

## Labor force and economic growth based on demographic pressures, happiness, and human development: Empirical from Romania

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### Abstract

This ~~paper article~~ examines the effects of demographic pressure, happiness, and a human development index on labor force and economic growth in Romania for the period 2013-2019. ~~By Using~~ path analysis, we ~~need to developed divide into~~ two models, ~~one exploring~~ (direct effects and ~~the other~~ indirect effects. ~~With a time series database, Ce~~calculations ~~in the models used time series data obtained from annual reports. can be presented through the data obtained in the annual report.~~ The ~~article paper~~ documents six important findings, including ~~that~~ the variables demographic pressure, happiness, and ~~the~~ human development index supports economic growth significantly. Moreover, ~~the~~ human development index and labor force also play an important ~~and significant~~ role in economic growth ~~significantly~~, but ~~the~~ human development index is the single most striking variable from ~~our the~~ hypothesis test; it is ~~shown proven~~ that ~~these index effect~~ also has a significant effect on economic growth through ~~the~~ labor force. This evidence offers insights to stakeholders that ~~there needs to be an~~ emphasis ~~needs to be placed on from~~ demographic pressure and happiness so that they can play a real role ~~in for~~ the success of the population's welfare.

**Keywords:** ~~demographic pressure, happiness, human development, labor force, economic growth~~economic development, path analysis, welfare, Romania.

### INTRODUCTION

Demographic changes are part of ~~an~~ intense policy pursued by various countries. These ~~changes problems~~ have a broad scope because they are related to complex problems including the labor market, pension systems, cultural cohesion, gender equality in ~~the~~ social and economic contexts, identity, quality of life, public expenditure performance, regional cohesion, public interest services, and balanced regional development. ~~balanced.~~ This section ~~seeks to~~ highlights evidence comprehensively based on ~~the~~ diversity of discussions and, ~~so it is necessary to~~

focusing on regional trends, patterns, and projects (Büchs & Koch, 2019; Gløersen et al., 2016; Mester, 2017).

This potential for demographic change has been demonstrated in a number of cases in several countries. For example, with respect to macroeconomics, cross-country happiness data from Europe was used to ~~In the macroeconomic realm, based on cross-country happiness data from Europe, to~~ calculate the trade-off between inflation and unemployment, finding that there is no significant difference between rich and poor. This ~~of course~~ explains how increasing real incomes over the decades helped East Germans lead gratifying lives. & the great life through the gratification obtained in East Germany through increasing real incomes over the decades. In addition ~~Meanwhile~~, the calculation of major changes in life satisfaction has also been observed in post-transition Russia and can be partly explained by increases in real income with some variation in the observations. By considering the demand for redistribution between the US and European regions through the intensity of income inequality on individual welfare, the discussion of validity with the welfare question seems subjective, (due to the use of real-time welfare measures and experience sampling. So far, the promotion of the concept of a national welfare index to complement economic recovery, with government strategies and programs in a number of countries, ~~it~~ is an important concern (Frijters et al., 2006; Kahneman & Krueger, 2006).

With respect to ~~Explicitly, the economy of~~ Romania, its economy is more dependent on services, which accounts for ~~at~~ 55% of GDP, and the rest is the industrial and agricultural sectors, accounting for 35% and 15% of GDP, respectively ~~of agriculture as a contributor to GDP~~. It should be noted, that 32% of the population work in the agricultural and production sectors (e.g. wine estates), which makes so that ~~these~~ sectors ~~is~~ the mainstay of the economy ~~sector~~. With the expansion of growth patterns based on primary sectors, generally speaking, ~~the~~ consumption of the population in a country is more inclined towards food needs (The Global Economy, 2020).

~~For various interrelated reasons, demographic pressures (DP), the happiness index (HI), and the human development index (HDI) indicators are closely related to the labor force (LF) and economic growth. This can be proved by various interrelated reasons.~~ A country needs to consider the comfort aspect that comes from its own demographics, ~~and in order for residents to live comfortably,~~ environmental conditions and situations for occupying an area are the most dominant ~~areas of concern so that residents can live comfortably.~~ If ~~residents live comfortably, that happens,~~ they will feel happy carrying out economic activities (production, distribution, and consumption), so that sustainable human resource development can be created. The social capital of the population is obtained through improvements in the fields of education, health, and adequate infrastructure. That way, they can also work and increase productivity in various sectors of the economy. The population, ~~whiche~~ is absorbed in all sectors, becomes an expansive driving force ~~expansively~~ if it is balanced with equitable economic growth. Based on this phenomenon, ~~from this article,~~ we intend in this paper to discuss the direct and indirect relationship ~~d~~ between DP, HI, and HDI on LF and economic growth in Romania.

## CONCEPTUAL AND THEORETICAL ARGUMENTS

### Demographic pressures (DP)

DP's capacity for nature is a multifaceted problem as well as a major problem in the demographic development of a region, and thus needs ~~.-This coverage~~ needs to be considered very broadly. ~~This is a major problem in the demographic development of the region.~~ DP not only complicates the problem of income inequality and poverty but also has a negative impact on the development process (Didenko et al., 2017; Carvalho et al., 2016).

The most important features of the demographics of a region are aging and population decline. All countries, especially those from Europe, are facing this problem, with different intensities from one region to another. In the last few decades, the fundamental change in the demographic



situation in the European Union (such as Romania) has been a transition period as the older population is densely packed and the growth rate of the young population gradually slows down.

Although, there was an increase in population in the EU as a whole in 2011, ~~As for~~ the population of countries such as Bulgaria, Germany, Latvia, Lithuania, Hungary, Portugal, and Romania ~~has~~ decreased (Serban, 2012).

### **Happiness**

If a sense of genuine happiness is based on one's comparative situation, then ~~a the~~ policy ~~that~~ addresses it must have a logical impact and nothing can be done to improve overall well-being. ~~This basic take, for example, as a justification for public~~ taxation, ~~Efforts~~ to increase ~~their~~ income that ends up being taxed more can lead to reduced happiness. Likewise, for the environment, these factors of economic externalities are closely related to taxation in terms of ensuring full social conditions against the costs of agency activities and are carefully calculated for the benefit of the individual. For the traditional income function, the estimated happiness function can be used as a comparison of welfare gains and losses (related to various factors). This sort of thing should be used to estimate the income balance from say, divorce, to imply the slope of the "Philips Curve", and to suggest that income their inequality has a significantly negative effect on the happiness inequality of people in Europe (Bejaković & Mrnjavac, 2018).

~~Quality of life, concentrating on the importance of the meaning of work extensively.~~ The rapid development of technology and the rapid scientific development of people's ability to balance work and family life (in other words, quality of life) can be analyzed by considering a person's job shortage or unemployment through the lens of mental health and well-being. It seems clear that happiness ins one's work-life can extend to oneself, others, and life outside of work. ~~From~~ ~~Several studies~~ have shown that, there is a strong correlation between job and life satisfaction in 34 countries. However, there is still much debate about the many empirical findings of causality

and the role of other factors such as ~~outlining the importance of~~ personality traits, mental health, and extraversion. In this connection, the determination of satisfaction in the world of work and leisure reflects one's happiness (Parasuraman & Simmers, 2001).

### **Human development (HD)**

Since 1990, the basic concept of HD was developed into HDI to enlarge the government's role in making development decisions and planning. In the past, this measure was also designed as an alternative use of GDP per capita ~~to, which~~ symbolizes human prosperity. ~~Until now, that~~ HDI has achieved increased acceptance, largely because it tremendous success. HDI includes a number of indicators other than income, namely education and health, to keep it simple and easy to calculate (Lind, 2010; Taner et al., 2011).

~~In the early days of~~ HDI received a great deal of criticism in its early days, however. ; many criticisms were reaped in several aspects. Much of the criticism relates to the high correlation between the components of ~~the~~ HDI, the functional form of ~~the~~ HDI (including the normalization of component indicators, aggregation, and multiplication), or problems related to their weighting. The combination of indicators in this method has included variables put into an index that tends to be subjective and lacks theoretical validity. This occurs because the problem lies in the equalization of the absolute value of each component, so that it can have an effect on HDI achievement. Extreme scores in some cases in certain countries that are included in the index and therefore influence overall HDI scores can ; selected and influence HDI scores, resulting in a change in ranking order. One criticism of ~~Until now, the~~ HDI is that it has been has been criticized for considering attaching equal weights to ~~the~~ selected components that have high levels of human development ~~components~~, causing these components to correlate with the composite index, causing and statistical problems to arise; ~~so that~~ the references provided do not provide an accurate and comprehensive range (Amaluddin et al., 2018; Latuconsina, 2017).

### **Labor force (LF)**

Many previous empirical studies have concentrated on the role of human capital investment and its relationship with ~~variations such as~~ production and economic growth. This is demonstrated by long-term sustainable growth and development across countries, as it is largely driven by the productivity of growth itself (Amir et al., 2015).

The perspective of the workforce and the industrial sector plays an important role in ~~a the~~ household's economy. The neo-classical framework is the first area to include gender in employment. ~~It is a~~ basic model ~~that does not challenge without challenging~~ theoretical foundations and ~~it is~~ simply a matter of dealing with the accurate analysis of the observed reality. From the theory of supply and demand ~~economy~~, labor shows that economic activity is most supported and attractive based on overall compensation. Job search theory has been in development since the 1960s. Basically, this theory predicts the behavior of job seekers who are unemployed and are faced with the problem of the cost of living to obtain information about possible wages for them (Guarino et al., 2006).

### **Economic growth (EG)**

The problems of EG have generated debate about the driving forces that determine economic growth and development. If EG is a dynamic process, then there are factors in the same proportion to predict future strength. Classical economists see the determinant of EG as driven by investment and an increase in production capacity. In ~~the~~ 20<sup>th</sup> century, neo-classical economists identified three causes for the rise and fall of a country's economy, namely capital, labor, and growth itself. This is sufficient to explain the performance of EG in capitalist countries. The more rapid the use of these factors, the greater the EG (Piętak, 2014; Cascio & Lewis, 2012).

EG theory explicitly addresses equilibrium dynamics and tries to answer acceptable questions about the types of use of the available factors of production, thus providing sustainability for the

increase in real GDP per capita in the long run. The level of EG can be achieved with the greatest possible increase through efficiently and effectively used the production factors ~~used and efficiently and effectively~~. The biggest weakness of the neo-classical EG theory is the failure to respond to a number of problems that occur due to technological change. As an illustration, at present it seems as if it is collapsing, thus making the workforce more productive (Cvetanović et al., 2011; Soyer et al., 2020).

## METHODOLOGY

### Data and scale

This ~~paper article~~ is based on a secondary data approach (time series). The data ~~are~~ focused on developments in DP, HI, HDI, LF, and EG with ~~Romania as the~~ object range ~~of Romania~~. Data ~~are~~ collected through ~~the~~ annual reports. In addition, the data are also supported by previous empirical studies ~~as a comparison of the findings of this article~~. A quantitative approach was used to process the data. ~~After that, we processed these data with a quantitative approach~~. Table 1 is an explanation of each variable component.

**Table 1:** Measurements of variables

Abbreviation	Variables	Period	Measure
Demographic Pressures (DP)	Exogenous	2013-2019	Index points (0 = low and 10 = high)
Happiness Index (HI)		2013-2019	Points (0 = low unhappy and 10 = happy)
Human Development Index (HDI)		2013-2019	Points (0 = low and 1 = high)
Labour Force (LF)	Endogenous	2013-2019	Percent
Economic Growth (EG)		2013-2019	Percent

Source: The Global Economy (2020)

Statistical models and mathematical methods in economic theory are very diverse. Economic dynamics for making policy and predicting the effects of an analysis of the interactions of



economic actors vary widely, so it is ~~very~~-necessary to determine whether or not the theory used supports the study findings ~~or not~~ (Prasolov, 2016).

### Specification and empirical model

The analytical model that we used to answer the purpose of this ~~paper article was~~ path analysis. This technique is aimed at analyzing the pattern of relationships between variables in order to determine the direct or indirect effect based on the data obtained from the analysis. The path analysis model plays an important role in testing how much influence is shown by the path coefficient of the causal relationship between the variables used directly and indirectly (Allen, 2017).

Correlation and regression analysis is the basis for calculating the path coefficient. In its presentation, we used the Statistical Product and Service Solution (SPSS) ~~2425~~. The specific steps ~~wentgo~~ through the following two structures:

$$LF_{it} = \beta_1 DP_{it} + \beta_2 HI_{it} + \beta_3 HDI_{it} + e_{it} \quad (1)$$

Where: LF is the Labor Force,  $\beta_1$  DP is the value of the influence of Demographic Pressures on Labor Force,  $\beta_2$  HI is the value of the effect of the Happiness Index on Labor Force,  $\beta_3$  HDI is the value of the influence of the Human Development Index on Labor Force, e is the confounding factor in the first equation, and  $it$  as a time lag.

$$EG_{it} = \beta_4 DP_{it} + \beta_5 HI_{it} + \beta_6 HDI_{it} + \beta_7 LF_{it} + e_{it} \quad (2)$$

Where: EG is Economic Growth,  $\beta_4$  DP is the value of the influence of Demographic Pressures on Economic Growth,  $\beta_5$  HI is the value of the effect of the Happiness Index on Economic Growth,  $\beta_6$  HDI is the value of the influence of the Human Development Index on Economic



Growth,  $\beta_7$  LF is the value of the influence of Labor Force on Economic Growth,  $e$  are confounding factors in the second equation, and  $it$  as a time lag.

For the completeness of hypothesis testing, the calculation of the intervening variables can be done using the Sobel test procedure because of the limitations of SPSS (Wijayanti & Darma, 2019). This test is done by testing the strength of the indirect effect of the exogenous variable (X) on the endogenous variable (Y) through the intervening variable (Z).

## RESULT

### Descriptive statistics result

Table 2 displays a summary statistical description based on regression estimates for the variables DP, HI, HDI, LF, and EG. The mean, standard error, standard deviation, skewness, and curve values of the five variables vary widely. As can be seen, LF has the highest mean (54.5914); EG has the highest standard error (0.47899), standard deviation (1.26728), Skewness (1.877) and Kurtosis (3.918). ~~For the highest performance of each, it is explained from the mean is LF (54.5914), while EG with standard error (0.47899), standard deviation (1.26728), Skewness (1.877), and Kurtosis (3.918).~~ This is because LF is a variable that has the highest unit value among all other variables.

**Table 2:** Descriptive statistics

	Mean	Std. error	Std. deviation	Skewness	Kurtosis
DP	3.4429	.22768	.60238	.050	-1.021
HI	5.6629	.16866	.46623	-.591	-1.562
HDI	.8060	.00266	.00705	.072	-.899
LF	54.5914	.16968	.44894	-1.275	2.074
EG	4.4600	.47899	1.26728	1.877	3.918

Source: Own tabulation

**Table 3:** Pearson correlation

	[1]	[2]	[3]	[4]	[5]
DP	1				
HI	-.968**	1			
HDI	-.997**	.953**	1		

LF	-.244*	.154*	.270*	1	
EG	-.410*	.555*	.353*	.218*	1

Source: Own tabulation

Note: \*level of sig. 0.05 and \*\*level of sig. 0.10

Table 3 reports the Pearson correlations for the variables (DP, HI, HDI, and LF) included in our model. There is a correlation between the exogenous variables lower than 0.6, which indicates that there is no multicollinearity in the path analysis model. This refers to the fact that the variance against the inflation factor in all estimation models is below the multicollinearity threshold, so it is generally accepted that it is 10 (Sekaran & Bougie, 2010; Brahmana et al., 2020). Meanwhile, the matrix shows a significant correlation between exogenous variables and endogenous variables.

### Regression results

Table 4 shows that the feasibility of this study model is suitable for use because the acquisition of correlation (R) reaches 84.7% with a coefficient of determination of 71.7%. ~~Meanwhile, there are 28.3% outside of the use of the variables that we designed.~~ In structure 1, the three relationships of DP, HI, and HDI are positive, where HDI is the most dominant variable in determining the LF performance of 3.33%. Partially, the three relationships between exogenous variables and endogenous variables are equally significant.

**Table 4:** Estimates of structure 1

	R	R Square	F	Std. coefficients beta	Std. error	Sig.
DP	.847	0.717	.035	2.469	8.614	.047
HI				.629	2.867	.010
HDI				3.332	6.283	.003

Source: Own tabulation

Note: LF (endogenous)

**Table 5:** Estimates of structure 2

	R	R Square	F	Std. coefficients beta	Std. error	Sig.
DP	.975	.951	9.694	-8.568	7.428	.136
HI				1.238	2.474	.291

HDI				9.506	5.573	.028
LF				.502	.494	.044

Source: Own tabulation

Note: EG (endogenous)

Meanwhile, from structure 2, LF acts as an exogenous factor linking its influence to EG. With the 5% probability limit, the values of R (97.5%) and R<sup>2</sup> (95.1%) are very high, so the study model is also very feasible to use. The variables outside of DP, HI, HDI, and LF to EG are 4.9% (standard error). From this model, we highlight from this model that there is a negative relationship between DP and GP so that it can reduce GP to 8,568%. At the estimates, there are 2 variables (HDI and LF) that have a significant effect on EG, while DP and HI have no significant effect on EG. As further information, HDI is the most dominant variable in determining EG performance; even its role can increase EG to by reach 9.506% (see Table 5).

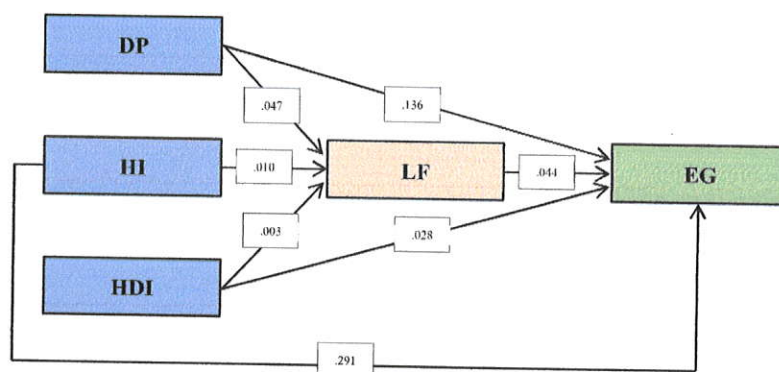


Figure 1: Complete relationship of regression

Path analysis based on the two previous structural relationships is based on significance values, and as a result so that it can be broken down into components and structural (causal) effects which are stated in the path diagram. Figure 1 has completely outlined the seven hypotheses.

#### Path analysis results

Hypothesis testing from this session is used to complement and answer unanswered hypotheses (points 8, 9, and 10). ~~Of the three hypotheses, in particular the indirect effect.~~ Table 6 presents ~~the calculation of~~ the Sobel test calculation, by which we conclude that HDI has a significant effect on EG through LF because the p-value is 5.844, far above the statistical requirement. ~~It is explained from these results, the size of the Sobel test statistics is above the statistical requirements~~ ( $n > 1.96$ ), meaning that HDI is a variable that can mediate the relationship between LF and EG. ~~Of the two other variables, namely DP and HI, however, they~~ do not directly have a significant effect on EG through LF.

**Table 6:** Significance for indirect effects

Relationship	Sobel test statistics	One-tailed statistics	Two-tailed statistics
DP → LF → EG	1.733	0.000	0.000
HI → LF → EG	1.225	0.110	0.220
HDI → LF → EG	5.844	0.000	0.000

Source: Own tabulation

Note: \*level of sig. 0.05

**Table 7:** Summary of direct effect, indirect effect and total effect

Hypotheses	DE Direct Effect	Indirect Effect E	TE Total Effect	Sig.	Decision
H1	2.469		2.469	.047	Supported
H2	.629		.629	.010	Supported
H3	3.332		3.332	.003	Supported
H4	-8.568		-8.568	.136	Not supported
H5	1.238		1.238	.291	Not supported
H6	9.506		9.506	.028	Supported
H7	.502		.502	.044	Supported
H8		1.240	-7.328	1.733*	Not supported
H9		.316	1.554	1.225*	Not supported
H10		1.673	11.179	5.844*	Supported

Source: Own tabulation

Note: \*level sig. 1.96

Our results show ~~It is proven~~ that the relationship with the largest path coefficient in the first structure is DP (2.469) and the lowest is HI to LF at the level of 0.629. In contrast, HDI to EG has the highest path coefficient of 9.506. On the other hand, the lowest coefficient is the relationship between DP and EG which is -8.568. Broadly speaking, the indirect effect also

**Comment [JD1]:** Are these right? Shouldn't they be DP, HI and LF?

**Comment [JD2]:** H7, though has a level of 0.502. It's still in the-1 structure, to be precise in H2.



shows different results from the previous one. The very wide gap analysis path is shown by the indirect relationship between HDI and EG through LF of 11.179. Meanwhile, the lowest coefficient is from DP to EG through LF (see Table 7).

### DISCUSSION

GDP is actually good enough to explain the dynamics of social welfare and economic welfare.

Both measures are defined as conditions for any country's net growth. When examined in depth, the social welfare in question is the population who has worked in various business fields and the indicators of economic welfare emphasize the aggregate output of a certain period (Esmail & Shili, 2018).

Investigating the relationship between human development, economic growth, and employment is two-pronged: for example, ~~As an emphasis,~~ the progress of economic growth for human development, so that unemployment and poverty can decrease. Productive age (15 years and over) is considered the ideal criterion to start a basic job and, conversely, this potential will be wasted if economic growth is on a negative slope. There is a strong and positive relationship in several aspects, and the government needs to make efforts through spending (health and education services) so that it can break the circle of social problems. Meanwhile, the inflow of investment to carry out economic activities plays an important role in their income distribution association (Appiah, 2019).

An international project has analyzed the value of happiness of populations across countries in 2006. Happiness is an integral indicator that aims to compare living standards in different countries. The indicators in it lie in life expectancy, community life satisfaction, and the environment (attitude towards nature). The environmental factor plays an important and very big role in determining the ranking of a country. At the beginning of its appearance, namely in 2006 it was known that Vanuatu was in first place with 68.21 points. After that, since 2009 and 2011,

Costa Rica came in first with 76.1 points and 64.0 points, respectively. All country leaders agree on a number of factors (especially for climatic conditions as a bonus for their territory). Most of the countries located in North, Oceania, and South America are in strategic regional positions. Countries with happy populations are mostly located on islands and peninsulas. The low standard of living for their residents is sufficient because these states can develop tourist destination services (Yudina et al., 2018).

### CONCLUSION

~~Our findings by calculating path analysis, there are Two~~ outputs (direct effect and indirect effect) ~~that~~ can be concluded from our path analysis. Broadly speaking, we report that in structure 1, DP, HI, and HDI have a significant effect on LP. From structure 2, it is precisely HDI and LF that have a significant effect on EG. We show ~~It is proven~~ that HDI is still the main key that indirectly affects LF against EG.

The first structure to discuss the relationship between DP, HI, HDI, and LF has been supported by previous studies. The relevance of this finding with what Perovic & Golem (2010) and Azizi (2018) stated, highlighted that there was a significant effect of these three variables on LF with different samples, objects, and analysis models. Meanwhile, Clark et al. (2016), Novid & Sumarsono (2018), and Doğan & Akyüz (2017) concluded that DP, HI, HDI and LF have a significant effect on EG. ~~Of course, their findings that~~ contradict the results of this study. DP and HI actually have no significant effect on EG, while HDI and LF have a significant effect on EG. Of the four hypotheses in the second structure, not all can be accepted.

Meanwhile, the three hypotheses that present an indirect effect also present different empirical results from previous studies from Headey & Hodge (2009), Li & Shi (2019), and Kusuma et al (2019). They revealed that DP, HI, and HDI had an indirect impact on EG through the role of LF.

Thus, the policy implications that we can provide through the role of the Romanian government in ensuring the safety of every citizen so that they can trust to live with the current environmental conditions ~~so far~~. The creation of a conducive climate can give them confidence. That way, happiness will arise along with the revitalization of the education and health sectors for the productive workforce. The process of human development cannot just be created but needs to be supported by job opportunities so that they can improve the quality of life.

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