neural network. Figure 10 shows the loss and accuracy of the train and validation set during training, where it reflects that the accuracy of the program is improving. In figure 11, we get to look closer at the trend of increasing accuracy and decreasing loss during the process. It is reasonable that training accuracy is always higher than testing accuracy while training loss is always lower than the testing loss simply because testing shows what needs to be improved.

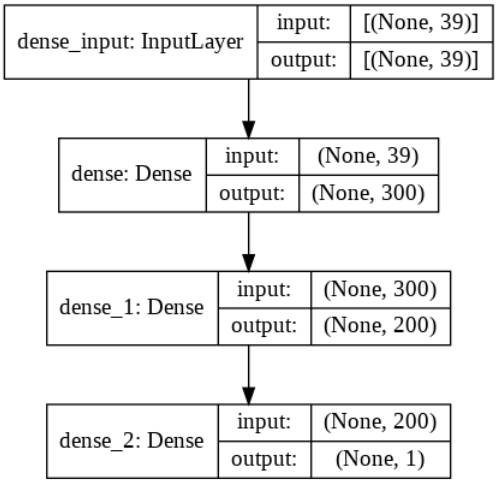

Figure 8. MLP model summary

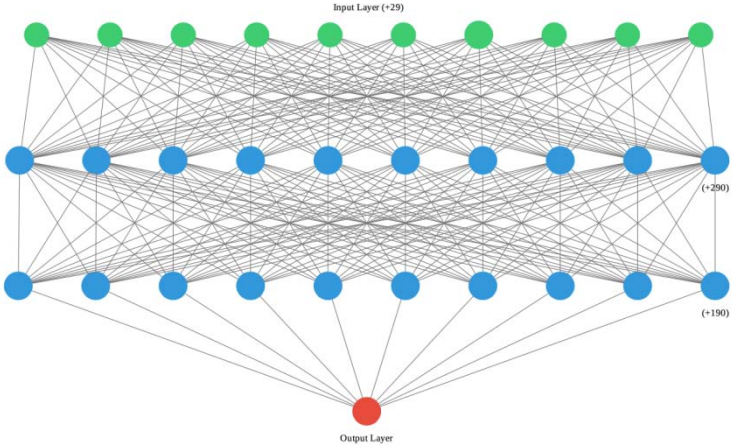

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Figure 9. Artificial Neural Networks visualization

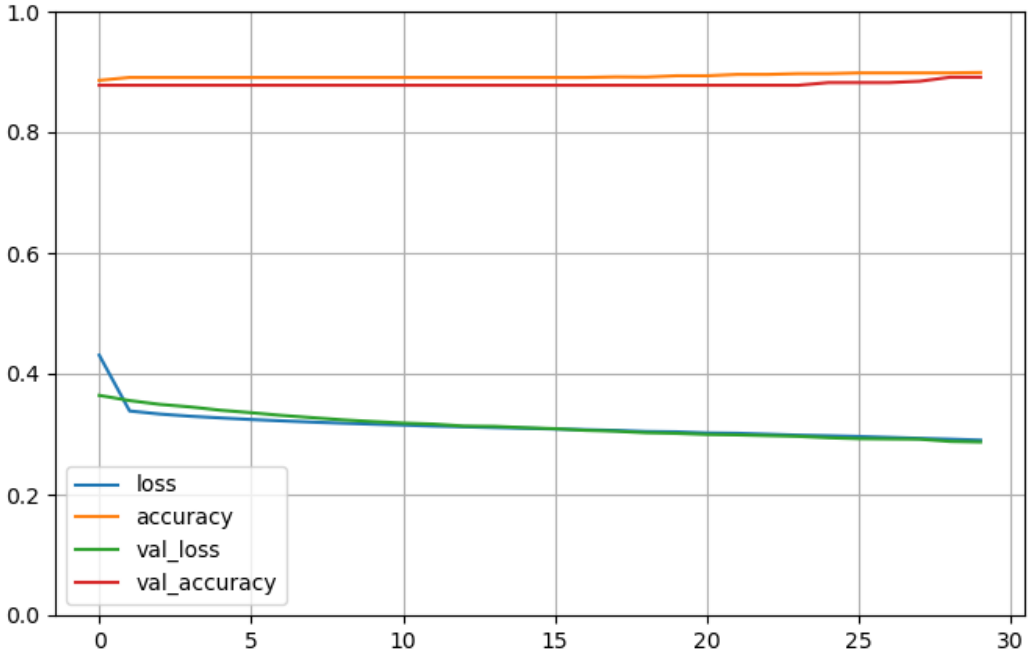

Figure 10. MLP train and validation set loss and accuracy plot during training

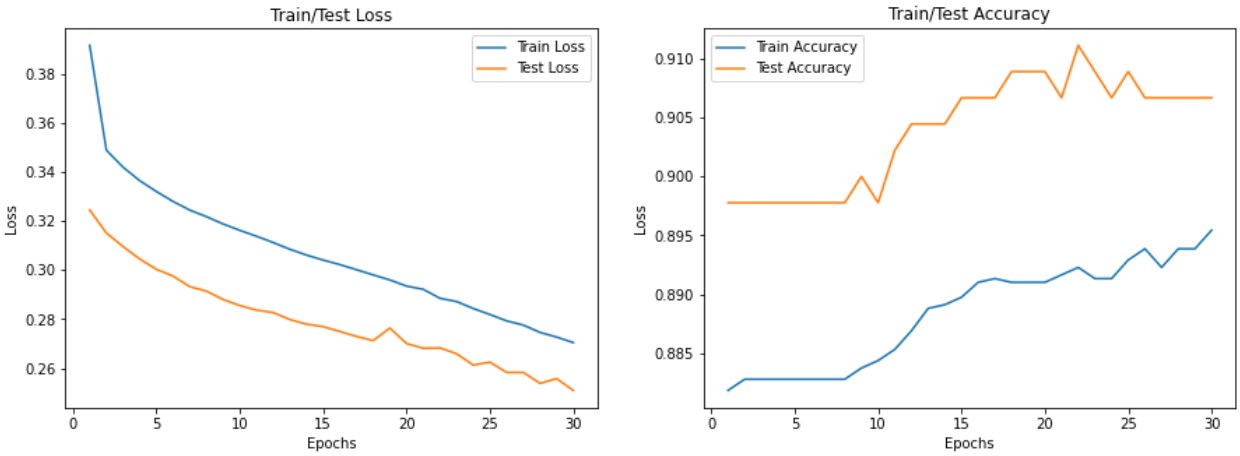

Figure 11. Train and Test set loss and accuracy of MLP

2) Logistic Regression

Regression is a type of math analysis that puts data together so that humans can analyze the trend or pattern of the relationship between variables. Logistic regression is, thereby, a machine-learning process that predicts binary information. (What Is Logistic Regression?, 2020) Logistic regression can be used to categorize different classes of information or performed as the same use as a linear regression--predicting continuous outcome. There should be a dependent/target variable and a set of independent/feature variables.

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In our ROC curve (receiver operating characteristic curve) for the logistic regression model, the X-axis is the false positive rate, which means the fraction of negatives that have been selected as positive incorrectly. On the Y-axis, we have the True positive rate, which measures the fraction of the initial positives which have been predicted correctly as positive by the classifier.

	precision	recall	f1-score	support
0	0.96	0.80	0.88	801
1	0.33	0.77	0.47	104
accuracy			0.80	905
macro avg	0.65	0.79	0.67	905
weighted avg	0.89	0.80	0.83	905

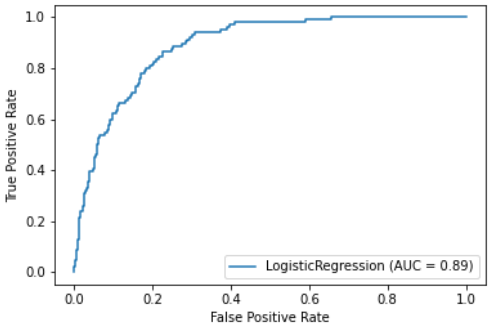

Figure 12. Logistic Regression Model classification report and ROC curve

Table 2 shows the odds ratios (converted from the log-odds which are the coefficients provided by the logistic regression classifier) of all the feature variables. The impact size of factor “balance” can be expressed by its odds ratio:

Odds subscribed/balance=x+1Odds subscribed/balance=x

When an odds ratio has a value above one, it means that the corresponding feature variable is positively associated with the target variable. For instance, in the table below, for balance we see an odds ratio of about 2.22. It means that we will see an increase of about 122 percent in purchasing term deposits when the balance of that customer’s account increased by 1.

Table 2. Odds ratios of selected feature variables

Feature Variable	Odds ratio (>= 1.5 or <= 0.5)
balance	2.22041722
duration	3.13496465e+05
pdays	6.09432521
previous	11.58689
month_other	2.32546258
Job-related variables	Odds ratio
job_adm	1.08849395

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job_blu	8.94624502e-01
job_man	1.06234040
job_other	1.02965993
job_ser	9.70727022e-01
job_tec	9.72869526e-01

3) Support Vector Machine

	precision	recall	f1-score	support
0	0.89	1.00	0.94	801
1	0.00	0.00	0.00	104
accuracy			0.89	905
macro avg	0.44	0.50	0.47	905
weighted avg	0.78	0.89	0.83	905

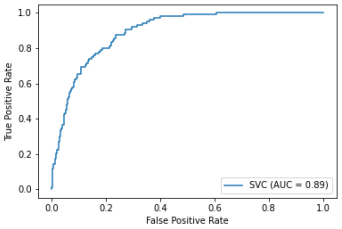

Figure 13. Support Vector Machine classification report and ROC curve

The first thing we do in an SVM is to find a hyperplane. What a hyperplane does is that it best separates the two different-class information, basically, a boundary. A hyperplane in a 3-D graph is a plane, while it is a line in a 2-D graph, as similarly, a dot in a line. Our goal is to find a hyperplane that has the largest margin between the two different classes of data. Here, we reach the support Vectors. They are the points, or positions, that are closest to the hyperplane, and serve a great role in changing the hyperplane. The AUC (Area under the curve) above represents how well the machine separates different classes.

4) Random Forest

	precision	recall	f1-score	support
0	0.89	0.99	0.94	801
1	0.52	0.11	0.18	104
accuracy			0.89	905
macro avg	0.71	0.55	0.56	905
weighted avg	0.85	0.89	0.85	905

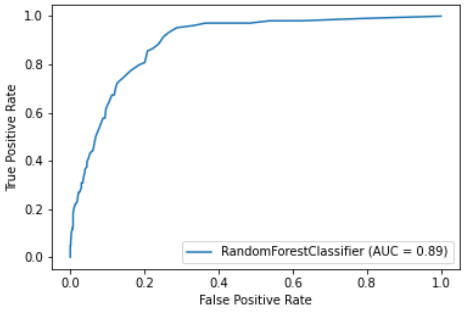

Figure 14. Random Forest Model classification report and ROC curve

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The random forest is a powerful yet illustrative technique that puts relative data together. (Giraud, 2020) Each small section we see below in figure 15 is called a node. There are two kinds of nodes in general, the decision nodes and the leaf nodes. We try to split each node with a specific type of method that allows us to eliminate overfitting and eventually binning outliers and non-linear data. Decision trees help us with that. The decision tree is a model that processes the data based on the independent variables. In this case, the model will train each sample with questions such as: "What is your job?", "What is your marital status?". Thereby, we divide samples through different categories in each branch. Eventually, when we combine these decision trees together, we have the random forest model. One key term of this model is Gini Impurity, which is what we try to eliminate since it points to the wrong classification of nodes when splitting.

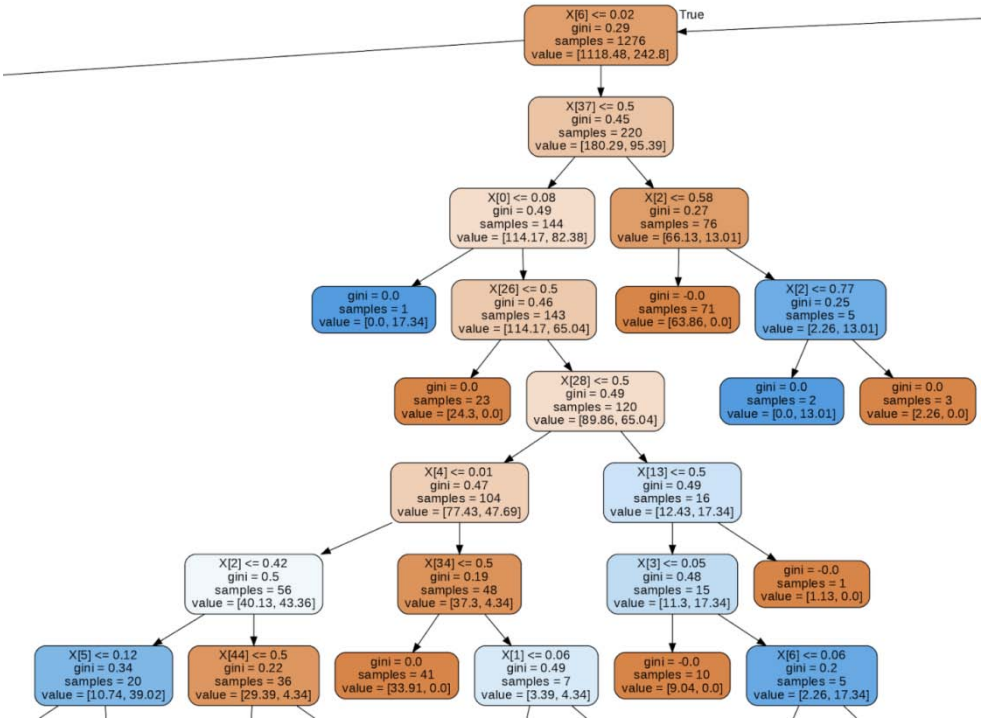

Figure 15. Part of the random forest visualization

3. Results and Discussions

Upon all four models we have employed, and the previous data analysis, we found out that there is no direct relationship between what kind of jobs one has and the decision to buy term deposits as we previously hypothesized.

Data errors do exist in our data project. We can see that our source based on a bank in Portugal is a little outdated. As the old saying goes, a machine learning model can only predict what the data illustrates. We may have better predictions if we manage to get a more refined and recent dataset.

4. Conclusions

For our neural network model, the curve is generally smooth, which means that the model gets more accurate at a slow but steady pace. Our process and result in logistic regression and support vector machines are quite similar. In both models, we saw a similar ROC curve, with the AUC 0.89, closer to 1 than to 0.5,

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which means that the models have relatively high-quality performance in distinguishing between different categories' effect on the project as a whole. We get a high precision score in logistic regression, but with a relatively low accuracy of 0.8. On the other hand, though not that precise, Support Vector Machines proved to be more accurate. In the end, since our data is imbalanced between category 0 and 1, where category 0 has far more data and higher accuracy according to the f1 value, the macro average (calculates the unweighted mean accuracy per label or category) is far lower than the weighted average (calculates the weighted mean accuracy per label). However, both average values from the Random Forest model are higher than the other models. Therefore, random forest is one of the most successful models for this dataset.

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Book Review: Azra Raza, *The First Cell: And the Human Costs of Pursuing Cancer to the Last*, Basic Books, 2019, ISBN 9781541699519

- A Philosophical Review, Part One -

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Abstract. This paper is a critical review of the book entitled *The First Cell: And the Human Costs of Pursuing Cancer to the Last*, published in 2019 by Basic Books. Its author, Azra Raza—an oncologist specialized in the diagnosis and treatment of myelodysplastic syndrome—presents "systems biology" as the panacea for the diagnosis and treatment of human malignancies. In addition, Raza holds "reductionism" as the reason for humanity's inability to defeat cancer. However, these concepts offer a simplistic account which lacks the nuance that the current discussions taking place in the field demand. This review will explore the philosophical basis of the author's views on why the so-called "War on Cancer" is being lost.

Keywords: cancer, cell, war on cancer, paradigm shift, reductionism, systems biology

JEL Codes: I1.

The "War on Cancer" was officially unleashed when US President Richard Nixon signed the National Cancer Act in December of 1971. In that same year, and in his State of the Union address, President Nixon proposed "an intense campaign to find a cure for cancer (Leaf, 2004). The National Cancer Act mandated the reduction of the "incidence, morbidity and mortality from cancer" through research and the translation of that research into implementable diagnostic and treatment methods (De Vita, 2004). Almost half a century into this war and an annual global investment in the billions of dollars in cancer research and treatment people are still debating whether or not we are winning, or even making a progress, in this fight against one of the staunchest enemies of humanity.

For most forms of cancer, a sustained remission is rare, and cures are even rarer. Cancer therapeutics, especially the new "smart drugs"-targeted therapy, immunotherapy, gene therapy, personalized medicine or customized drugs-are exorbitantly costly, yet provide marginal benefits measured in terms of weeks or months of extended survival. This constitutes a major cost-benefit dilemma for patients, healthcare systems and governments worldwide (Hanahan, 2004).

In the "War on Cancer" debate very few take the position that we have won, or are winning, this fight. In the main, there are two groups in this debate: on the one hand, there are those who maintain that although humanity is still far from announcing victory, we are, nevertheless, making significant progress in the understanding and treatment of different kinds of cancer; on the other hand, there are those who believe that

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not only we are not making any progress in this war, we are actually losing it. Azra Raza, in her book *The First Cell*, belongs to the latter group. Raza thinks that the "cancer winter continues (10).

Azra Raza is an oncologist by training who specializes in the diagnosis and treatment of myelodysplastic syndrome, which is a disease of the bone marrow with high potential for acute leukemic transformation, which ushers in the terminal stage of this disease. In her book, Raza gives an account of her personal experiences with a number of individuals who were afflicted with cancer. Most of whom she treated and cared for and all of whom ultimately succumbed to their illness, including her husband Harvey Preisler, who was a distinguished oncologist and who died of lymphoma in 2002.

The book is composed of seven main chapters; each carries the name of one of those individuals with whom she established more than just a patient-doctor relationship. With Raza, things became very personal and many times she would let those patients into her life. The last of these chapters carries her late husband's name "Harvey". But in these chapters, Raza not only described the experience of dealing with those patients, but she also included her views on the current state of cancer research and treatment. There is a lot going on in this book and in this limited space, therefore, one must be selective in what to highlight.

The following lines will focus on the author's views on the problem of cancer and how she envisages the war on cancer should be conducted moving forward. Despite all the grandiose ideas, some of which verge on the fantastic, the author did not offer a real, or realistic, alternative model for dealing with the cancer problem. She presents the concept of systems biology, which is a relatively new concept and gained prominence and attention in the past couple of decades, as the panacea for the diagnosis and treatment of human malignancies. However, as we shall see later, systems biology is still a discipline in the making and faces several challenges that should be overcome before it becomes a basis for a new approach to the understanding of the malignant process. But before we show how systems biology cannot be the paradigm shift that the author enthusiastically advocates, we will look at the philosophical basis of the author's view on why we are losing the war on cancer.

Few would dispute the author's assessment that the current state of cancer research and therapeutics is not bringing humanity anywhere close to defeating this disease. As someone who specializes in treating myelodysplastic syndrome and its acute leukemic phase, known as acute myeloid leukemia, the author maintains that the treatment of this disease has not changed or evolved in any significant way for the past fifty years. The author argues that the same can be said of most common types of cancer. She describes the routine protocol for treating most cancers as "slash-poison-burn" (Raza, 6). This stands for surgery, chemotherapy and radiation therapy.

On the cancer treatment front, the author directs harsh criticism towards those who announce a certain drug as "game changer" while, in fact, it only prolongs life for few weeks or months. On the cancer research front, the author rejects animal models and tissues cultures for investigating carcinogenesis and experimenting with new drugs. She thinks that successes in those animal models and in vitro methods has nothing "to do with treating disease in humans" (Raza, 6). After this assessment, the author proclaims her view on the war on cancer forcefully, unequivocally and without mincing words: "No one is winning the war on cancer. It is mostly hype, the same rhetoric from the same self-important voices for the past half century" (Raza, 6).

The author then goes on to attack the philosophical basis of the current paradigm for understanding the malignant process. The author holds "reductionism" the responsibility for humanity's inability to deal cancer the long-awaited coup de grace: "The disease [cancer] is fantastically complex. More fantastic is the reductionist conceit that targeting a single genetic abnormality with a single drug will be curative" (Raza, 10). But the author has good tidings to tell readers: "The heyday of reductionism, looking for one culprit

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gene at a time and searching for one magic bullet, is over. The era of big data, cloud computing, artificial intelligence…has arrived. The ideal strategy will emerge from harnessing cutting-edge technology for a multidisciplinary *systems biology* through the consilience of scientists with expertise in molecular genetics, imaging, chemistry, physics engineering, mathematics and computer science" (Raza, 244).

Let me note here that introducing concepts such as reductionism and systems biology in a popular book about cancer, which is supposed to be written for the illumination of the lay reader, without providing even a brief history on the development and evolution of those ideas is somewhat problematic. Most of those who pick up this book, I am willing to bet, are hardly versed in the fundamentals of the philosophy of science and biology, let alone aware of the ongoing debates taking place in those fields of inquiry, to be able to judge the author's assessment of the cancer problem. Many will have no choice but to accept the author's narrative that reductionism is the culprit and systems biology will save the day. This is a simplistic account and lacks the nuance that the current discussions taking place in the field demand.

But what exactly is reductionism? Is it really, as the author claims, responsible for our failure to defeat cancer? Is molecular biology, which is supposedly the epitome of the reductionist model in biology and against which the author directs her criticism a reductionist explanatory model? Will the new era, the era of systems biology, which the author is so enthusiastic about, witness a paradigm shift in cancer research and treatment? Will this new paradigm, should we accept that characterization, put reductionism finally to rest? In this first part of the article I will attempt to answer the questions pertaining to reductionism. In the second part I will deal with systems biology.

Reductionism has a very long history that dates to the ancient Greeks. But a relatively more recent history of reductionism attributes this explanatory model to Galileo and Newton, who laid down its foundations, and the French philosopher Rene' Descartes who formulated its philosophical premises (Bazzari, 2013.) In the classical sense, reductionism can be defined as an approach to the understanding of phenomena based on the laws of physics and chemistry. Any phenomenon, according to this explanatory model, can be decomposed into its constituent components. These components can then be understood in terms of the laws of physics and chemistry. By understanding the parts, an account of the whole can be achieved. Reductionism has been the dominant explanatory paradigm in the sciences for the past three centuries.

Reductionism as it pertains to the biological sciences is represented by molecular biology, which the author of "The First Cell" is supposedly attacking when she attacks reductionism. The molecular biological program started its ascension in the 40s and 50s of the past century, especially after the discovery of the double helix structure of the DNA by Francis and Crick in 1953. The role of genes and their products in explaining biological function soon gained significance. Molecular biology reached its apex in the 1970s and 80s. This was enhanced by the development of advanced technologies such as recombinant DNA technology, cloning, mass spectrometry and high-through put platforms for DNA sequencing. These technologies allowed the discovery and elucidation of the roles of different genes and their byproducts; most prominently the identification of the oncogenes, tumor suppressor genes and their proteins. The focus, subsequently, became on the part which each of these genes and proteins played in malignant transformation and growth. Of course, things did not remain that simple and soon cellular signaling pathways and their substrates were discovered and their roles in malignancy became the latest research programs in the study of cancer.

The literature on reductionism in the sciences, especially the biological sciences, is huge. But the idea of reduction is one of the most controversial topics in the biological sciences. It is not the purpose of these lines to outline these debates. However, we will focus on the idea whether molecular biology is a reductionist

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program. It is important to note that one of molecular biology's main tenants is to encourage the study of individual molecules in order to understand a more complex biological phenotype (Powell & Dupré, 2009). In this sense molecular biology can be defined as a research program that "looks to the molecular scale for answers to biological questions posed at any scale" (Powell & Dupré, 2009). But molecular biology never engaged in any further reduction. Molecular biology afforded knowledge at the molecular level of organization that opened the possibility for understanding human biology from that level to the level of the whole organism (Hartwell et al., 2008).

It has been argued that those who attack reductionism and advocate the systems biology approach seem to be against a kind of an obsolete form of reductionism, which can be described as classical reductionism. This kind of reductionism calls for the reduction of all phenomena into their physical and chemical properties and tries to explain them in accordance with the laws of physics and chemistry. In other words, classical reductionism entails reducing all biological laws, that supposedly explain biological phenomena, into physical laws (Dupré, 1993). Molecular biology, the quintessence of biological studies, it is argued, has never implemented such a program (Gatherer, 2010).

Further, there are those who think that molecular biology is not a reductionist approach for the study of biological phenomena to begin with. They argue that reduction of a biological complex phenomenon, like cancer, to its molecular property "is not reductive at all…because it is not a reduction of a complex to a simple representation but a reduction of a complex to a complex representation" (Debru, 2002). Thus, the author in her book seems to be totally insensitive to the historical nuances of the reductionist doctrine and its usage in the different domains of scientific study. This lack of historical sensitivity led the author to present her thesis-end of reductionism and the rise of a holistic or systemic understanding of biological phenomena- as a fait accompli. A cursory review of the literature on this hotly- debated subject will reveal the inaccuracy of the author's premise.

Raza rightly points out that animal models and in vitro methods (such as tissue cultures) do not recapitulate cancer behavior and its response to therapy in the same way that they take place in the human body. Additionally, she plausibly argues that cancer is a complex disease that cannot be exhaustively explained by a linear model of causation: gene mutation leads to malignant transformation. We now know that there are other factors that play a significant role in the malignant process; most importantly, epigenetic factors and the tumor's microenvironment. Mention should also be of the cellular networks, which are composed of hundreds, sometimes thousands, of interacting elements that need to be mapped and analyzed. The latter is the domain of systems biology.

Indeed, a more holistic or systemic approach to carcinogenesis is needed. But can we say that reductionism, which, according to the author, gave us an incomplete understanding of the malignant process, is the reason why we are losing, or at least not winning, the war on cancer? It is too simplistic a view to claim such a thing. To blame a single factor for our mishandling of this very complex disease is, ironically, a reductionist view. It has been extensively discussed why the fight against cancer has not been going in humanity's favor. However, even if cancer research changes course and fully adopts systems biology as the new paradigm for understanding cancer, a lot must be done on many fronts before cancer research can be said to have changed course. Take for example what is entailed by the implementation of systems biology as the new model for studying cancer. Systems biology is an interdisciplinary approach that requires the collaboration of molecular biologists, mathematicians, information specialists, physicists and computer engineers. Fundamental changes are needed, in both academic and research institutions, to bring all those experts together. This is not an easy challenge to overcome.

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There is also the financial aspect. Systems biology, simply defined, is a methodology that aims to integrate biological information. It amasses huge amounts of data and then studies them using mathematical models and computer simulations. Some of the technologies that the author proposes as tools for collecting information, which might signal the first inklings of cancer, hence the title of the book *The First Cell*, sound like they are from a sci-fi movie as the author herself admits: "The above [technologies] are not scenes from Fantastic Voyage" (Raza, 237). The author is referring to a 1966 sci-fi movie. Some of the proposed technologies are: a smart bra that is worn for an hour once a week and has biosensors that monitor changes in bodily temperature and texture. The data generated is then captured and interpreted by an accompanying app that detects the first few cancer cells; there is also a machine that scans a person's body every day while taking their shower (Raza, 237). But the most fantastic of all is a scenario in which individuals are screened from birth to death for any early development of cancer cells. The protein signature of these cells is identified and is used to determine their origin (Raza, 238).

One cannot but ask: Who is going to pay for all this? Is it the government? The insurance companies? Will public policy facilitate, or stand as a barrier to, the wide-spread availability of such technologies? Will the technology be available in, and affordable by, developing nations? Cancer is not a problem for the wealthy and developed countries. Cancer is a global problem. Winning the war on cancer requires more than changing our epistemic model for the study of this disease.

In the second part of this article we will look at systems biology and give a brief overview of this relatively young discipline. We will try to answer the question whether systems biology can be considered a paradigm shift (à la Kuhn) in the study of cancer and other diseases. We will also look at some of the challenges that systems biology still faces.

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