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C O N T E N T

CONSTRUCTING EXOGENOUS OUTPUT ELASTICITY OF TAX REVENUE FOR THE ALBANIAN FISCAL SECTOR

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INTRODUCTION

The responsiveness of government tax revenues to macroeconomic developments is a key parameter for the modelling of public finances. Estimates of tax revenue elasticities with respect to economic output or tax bases are needed not only at the Ministry of Finance and Economy, but also at Bank of Albania, for the fiscal parameters of the macroeconometric models which aid monetary-policy making. These elasticities are essential for tax revenue forecasts based on macroeconomic predictions and for the cyclical adjustment of public budget balances. Moreover, the calculation of tax multipliers also crucially depends on the estimated values of tax elasticities (Mertens and Ravn, 2014). Despite their importance, tax revenue elasticities are often not estimated but only calibrated, especially for emerging and transition economies. Either the calibration is based on the ratio of the marginal to the average tax rate, or, for some tax categories, the elasticity is assumed to equal one.

The output elasticities of tax revenue for the Albanian fiscal sector have already been calculated by Mançellari (2011), using an application of the Divisia Index based on Choudhry (1979) for the period 1998Q1-2009Q4. The Ministry of Finance and Economy of the Republic of Albania (2018) and Gazidede (2013) estimate the tax revenue elasticity not with respect to the output, but with respect to the output gap, in order to estimate the cyclically-adjusted budget balance to analyse and monitor the fiscal position of Albania. In addition to these publications, this article contributes to literature by estimating the output elasticity of tax revenue through the disaggregated approach as suggested by OECD using the latest available data for the Albanian economy (1998Q1-2018Q2), estimating also the output elasticities for the main tax components such as: Value Added Tax, direct taxes on individuals and corporations, Excise Taxes, Customs duties and Social security taxes.

As the main purpose of estimating output elasticity of fiscal revenue in this article is to use it for the identification of fiscal policy shocks within a Structural VAR framework, this article focuses just on the contemporaneous relationship between the indicators, i.e. the effect of economic activity on public finances only in the period of the economic shock, leaving apart the dynamic nature of the relationships in question. The approach used here builds on the assumption of a proportional and static relationship between tax revenue and the corresponding tax base, and focuses on estimating how economic output influences individual tax bases.

DATA AND METHODOLOGY

The dataset used for the calculation of output elasticity of tax revenue includes quarterly time series on the components of net tax revenues and their respective tax bases, and real Gross Domestic Product (GDP, where 2010=100), covering the period 1998Q1 to 2018Q2, which amounts in total to 82 observations. "All the indicators are expressed in real terms by using CPI as a common deflator." This article makes use of quarterly data, because the annual time series available for Albania are too short to allow for any meaningful regression analysis. The use of quarterly data brings additional problems, because tax revenue components, tax bases and real GDP display a strong seasonal pattern, therefore all the series are adjusted seasonally using the TRAMO/SEATS method.

Using the publicly accessible database of the Ministry of Finance, the fiscal revenues used in the SVAR are defined as in Perotti (2002):

Net Tax Revenues = Fiscal Revenues – Transfers = VAT revenues + Direct taxes on individuals + Direct taxes on corporations + Excise Taxes + Customs duties + Social security taxes - Government transfers, where the later represent transfers to households and subsidies to firms.

Quarterly data on GDP are published only for the period 2009Q1-2018Q2, while before they are available only annually. Therefore for the period 1998-2008, they are interpolated into quarterly data following the methodology described in Dushku (2008).

In line with Blanchard and Perotti (2002) and Giorno et al. (1995), in this article we adopt the OECD methodology for calculating the output elasticity, which uses a two-stage approach and identifies separately: i) the elasticity of fiscal revenues with respect to their base, ii) the elasticity of bases with respect to the output.

The individual elasticities are proxied by the coefficients obtained from regressing each of the revenue components ($\mathbf{r}_i$) on the macroeconomic base ($\mathbf{B}_i$) (equation (1a)) and the later ($\mathbf{B}_i$) on the output $\mathbf{y}$ (equation (1b)) over the whole sample, where all the variables are transformed in natural logarithms. The equations (1a) and (1b) are estimated using Ordinary Least Squares (OLS) method and a correction approach of the standard errors developed by Newey and West is applied to account for serial correlation and heteroscedasticity. The terms and represent the errors for each of the linear regression equations, respectively.

$$\ln(r_i) = \alpha_0 + \alpha_{B_i}^{r_i} * \ln(\beta_i) + u_t \quad (1a)$$

$$\ln(\beta_i) = \alpha_1 + \alpha_y^{\beta_i} * \ln(y) + v_t \quad (1b)$$

The exogenous elasticities of a budgetary item with respect to output $\alpha_y^{r_i}$ are obtained as product of the elasticity of the budgetary item to its macroeconomic

base $\alpha_{B_i}^{r_i}$ and the elasticity of this base with respect to output $\alpha_y^{B_i}$. If the elasticity of a budgetary item is constructed as an average value of two or more sub-components' elasticities, then their respective shares in the budgetary item's volume are used as weights. The output elasticity of total net tax revenue α_y^r is estimated as a weighted average of output elasticities of different revenue components, where the weights are assigned according to their share on the total tax revenue $\frac{T_i}{T}$. To sum up, the net tax elasticity to output is calculated through the formula (2):

$$\alpha_y^r = \sum_{i=1}^{n} \alpha_{B_i}^{r_i} * \alpha_y^{B_i} * \frac{T_i}{T} \qquad (2)$$

Table 1 and 2 give a summary of the estimated exogenous elasticities and the proxies used for the tax bases of the revenue components, respectively. For details on the respective "macrobase" (macroeconomic base) see for instance Bouthevillain et al. (2001). Note that elasticity of government transfers multiplied by their relative weight in the fiscal revenue indicator is subtracted from the overall output elasticity of fiscal revenues, according to the definition of net tax revenue used in this article.

Table 1 Exogenous sub-elasticities with respect to real GDP and share of tax item in total taxes.

	Elasticity of budgetary item to tax base	Elasticity of Tax base to real GDP	Elasticity of budgetary item to real GDP	Avg. Weight (Share in tax revenues)
	$\alpha_{B_i}^{r_i}$	$\alpha_y^{B_i}$	$\alpha_y^{r_i}$	$\frac{T_i}{T}$
VAT	1,443	0,913	1,317	0,455
Profit tax			2,250	0,096
Excise	1,780	0,913	1,625	0,131
Personal Income Tax	1,910	0,541	1,034	0,083
Custom duties	1,012	1,318	1,334	0,075
Social Security Tax	0,863	0,541	0,467	0,218
Health Tax	1,445	0,541	0,782	0,025
Transfers (unemployment and economic assistance)			0,800	0,082

Note: All coefficients are significant at least at the 5% level.
Source: Author's calculations.

Table 2 Proxies for tax bases.

Tax category	Tax Base Proxy
Value Added Tax	Private Consumption
Profit Tax	Corporate Profits
Personal Income Tax	Wages
Excise	Private Consumption
Custom Duties	Imports
Health and Insurance	Wages

Source: INSTAT, Ministry of Finance and author's calculations.

The series of private consumption, used as a proxy for the tax base of Value Added Tax (VAT), is published by INSTAT on an annual basis before 2009, therefore for the period 1998Q1-2008Q4, it has been interpolated to quarterly frequency following the methodology described in Vika, Abazaj (2013). The

series of corporate profits is published annually by INSTAT only for the period 2013-2017. As this is a very short series, it has not been extended before this period with specific extrapolation techniques, as the error margin in such cases could be very high. For simplicity, we have assumed unit elasticity of tax proceeds with respect to tax base for the period till 2013, meaning that an increase in corporate profits is followed by the same rise in the profit tax revenues. This could be reasonable as before that year Albania was under flat tax regime of 10%, and theoretically, the elasticity of proportional taxes with respect to their tax base is unity. For the rest of the period (2013-2017), annual elasticities of profit tax revenues to corporate profits and the corporate profits to real GDP are calculated according to data availability. The elasticity of profit tax revenues to GDP for the whole period is obtained as a weighted average of the two elasticities in each of the sub-periods, where the weights are assigned according to the length of the sub-periods relative to the whole sample. The series of nominal wages per employee is published by INSTAT in annual terms since 2000. The quarterly data are interpolated into quarterly frequency for the period 2000-2002 using the wages of the public sector, while starting from 2003 they are interpolated in line with the wage index from the Survey of Economic Enterprises conducted by the National Institute of Statistics (INSTAT). The series of total wages is obtained by multiplying the nominal wage per employee with the number of employees, when the later is obtained from the INSTAT web page publication "Labor Forces Balance". The data on imports of goods and services are taken from Bank of Albania.

Following the methodology explained above, the quarterly output elasticity of net tax revenues for Albanian data results to be 1.3, meaning that a 1% increase in economic output (measured by real GDP) generates a 1.3% increase in tax revenues. Compared to the results obtained for Albania by Mançellari (2011), this value is 0.14 percentage points lower, however due to different methodological approaches and different time series, the presented fiscal elasticities may not be directly comparable. If it is compared to the results obtained by studies covering other countries, the output elasticity of fiscal revenue in Albania matches the tax elasticity in the Ukrainian case (Mitra, Poghosyan, 2015), it is higher than that in the Croatian case (Gnip, 2012) and in the German case shown in Perotti (2002), but it is lower than that in the US economy.

FEW CLOSING REMARKS

This article aims at estimating the exogenous elasticity of fiscal revenues with respect to economic output in Albania through the OECD disaggregated approach using the latest available data for the Albanian economy (during 1998Q1-2018Q2). The calculated elasticity results to be 1.3, meaning that a 1% increase in economic output (measured by real GDP) generates a 1.3% increase in tax revenues. The results are in line with previous studies on this topic for Albania and for other countries too.

The herein analysis focuses only on the cotemporaneous relation between the economic output and tax revenue components, as this way it serves to the fiscal Structural VAR approach for which this analysis is intended. However, it would be very interesting and helpful taking into account the dynamic nature of these relationships in the future through a vector error correction model, as suggested mostly in the empirical literature (see for instance Koester and Priesmeier (2012), Havránek et al. (2015), Výškrabka (2017)), which allows the estimation of the short-term and long-term fiscal elasticities, as well as the investigation of the adjustment process between the two.

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PRACTICAL ISSUES IN FORECASTING WITH VECTOR AUTOREGRESSIONS

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INTRODUCTION

Vector Autoregressive (VAR) models are widely used for forecasting economic indicators such as inflation, economic growth, and the exchange rate. They were proposed in the early 1980s by Sims (1980) as a more appropriate technique in the economic analysis compared to single models. Although the VAR method has encountered many criticisms and has been challenged over the years by many complex econometric techniques, it continues to be a reference or comparative method, due to the convenience and rapidity it provides when building economic scenarios.

The use of autoregressive vectors for forecast purposes raises some questions regarding the models' specification and evaluation. Generally, they are related to issues such as: a) selecting the appropriate number of time lags; b) the way of entering the statistical series in the model, in levels or differences, i.e. whether it is necessary for them to be stationary; c) model prediction strategy, if the extension of the number of observations gives us more information than a fixed and repeated sample (i.e. rolling), evaluated with a sufficient number of observations; d) the evaluation of the predictability within or outside a given period; as well as e) controlling for issues that arise from over-parameterization.

This paper addresses some of the practical issues encountered during the building of VAR models for forecasting purposes for the Bank of Albania. It relies on a model with several indicators and compares the forecast ability of its various specifications which can serve to potential users as a starting point for building their models. Firstly, we will discuss the models' evaluation and specification method, and later on the procedure followed for the forecast and the conclusions.

SPECIFICATION AND EVALUATION OF THE MODEL

Certainly, the specification of one model always depends on the purpose of its use. If a model is built to help with the monetary policy decisions, it should be able to predict key economic indicators that concern the Supervisory Council of the central bank, such as inflation and economic growth. VAR models that are commonly used in the studies for monetary transmission mechanism are generally based on a small set of indicators. For the purpose of this essay, I have used a small model with four domestic endogenous indicators – inflation, economic growth, exchange rate and key interest rate – and three exogenous foreign indicators – inflation, economic growth, and euribor in the euro area.

This set of indicators is in line with the structural model proposed by Svensson (2000) for small and open economies with inflation targeting regime.

The autoregressive vectors helps us determine the dynamics of the relationships that characterize the economic indicators in the model, and then use these estimates for their projection in the future. In the VAR method, the value of each indicator at the current time t is explained as the weighted average of past values of all series at time ***t-p*** plus a term that includes all other shocks at the current time. Mathematically, this would be expressed as:

$$y_t = c + B_1 y_{t-1} + \ldots + B_p y_{t-p} + u_t ,$$

Where y_t shows the vector of variables included in the model, while u_t is the vector of errors measured as the divergence of observed values y_t from the forecast obtained from the linear combination of past values of y with the estimated parameters B and the constants c. The ability to forecast accurately is influenced by the values of the parameters used for their weighting, as well as by the number of time lags p of the observed series.

Parameter estimation using the least squares method in VAR models requires time series to be stationary, but many economists also use them in a non-stationary form. The presence of the trend on economic indicators and their sensitivity to the persistence of model errors can give spurious estimates of coefficients, so the stationarity test is important. However, the use of indicators in a non-stationary form is useful for capturing the cointegrating correlations, if they exist. For this reason, checking for the stationarity of variables should not be seen as mandatory, but as instructive to understand the dynamics of their qualities before the model's evaluation (Mahadeva and Robinson 2004).

With regard to determining the order of time lags in VAR, the literature offers several methods. They compare the performance of different specifications that take into account the size of the sample and the number of dependent variables. Some of them give priority to model efficiency by selecting the one that gives the smallest errors (such as the Final Prediction Error criteria (FPE), Akaike, and corrected Akaike), while others' main criterion is the consistency of the process of finding the real model (such as the Schwarz (BIC) and Hannan-Quin (HQ) criteria. Other studies have developed different approaches, such as focused information criterion, transfer function method, principle of predictable least square, combined information criterion, and so on, however AIC and BIC still remain the most popular methods (Ding, Tarokh and Yang, 2016). Selecting the "best" information criterion is difficult and requires a compromise, depending on what we want to optimize. Including a higher number of time delays decreases the degree of freedom in the model, and consequently the veracity of the estimated parameters. On the other hand, a small number of lags increases the likelihood of failing to capture some inter-temporal dynamics and the ability to remove autocorrelation in residuals (Lack, 2006).

Generally, the selection criteria of the BIC model from Schwarz suggests a spared number of lags; while the standard AIC criterion suggest numerous lags even for samples with relatively short periods. Asghar and Abid (2007) find that all the criteria reviewed by them may be valid for determining the real number of time delays, in case of regime alternations or system shocks; meanwhile, the authors recommend Schwarz BIC information criterion as the best for the models with large sample estimations. Similar to these authors, the simulation results from Ayalwe et al. (2012) show what BIC, HQ, Akaike-HQ median and BIC-HQ median may perform better in large samples, while the AIC-BIC combination median may be a reliable criterion in all small or large samples.

Concerns on the over-parameterization may push practitioners into using the most parsimonious BIC method in small sample models, however Liew (2004) finds that the more tolerant AIC and FPE criteria exhibit superiority against other criteria even in the cases of small samples (up to 60 observations). Furthermore, Hurvich and Tsai (1989) find that bias correction in the AIC method can increase the efficiency in small size samples, also when the proportion of the estimated parameters over the sample size is relatively large. Another attempt by Safi (2011) on the selection of autoregressive models under the presence of autocorrelation finds that "over-specification performs better in finding the true model, especially when the size of the sample is small compared to the number of estimated parameters" and that "the BIC criterion corrects the over-specification of AIC". In estimations with vector autoregressions, McQuarrie and Tsai (1998) state that the probability of overfitting the model is smaller than in multivariate regressions, despite the rapid increase in the number of parameters in VAR. Authors base this statement on the results derived from multiple simulations of VAR models, including large-scale estimations and small sample sizes. Therefore they recommend not to underestimate the problem of model under-fitting where heavy penalty functions can hinder the performance.

However, empirical researchers have shown that determining the number of parameters in VAR models is very important, especially if they are to be used for forecasting purposes. Loss of the degrees of freedom due to the high proportion of the number of coefficients compared to the number of observations may reduce the accuracy of estimated coefficients, thus weakening the predictive power (Wallis, 1989). Doan (1990) says that "predictions made with unrestricted vector autoregresions often suffer from model over-parameterization… (which) cause large out-of-sample forecast errors." There are several approaches that address this issue, imposing the value of coefficients, in order to reduce their uncertainty.

A common method used in the last two decades to solve the dimensionality problem is the Bayesian estimation, which consists in the shrinkage of the estimated parameters of the model, by setting some prior values. Unlike the traditional structural models where the overfitting is avoided by setting zero values for many coefficients (based on the theoretical preferences of modellers), the Bayesian method tries to achieve this by allowing the same number of parameters evaluated in VAR, and by reducing their sensitivity to

data. This way there is more flexibility in order to eliminate overfitting, allowing thus the representation of both, the preliminary economic expectations and the statistical estimates of the modellers (Todd, 1984).

FORECAST PROCEDURE

Earlier in the article we came across some of the most discussed issues for model building such as: transformation of time series into stationary form; choosing the number of time lags; and the use of the Bayesian method for avoiding the dimensional issue in VAR models. Table 1 shows the forecast procedure followed in this paper. The selected indicators (output, prices, exchange rate and interest rates) enter into our model in three forms. The variables in levels are intended to not circumvent a possible cointegrating relationship between the indicators, while their changes are intended to avoid spurious estimates that result in the case of a lack of cointegration to our non-stationary variables.

Table 1. Summary of the Forecast Procedure

Indicators	Forecasting Models	Estimation strategy	
		Recursive	Rolling
Level	VAR(1-4)		
	BVAR(1-4)		
YoY Differenced	VAR(1-4)		
	BVAR(1-4)		
QoQ Differenced	VAR(1-4)		
	BVAR(1-4)		

The data availability and the statistical noise that characterizes them during the first decade of transition impel us to narrow the exercise period for 2001-2017, with quarterly frequency. The data criteria for selecting the number of time lags in the model recommend for expansion of the information for more than one year (about 6-7 quarters according to AIC, HQ, FPE criteria); with the exception of Schwarz criterion, which suggests 3 lags for variables in first differences and 1 lag for the case where they are expressed as annual changes. Because the number of observations in our time frame is considered relatively small, the number of time lags of endogenous variables in VAR has been tested from 1 to 4 quarters for all estimates. Thus, the concentration of previous data within a year (with 1to 4 lags) limits the number of estimated coefficients (including exogenous ones) from 32 to 80. This numerical range is quite significant, especially if we narrow furthermore the evaluation period, to test the predictive ability of the model outside the evaluation period.

The forecasting experience with VAR models has shown that a model with good in-sample forecasts does not guarantee such satisfactory predictions in the out-of-sample period. Since, in practice, analysts involved in the economic policy proposal rely on forecasts for the future, the out-of-sample forecast ability of the model becomes more important. For this reason, the full available period, 2001Q1:2018Q1, is divided into so-called training periods, 2001Q1:2012Q4 (48 quarters), and in the forecast testing period,

2013Q1:2018Q1 (21 quarters). The number of coefficients evaluated in the model is considerable in relation to the number of observations. To control for the statistical issues in the OLS estimates due to possible over-parameterization, the forecast procedure with the unrestricted VAR model above has been repeated by using the Bayesian estimation method, BVAR. Determination of the prior parameters in the latter is carried out in a number of ways, but in this article I have followed a simple type, Normal-Wishart, as recommended by Carriero et al. (2011).

The exercise focuses on the predictive ability of the model in the short and medium term. The forecast evaluation is measured here by the root mean squared errors, RMSE, which compares the size of forecast errors through different estimations. More concretely, the procedure starts with the model estimation for the period 2001Q1:2012Q4 and for each of its specifications, according to the form of variables and the number of lags, a forecast is noted down for the 1, 4 and 8 quarters ahead. Moreover, the evaluation period recursively expands by a quarter, 2001Q1:2013Q1, calculating and maintaining the RMSE of forecasts for the time horizons we want. The evaluation process is repeated until 2017 Q4, when we are allowed to foresee in advance the last quarter 2018Q1. Apart from the recursive strategy, I have used and compared the rolling estimation as well. In this method, the training period is kept unchanged in a window of 48 observations, while the procedure for the re-evaluation and maintenance of RMSEs of the relevant specifications continues the same. Recursive and rolling strategies can improve linear model projections for an economy with continuous structural changes (Clark, 2008), so comparing their performance may serve to understand the existence of structural failure of economic indicators during 2001-2017, and if the loss of information due to short samples reduces the strength and validity of VAR models in Albania.

EMPIRICAL RESULTS

As noted in the beginning, this article does not aim to find the best forecast model but to discuss more about its nature. For this reason, the following analysis addresses the general characteristics of a good forecasting model for the Albanian economy. Table 2 shows the results on the predictive ability of the standard VAR model, according to the different expression forms of the variables and the choice of time lags. In order to have comparable RMSEs, despite the transformation of indicators, the gross domestic product, the price index and the exchange rate have been expressed as annual changes in percentage, while the key interest rate has remained unchanged. The highlighted figures in the table show the smallest errors, according to RMSE, of a specific compared vertically within its group.

Table 2. VAR Model: Average RMSE of Out-of-sample Recursive Forecasts, 2013Q1:2018Q1

Variables, in %	Annual Growth			Annual Inflation			RER, yoy chg.			Policy rate		
Forecast horizon	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y
Variable transformation												
Levels	3.1	3.0	2.8	0.8	1.1	1.1	1.2	1.5	1.5	0.1	0.3	0.5
YoY	1.3	1.6	1.7	0.4	0.5	0.6	1.2	2.3	3.4	0.1	0.3	0.5
QoQ	2.3	2.9	3.0	0.7	0.9	0.9	0.8	1.3	1.8	0.2	0.3	0.5
Model selection												
1 Lag	2.5	3.0	2.9	0.8	1.1	1.1	1.0	1.7	2.2	0.1	0.3	0.4
2 Lags	2.9	2.9	3.0	0.7	0.8	0.8	1.1	1.6	2.2	0.1	0.3	0.5
3 Lags	2.2	2.4	2.2	0.6	0.7	0.8	1.0	1.7	2.2	0.1	0.3	0.5
4 Lags	1.4	1.8	1.9	0.5	0.6	0.8	1.0	1.8	2.3	0.2	0.3	0.5
Model selection: VAR in levels												
Level: 1 lag	3.4	3.5	3.0	1.2	1.8	1.7	1.3	1.5	1.3	0.1	0.2	0.3
Level: 2 lags	4.0	3.2	2.9	0.8	1.1	1.0	1.3	1.6	1.5	0.1	0.2	0.5
Level: 3 lags	3.7	3.4	2.9	0.7	0.8	0.7	1.1	1.6	2.0	0.1	0.4	0.6
Level: 4 lags	1.5	1.9	2.2	0.6	0.8	0.9	0.9	1.2	1.3	0.2	0.3	0.5
Model selection: VAR in annual changes (YoY)												
YoY: 1 lag	1.3	1.6	1.7	0.4	0.5	0.6	1.0	2.1	3.1	0.1	0.3	0.4
YoY: 2 lags	1.3	1.6	1.7	0.4	0.5	0.6	1.0	1.9	3.0	0.1	0.3	0.5
YoY: 3 lags	1.3	1.6	1.6	0.4	0.5	0.6	1.3	2.3	3.3	0.1	0.3	0.4
YoY: 4 lags	1.4	1.7	1.8	0.4	0.4	0.7	1.4	2.9	4.2	0.2	0.4	0.7
Model selection: VAR in first difference (QoQ)												
QoQ: 1 lag	3.0	3.7	3.9	0.8	1.0	0.9	0.8	1.4	2.1	0.1	0.3	0.6
QoQ: 2 lags	3.3	3.9	4.4	0.8	0.9	0.9	0.9	1.4	2.1	0.2	0.4	0.6
QoQ: 3 lags	1.7	2.1	2.1	0.7	0.9	0.9	0.7	1.2	1.4	0.2	0.3	0.5
QoQ: 4 lags	1.3	1.7	1.7	0.5	0.7	0.8	0.7	1.3	1.5	0.2	0.3	0.4

Table 3. Bayesian VARs: RMSE of Recursive Forecasts, in the Out-of-sample Period of 2013Q1:2018Q1

Variables, in %	Annual Growth			Annual Inflation			RER, yoy chg.			Policy rate		
Forecast horizon	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y
Variable transformation												
Levels	6.7	6.0	4.6	1.3	1.4	1.2	1.5	1.5	1.3	0.1	0.2	0.3
YoY	1.4	2.0	2.6	0.3	0.5	0.5	0.7	1.1	1.4	0.1	0.3	0.5
QoQ	4.6	7.0	7.8	0.9	1.5	1.4	1.0	1.8	2.8	0.1	0.4	0.9
Model selection												
1 Lag	5.5	7.3	8.1	1.0	1.4	1.3	1.1	1.6	1.9	0.1	0.3	0.6
2 Lags	4.6	5.4	5.0	0.8	1.1	1.0	1.1	1.5	1.8	0.1	0.3	0.6
3 Lags	4.2	4.3	3.8	0.8	1.0	0.9	1.1	1.4	1.8	0.1	0.3	0.6
4 Lags	2.6	3.1	3.0	0.7	0.9	0.9	1.0	1.4	1.8	0.1	0.3	0.6
Model selection: VAR in levels												
Level: 1 lag	8.7	7.3	5.5	1.4	1.6	1.3	1.6	1.6	1.3	0.1	0.2	0.2
Level: 2 lags	7.3	6.8	5.1	1.3	1.5	1.3	1.5	1.6	1.3	0.1	0.2	0.3
Level: 3 lags	7.6	6.6	4.9	1.2	1.4	1.2	1.5	1.5	1.3	0.1	0.2	0.3
Level: 4 lags	3.0	3.4	2.9	1.1	1.2	1.1	1.3	1.3	1.2	0.1	0.2	0.4
Model selection: VAR in annual changes (YoY)												
YoY: 1 lag	1.4	2.0	2.7	0.3	0.5	0.5	0.7	1.2	1.5	0.1	0.3	0.6
YoY: 2 lags	1.4	2.0	2.7	0.3	0.5	0.5	0.7	1.1	1.4	0.1	0.3	0.5
YoY: 3 lags	1.4	2.0	2.6	0.3	0.5	0.5	0.7	1.1	1.3	0.1	0.3	0.5
YoY: 4 lags	1.4	1.9	2.6	0.3	0.5	0.5	0.7	1.1	1.3	0.1	0.3	0.5
Model selection: VAR in first difference (QoQ)												
QoQ: 1 lag	6.3	12.6	16.2	1.4	2.3	2.0	1.1	1.9	2.9	0.1	0.4	0.9
QoQ: 2 lags	5.0	7.4	7.4	0.8	1.3	1.2	1.0	1.6	2.7	0.1	0.4	0.9
QoQ: 3 lags	3.7	4.3	4.0	0.8	1.2	1.1	1.0	1.7	2.8	0.1	0.4	0.9
QoQ: 4 lags	3.3	3.9	3.5	0.8	1.2	1.1	1.0	1.7	2.8	0.1	0.4	0.9

Concerning the transformation of time series in the VAR model, the estimations with the data in annual changes turned out as the most preferred candidate for the forecasts of all variables, except the exchange rate. Individually, forecast errors by to this mean of expressing the indicators are considerably lower in the case of economic growth and inflation, while for the REPO rate the differences at the level or first difference are more controlled. On the other hand, the most appropriate transformation of the indicators for the forecast of the exchange rate seems unclear, as it varies depending on the forecast time horizon that interests us more.

The VAR model performance with different selections reveals that for finding a suitable model for all variables, it may be necessary to include enough lags (usually 4), which seem to contain valuable information that leads to the improvement of the forecasts. In our exercise, this conclusion is again evident in the case of the projection of economic growth and inflation, especially if the model is estimated with the data in levels or in first differences. Meanwhile the interest rate and exchange rate forecast is less sensitive to the 1 to 4 time lags included in the model. The AIC, HQ and FPE information criteria, discussed above, suggested an abundant number of lags beyond the number tested here. However, the findings in this modest exercise seem to be more in line with Schwarz's criterion, which recommended significant lags for the VAR in levels and first differences, and 1 lag in estimations with annual changes.

Table 3 shows the forecast results of the model estimated by the Bayesian method, BVAR. Its shows a confirmation of the overall superiority of the model when variables are transformed into annual changes. Apart from re-emphasizing this form as best for forecasting economic growth and inflation, the Bayesian estimation reveals its usefulness for forecasting exchange rate as well (unlike the OLS method that, for the exchange rate, suggested a model with variables in first differences). Also, the Bayesian estimation confirms the importance of the information that is conveyed by an adequate number of lags (four lags if we refer to the loss function that minimizes forecast errors in case of having one model for all variables). However, the improvement of forecast ability by the Bayesian method, which significantly reduces the RMSEs for the exchange rate, does not appear so useful for all variables in the model, particularly for economic growth. Therefore, users are faced with the need of making trade-offs when selecting the estimation method, depending on the indicators that they are more interested in. However, these conclusions show the flexibility of the Bayesian method by keeping a considerate number of coefficients in the model, while at the same time reducing, in some ways, the concerns regarding the weakness of predictability of the VAR model, due to the significant number of estimated coefficients in relation to the number of observations.

Last but not least, a comparison of the recursive and rolling forecasts reveals that it could be better to extend the estimation sample period in our case. The results of a rather short rolling sample with 48 observations remain largely in line with the conclusions drawn from the recursive forecasts, with regard to variables transformation (yoy), recommendations on the number of lags, and

the advantages of each estimation method (please see Table 2A and 3A in the Appendix). However, the generally positive differences between RMSEs from rolling and recursive forecasts - although not that significant - point out the inability to improve forecast derived from the recursive strategy. Loss of information due to short samples and reduction of forecasting performance does not support the idea of structural breaks in the time series during our investigation period. This also implies that empirical analyses that use linear methods to estimate parameters can be reliable for the Albanian economy, at least for estimations that exclude the 1990s.

CONCLUDING REMARKS

This analysis discusses the nature of the VAR models for forecasting purposes based on the importance of stationarity, the use of information criteria, attention to dimensionality and structural breaks in the data.

Regarding the transformation of time series, estimations with data expressed as annual changes appeared to be the preferred form for forecasting our VAR variables, except the exchange rate. To improve the performance of the latter, it is worth using the Bayesian method for model evaluation; this may not be achieved without compromising the growth forecast performance. Having said that, the most accurate forecast of each indicator may require several adjustments of the model's evaluation and specification, since it is perhaps impossible to achieve this goal with one single VAR model.

Also, the results removes all doubts for the selection of many time series, particularly in unrestricted VAR models in level and first differences, and when it is used for forecasting purposes. Similarly, lost information due the short samples does not lead to the improvement of the models' predictive performance. This implies that the models' assessment for the Albanian economy with linear methods can be useful, at least for the evaluation samples that avoid the 1990s.

To further support our conclusion, the discussion in this article can be extended with measurements of forecast performance other than RMSE, such as the Measure of Change of Direction and the Diebold-Mariano statistics. The RMSE average shows the average performance of the model; their standard deviation can enrich the distribution of the model's performance throughout the repetitions of model trainings. The increase of the number of variables in VAR may shed light whether the VAR estimation method with OLS would maintain its performance in comparison to the Bayesian method.

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APPENDIX

Table 2A VAR Model Rolling Forecast: Average RMSE of Out-of-sample Period during 2013Q1:2018Q1

Variables, in %	Annual Growth			Annual Inflation			RER, yoy chg.			Policy rate		
Forecast horizon	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y
Variable transformation												
Levels	3.0	3.2	3.3	0.8	1.0	1.0	1.4	2.2	2.8	0.1	0.4	0.8
YoY	1.7	1.8	1.8	0.4	0.5	0.7	1.0	2.4	4.1	0.2	0.4	0.7
QoQ	2.5	3.2	3.3	0.6	0.8	0.9	0.9	1.3	1.7	0.2	0.4	0.7
Model selection												
1 Lag	2.7	3.2	3.4	0.8	1.1	1.1	1.1	2.1	2.8	0.1	0.4	0.7
2 Lags	3.0	3.2	3.5	0.6	0.8	0.9	1.1	1.9	2.8	0.1	0.4	0.8
3 Lags	2.2	2.7	2.6	0.6	0.6	0.7	1.1	1.9	2.8	0.2	0.4	0.8
4 Lags	1.6	1.8	1.8	0.5	0.6	0.8	1.1	1.9	3.1	0.2	0.4	0.7
Model selection: VAR in levels												
Level: 1 lag	3.6	3.9	4.3	1.2	1.7	1.6	1.6	2.6	2.7	0.1	0.4	0.7
Level: 2 lags	3.8	3.6	3.9	0.8	1.1	1.1	1.5	2.4	2.8	0.1	0.3	0.8
Level: 3 lags	3.0	3.7	3.6	0.7	0.6	0.7	1.2	2.1	3.0	0.1	0.4	0.9
Level: 4 lags	1.6	1.6	1.5	0.6	0.7	0.7	1.2	1.8	2.8	0.2	0.3	0.6
Model selection: VAR in annual changes (YoY)												
YoY: 1 lag	1.3	1.5	1.6	0.4	0.5	0.7	1.0	2.4	4.0	0.2	0.3	0.6
YoY: 2 lags	2.0	2.1	2.0	0.4	0.6	0.7	0.9	2.3	4.0	0.2	0.4	0.8
YoY: 3 lags	1.7	1.9	1.8	0.5	0.5	0.7	0.9	2.2	3.7	0.1	0.3	0.7
YoY: 4 lags	1.7	1.9	1.8	0.4	0.5	0.8	1.1	2.7	4.8	0.2	0.4	0.9
Model selection: VAR in first difference (QoQ)												
QoQ: 1 lag	3.0	4.1	4.2	0.7	1.0	1.0	0.8	1.3	1.7	0.1	0.4	0.8
QoQ: 2 lags	3.3	4.1	4.5	0.7	0.8	0.9	0.8	1.2	1.6	0.1	0.4	0.7
QoQ: 3 lags	1.9	2.5	2.5	0.6	0.8	0.8	1.0	1.4	1.7	0.2	0.4	0.7
QoQ: 4 lags	1.6	2.0	2.0	0.5	0.7	0.8	0.9	1.3	1.7	0.2	0.4	0.7

Table 3A. BVAR Model Rolling Forecast Performance Average RMSE of Out-of-sample Period during 2013Q1:2018Q1

Variables, in %	Annual Growth			Annual Inflation			RER, yoy chg.			Policy rate		
Forecast horizon	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y	1Q	1Y	2Y
Variable transformation												
Levels	7.3	6.5	5.0	1.3	1.5	1.3	1.5	1.8	1.8	0.1	0.3	0.4
YoY	1.5	2.0	2.6	0.4	0.6	0.6	0.7	1.0	1.2	0.2	0.3	0.7
QoQ	4.8	7.6	7.8	0.9	1.5	1.5	1.0	2.7	4.5	0.1	0.4	0.7
Model selection												
1 Lag	5.7	7.5	7.8	1.0	1.6	1.5	1.1	1.9	2.6	0.1	0.3	0.6
2 Lags	4.9	5.9	5.2	0.8	1.2	1.1	1.1	1.8	2.4	0.1	0.3	0.6
3 Lags	4.5	4.6	4.1	0.8	1.1	1.0	1.1	1.8	2.5	0.1	0.3	0.6
4 Lags	2.9	3.5	3.3	0.7	1.0	1.0	1.0	1.8	2.5	0.1	0.3	0.6
Model selection: VAR in levels												
Level: 1 lag	9.4	7.9	5.9	1.4	1.7	1.5	1.6	1.8	1.7	0.1	0.2	0.3
Level: 2 lags	8.0	7.3	5.4	1.4	1.7	1.4	1.6	1.8	1.8	0.1	0.3	0.4
Level: 3 lags	8.1	7.0	5.2	1.2	1.5	1.2	1.5	1.7	1.8	0.1	0.3	0.4
Level: 4 lags	3.7	3.9	3.3	1.0	1.2	1.0	1.3	1.6	1.8	0.1	0.3	0.5
Model selection: VAR in annual changes (YoY)												
YoY: 1 lag	1.5	2.0	2.6	0.3	0.6	0.6	0.6	0.9	1.2	0.2	0.3	0.7
YoY: 2 lags	1.5	2.0	2.6	0.3	0.6	0.6	0.7	0.9	1.2	0.2	0.3	0.7
YoY: 3 lags	1.5	2.0	2.6	0.4	0.6	0.6	0.7	1.0	1.2	0.2	0.3	0.7
YoY: 4 lags	1.5	1.9	2.6	0.4	0.6	0.6	0.7	1.0	1.3	0.2	0.4	0.8
Model selection: VAR in first difference (QoQ)												
QoQ: 1 lag	6.4	12.6	15.0	1.3	2.5	2.4	1.1	2.9	4.9	0.1	0.3	0.7
QoQ: 2 lags	5.3	8.2	7.6	0.8	1.2	1.2	1.0	2.6	4.4	0.1	0.4	0.7
QoQ: 3 lags	4.0	4.9	4.4	0.7	1.2	1.2	1.0	2.7	4.4	0.1	0.4	0.7
QoQ: 4 lags	3.7	4.5	4.0	0.7	1.2	1.2	1.0	2.6	4.4	0.1	0.4	0.7

VIRTUAL CURRENCIES, THEIR TECHNOLOGICAL INNOVATIONS AND CENTRAL BANKING

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1.WHAT ARE VIRTUAL CURRENCIES?

Cryptocurrencies or **virtual currencies** are digital currencies issued by private individuals or entities that do not have a legal tender granted by a sovereign state or an international institution. Their market value fluctuates as a result of the demand of individuals for transaction or their expectations of potential market price increases in the future. Electronic media uses different terminologies to refer to virtual currencies. In this article, the terms *"cryptocurrencies", "digital currencies"* and *"virtual currencies"* are used interchangeably.

The infrastructure of a *cryptocurrency is a decentralized electronic payment system*, available to the public and regulated by a privately drafted electronic protocol. The acceptance of the regulatory electronic protocol by the agents that operate the infrastructure is regulated through financial incentives granted to the users by the protocol itself. These incentives consist in (i) financial income for the agents operating the system and (ii) the usefulness allowed to individuals by the availability of this payment system. The electronic protocol performs the role that payments guaranteeing central authorities perform in traditional payment systems, like central banks, regulatory authorities or private enterprises like Visa and MasterCard. The blockchain technology underpinning the virtual currencies operates without the need of a central party to authorize these transactions. Also, the creation of money is realized by the same electronic protocol that enables payments' transactions. In this way, the creation of virtual money takes place at a deterministically predictable rate defined by the operating electronic protocol.

The first and one of the most traded virtual currency considered in the paper is Bitcoin. It is the most widespread virtual currency with easily accessible quantitative data regarding transaction value, volume and other trade details. The anonymous author of the cryptocurrency Bitcoin, Satoshi Nakamoto, published the *Bitcoin* electronic protocol documentation and created the first Bitcoin coin of 50 units on 3 January 2009 (Nakamoto, 2008). Electronic money is not an innovation for the economic literature. It has been present at least since the 90s with the massive spread of credit and debit cards or in the M-pesa format (Kaminska, 2015). However, Bitcoin refers also to the technological innovations that its author proposed for carrying out transaction with this currency. In this paper, depending on the context, the term Bitcoin will have the meaning of money, the technology that this currency represents or both.

[1] *This short summary is based on a yet unpublished Discussion Paper originally written in Albanian with the same title at the Bank of Albania and submitted by the author in May 2018.*

Although initially the public was sceptical about *Bitcoin*, the number of electronic transactions carried out in the digital currency Bitcoin increased exponentially. The spread of Bitcoin use has been non-negligible for the financial industry, the public and national and international authorities. At the end of 2011 the number of confirmed transactions denominated in Bitcoin was no more than 5-6 thousands per day. In the last months, before the submission of this paper (October 2017 - February 2018), the number of transfers through Bitcoin fluctuated around 200 - 400 thousands transactions per day. In the same period the value of these transactions reached around USD 1 - 4 billion a day. The amount of income generated by the private agents that maintain the infrastructure of Bitcoin from these transactions reached around USD 20 - 40 million per day. The magnitude of these incomes has prompted other private entities to propose other currencies that operate with similar infrastructure. At the time of writing this paper, the number of virtual currencies in decentralised computer networks amounts to more than 1000.

The attention of the financial industry as well as of academic actors is focused on the infrastructure of Bitcoin. The technological innovation implemented in the infrastructure of Bitcoin transactions is called blockchain. The distributed ledger technology (hereinafter DLT) is a broader term for the blockchain technology that includes modified version of the infrastructure for the needs of various industries. In this paper we will refer to it with the term *decentralized transaction ledger technology (DTLT)*. The function of this ledger is regulated by an electronic protocol drafted by the author of Bitcoin.

The infrastructure of *Bitcoin* is composed by the transaction electronic ledger and by powerful computer units operated by private agents called 'miners', who are financially motivated by an electronic protocol. The private miners may enter or leave this infrastructure maintenance business according to their financial motivations. The ledger is *decentralized* because the miners that maintain the system record the transactions in the only public copy of the ledger, leaving traces only in this unique ledger and not in private ledgers of each miner. Its reliability is granted by the implementation in the electronic protocol of (a) *cryptographic security elements* and by (b) financial remuneration that motivate the miner to maintain the system's (decentralized) infrastructure. Agents' financial remuneration consists in (i) transactions' commissions and in (ii) a subsidy that the electronic protocol allocates by creating new coins *(seigniorage)*. The creation of new Bitcoin money is accomplished by rewarding miners for each finalization of a transaction block. The ledger requires the consent of the agents that maintain the infrastructure of the system. The size of financial remuneration provided in the protocol dictates that consensus is reached in the normal operation of the infrastructure. Two key features, cryptographic security and *decentralisation* of payment infrastructure, make unnecessary the presence of a regulator or authority that guarantees the reliability of the transactions.

Due to these characteristics provided in the electronic protocol, the technological innovation underpinning the ***blockchain infrastructure*** allows individuals some advantages in making payments compared with the current infrastructure monitored or regulated by national or international supervisory authorities. First, the cryptographic protocol elements enable the anonymity of the payments' payers andpayee. This does not prevent the *decentralised transaction electronic ledger* to enable *the registration and tracking of transactions or any change of ownership of Bitcoin* coins. Second, conducting transactions with this technology (the ledger) does not require a central *authority* or *regulator* that guarantees the reliability of the transactions. *Blockchain allows* ***processing*** *and* ***finalisation*** *of* a transaction to be unified in one step. *Fast finalisation* completion allows for a ***reduction in the time*** of performing a transfer and ***minimizing counterparty risk***. Third, the lack of a central regulator, the fast finalisation of a transaction and the subsidy that the electronic protocol provides, allows private agents to ***reduce the financial cost*** of a transfer.

These advantages have prompted a rapid rate of spread of Bitcoin's use, as can be seen by the high number of daily transactions denominated in Bitcoin. The ***blockchain*** technological infrastructure is an innovation that gives a positive impulse to the productivity of private or public enterprise units in almost all areas. Virtually any valuable transaction, action, or objective can be recorded and tracked in such a ledger minimizing the counterparty risk and the financial or time costs associated with the maintenance of the current systems. The high number of other virtual currencies not regulated by the authorities is based on similar technology. Also, the financial and information industries are showing interest in implementing this technology in a new wave of financial products. In this regard, the modification of the electronic protocol enables the formulation of *blockchain* technology according to the needs of public regulatory authorities or private enterprises.

II. THE POTENTIAL IMPACT OF BITCOIN AND OF THE TECHNOLOGICAL INFRASTRUCTURE

The current spread of Bitcoin is motivated by the incentive of individuals to earn quick profits driven by expectations of prices increases, by the anonymity of the parties involved in large volume transactions, by the low cost of transactions, and by the short time of their finalisation. Decentralized payment performance and electronic recording (chain) of transactions makes difficult to monitor the financial transactions denominated in *Bitcoin*. Pre-emptive measures to stop the phenomenon in the form of transaction supervision are difficult due to the anonymity that enables the transactions in *Bitcoin*. **In most developed countries the regulatory and legal authorities are not in a rush to take limiting measures against transaction with virtual currencies.**

A massive hypothetical spread of Bitcoin is not expected due to the conservative and rational behaviour of individuals and the high risk of cash holdings in virtual currencies, Bitcoin or others. The massive spread of Bitcoin as a currency is considered a hypothesis which does not find support in academic

or institutional circles. Likewise, the high price fluctuations of Bitcoin make it a speculative monetary tool.

The monetary authorities of different countries have been careful in their public communications not to stimulate the use of these currencies. Most of them have been short of indicating any signstoward issuing the digital version of national currencies. However, countries such as Sweden, China and a few developing countries have considered the possibility of issuing a national electronic currency to meet the needs of respective nationals for electronic payments. Such an approach provides higher security for citizens in exchange for anonymity. The intention to issue a national electronic currency in these countries is mainly related to the specifics of their own economies. Currently, issuing national electronic currencies is not considered an alternative by most developed countries.

However, the virtual currency *Bitcoin* is considered an innovation, whose infrastructure has served to prompt discussion about the possibility of improving the international payment system between international financial agents.

The efforts of the authorities in various countries are focused on the potential of technological innovation that enables the electronic transaction ledger (blockchain). ***The implementation of the technological infrastructure aiming at improving the existing payment system is the focus of the authorities of many developed countries over a long-term horizon.*** The implementation of the technology is assessed to have an impact on (i) lowering transaction time and financial costs and (ii) further containing liquidity and credit risk. Also, some of the monetary authorities are looking at the possibility of promoting financial technology in the private sector of the respective economies.

FEATURES OF THE LABOUR MARKET IN ALBANIA, IDENTIFICATION OF MAIN INDICATORS AND THEIR DYNAMICS OVER TIME

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INTRODUCTION

The analysis of the features, problems and dynamics of labour market indicators, are important to understand the current trends in this market and to see the differences among various groups of employed and unemployed persons.

This analysis provides an overview of the labour market situation in Albania and its main components' dynamics, based on the quarterly and annually data taken from the Labour Market Survey reported by the Institute of Statistics. Notwithstanding labour market in Albania traces back in '90's, the consistency of data reporting on its main indicators dates back in 2000s. Hence, the following analysis is manly based on these 18 years.

The purpose of this analysis is also to identify some of the most highlighted features of potential output of the Albanian society, including: workers; unemployed persons; working age population; and flows from its economic inactive component. Each of them is specific in case of Albania.

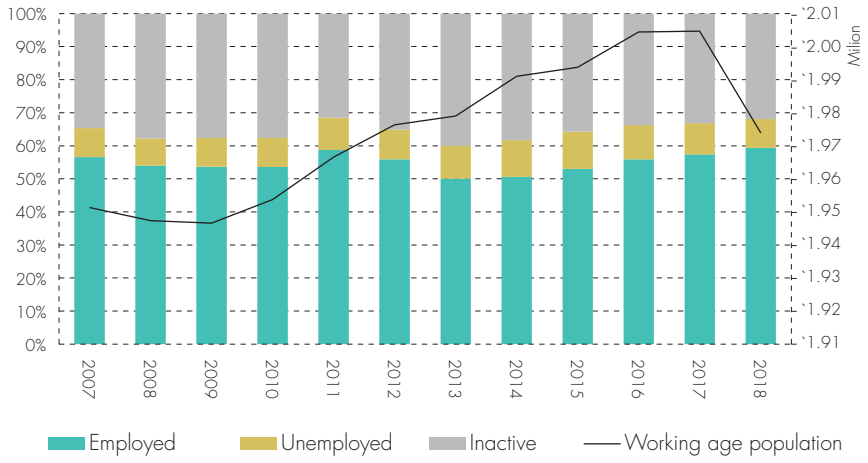
The results show that from 2014, the main indicators of labour market in Albania, employment and unemployment, show favourable and encouraging dynamics to economy. Nevertheless, figures show difficulty in finding a job, mostly encountered among young people, and a non-optimum utilisation of labour force of women, in our labour market. Also, it is noted, that based on the reports on the performance of the economically inactive population over time, the latter may include a considerable number of individuals who are vigilant and alert to developments in the labour market, and tend to join immediately the labour market once having this opportunity.

This paper is organised as follows: (i) The first session shows the main data and some developments of dynamics of the working age population, which includes all the segments of population engaged in labour market, and that part not economically engaged; (ii) second session deals with the labour force and its two components: employment and unemployment. It considers and interprets in particular data related with the gender and by age group differences, aged 15-29 years and 30-65 years. It also provides information on the dynamic of employed persons' productivity, in the reported time period; (iii) the third session identifies and analyses the composing categories of this population component at labour age; and (iv) the fourth session concludes.

SESSION I – FEATURES AND EVIDENCE AMONG THE WORKING AGE POPULATION

Graph 1 shows the ratio of average indicators of working age population, labour force, employment and unemployment in Albania, in the last ten years. The Graph provides information on the performance of working age people components over time, composed of the labour force (employed and unemployed persons) and the economically inactive population that includes all individuals who are not engaged economically in the society.

Chart 1 Structure of working age population (15-64 y.o.a.)



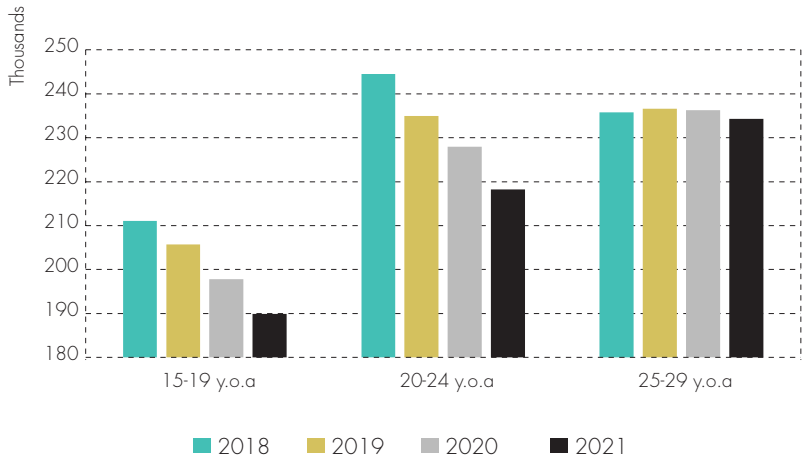
Source: INSTAT, Labor Force Survey (2018).

In the last 10 years, the working age population consisted in 2/3 of the whole population of the country. The labour force included 63.6% of working age population - around 1.3 individuals, while the rest is the economically inactive population.

In 2015, for the first time since the introduction of Albania in the free market economy, the working age population reached at 2 million. In 2018, the increasing trend decelerated averagely by 0.4% per year characterising this indicator since 2009. World Bank Group Report on the performance of labour markets in Western Balkans shows that (Vidovic, et al., 2018), the regions where Albanians live are the solely regions which do not show a falling trend of the working age population. Data for 2018 and the pace this population is increasing attributable to the flows of young people have started to gradually fall also in Albania.

Graph 2 shows the projections of population for three subdivisions of the youth population group, for 2018-2021, according to the collected data and INSTAT projections. It clearly shows that those aged 15-19 and 20-24 show a notable fall in the 4 forthcoming years. This trend marks the starting point of all for the total of population in working age, and will very soon reflect its impact on employment, productivity and economic growth in Albania.

Chart 2 Population projections by age group (2018-2021)



Source: INSTAT, Population projections (2018).

SESSION II - FEATURES OF THE LABOUR FORCE

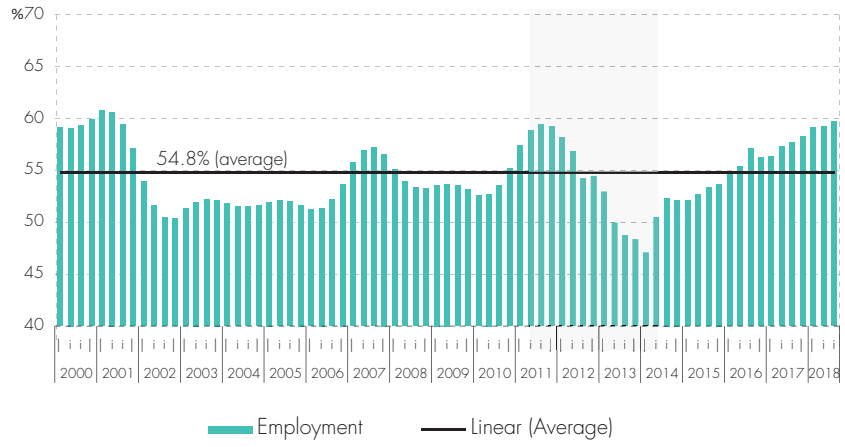
According to INSTAT, labour force includes all individuals active in the labour market, aged 15 to 65, and is composed of only employment and unemployment. The latter and their dynamics are included in the main entities of the labour economy. They are combined quantitative indicators, hence one cannot be analysed without considering the other. Employment rate is the ratio of employed population to the total of working age population in a society; while unemployment rate is the ratio of unemployed people to the participants in the labour force. Because employment is the most important component of labour force, it considerably dictates its volatility. Data for Albania show that the participation rate in labour force tends to faithfully follow the unemployment rate volatility, due to the considerable impact that employment has in the composition and performance of labour force.

Employment – Statistics include a large number of individuals as employed persons. A considerable part of them are not included in employment for a periodic wage. There are also ambiguities and grey areas between employment for a wage, self-employment and self-employment in agriculture when the products are used for self-consumption, yet it is considered as employment.[1]

[1] *INSTAT determines the individuals included in the employed category, as follows:*
The employed comprise all persons that (throughout the survey period) perform some work for a wage or financial benefit. They include:

- *Self-employed persons who work in their own business, professional practice or farm.*
- *Persons temporarily absent from work during the survey period, for various reasons;*
- *Employed persons without a wage expecting to return to work within three months;*
- *Individuals self-employed in agriculture, who do not trade their products, but use them for self-consumption (Institute of Statistics, 2016).*

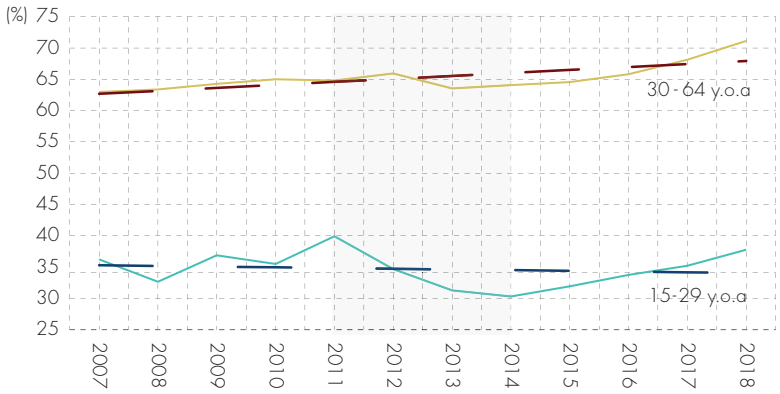
Chart 3 Employment rate progression(2000-2018)



Source: INSTAT, Labour Force Survey (2018).

Since 2014, employment has been trending upward, towards the level of 2000-2001. In this period the employment rate was stabilised at around 60% (see Graph 3). The analysis of employment rate since the beginning of 2000s shows its frequent volatilities between the range 50% and 60%, and a slight long-term falling trend (but not genuine).

Chart 4 Employment rate and respective linear trend forage groups: 15-29 y.o.a and 30-64 y.o.a



Source: INSTAT, Labour Force Survey (2018).

In 2001 Q1, employment recorded its highest level, 60.7%, while in 2017 Q1 the lowest level of 18 years, 47.1%. Structural fluctuation reflected in the fall of employment rate, in 2014, coincides with the lowest level of economic growth in the last 18 years, with an average growth of only 1.3% in 2011 (second quarter)-2014 (second quarter) and with the period of elections campaign of 2013. Following, employment rate grew by 12.6 percentage points since the beginning of 2014, supported also by the strategies on the formalisation of the economy implemented by the Government. Nevertheless, current employment level is only 4.9 percentage points above the average

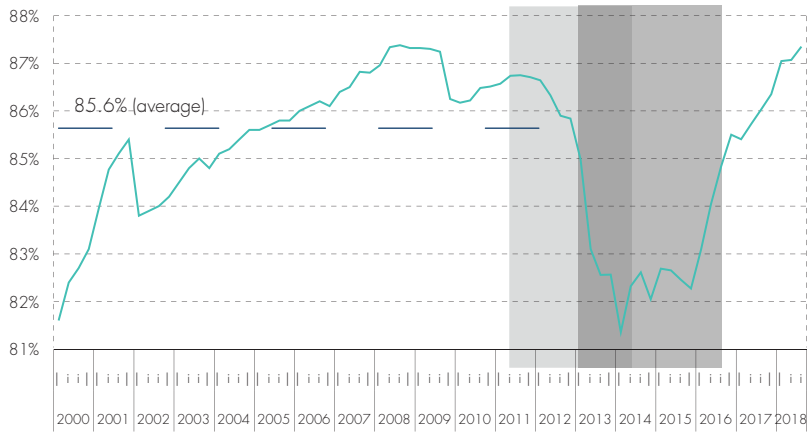
level of these 18 years, and remains marginally below the level of 2000-2001s, when it recorded its maximum values (60%).

Regarding the differences by age group, pronounced differences are noted for individuals aged 15-29 years and those 30-69 years (see Graph 4). The average of employed young people aged 15-29 years, during the last 11 years, is 34.4%, almost half of the employed persons for individuals aged group 30-64 years (whose employment averages 65.3%). The percentage of employed persons aged 15-29 years has a falling linear trend, while the one age for group 30-64 years has an increasing linear trend. Also, the deviation from the employment rate trend for the group aged 15-29 years averages 2.2 percentage points, around 1.9 times higher than the average of the deviation from the trend of the group aged 30-64 years. This difference in the deviation from the trend shows the fact that fluctuations of young people employment are more frequent, by reflecting uncertainty to keep the work place, compared to the group aged 30-64 years.

Regarding the gender difference, during the last 10 years, the gap between employed men and women remains relatively constant, at 15.3 percentage points – on average around 153 thousand more men. Data show that in the last 18 years, on average 85% of the labour force was employed and the rest unemployed. Almost 3/5 of it are men, and only 1/4 are young people aged 15-29 years.

Graph 5 shows employment performance as a percentage of labour force, during the reported period. It is noted that employment percentage in labour force maintains a clear increasing trend till 2012. During the period 2013 Q1 - 2016 Q2 (the striped area) the trend changes immediately, and employment falls considerably at 85.7% of labour force composition (that was the average level till the end of 2012). This immediate fall of employment level reflect the economic slowdown in Albania, as it occurred rightly two years after the period 2011-2014 (grey area), during which, economy growth recorded the lowest values in these 18 years, on average 1.3%.

Chart 5 Employment expressed as a percent of workforce



Source: Bank of Albania and INSTAT, Labour Force Survey (2018).

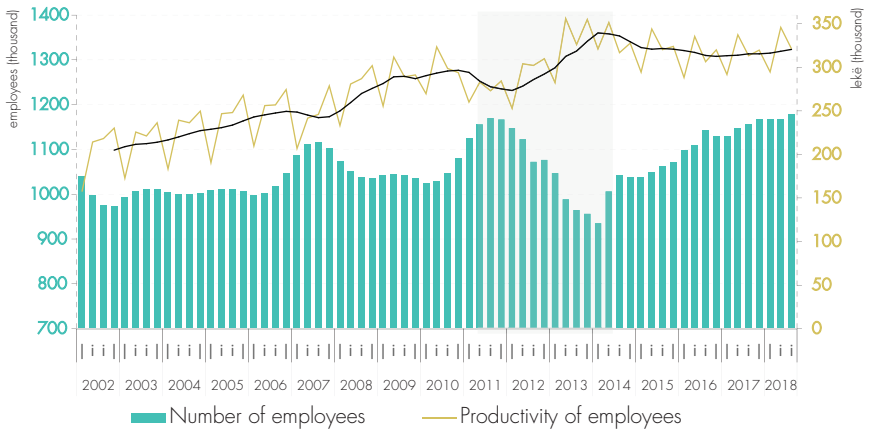
Graph 6 shows the dynamics in the performance of both economic growth and employment rate. Their relatively harmonised performance is noted. In the short-term view, it is noted that the economic growth anticipates the fall in the unemployment rate, in the period 2013-2015. The pronounced fall in the economic growth rate in 2011 Q1, is followed by the start of the decrease in employment rate, almost two periods after. This decrease continues till 2014 Q1, recording the lowest values of the last 16 years. The recovery of economic growth in 2014 Q3 is followed, about two periods later, by an upward trend of employment. This trend continues into the current period. Since the beginning of 2014, while economic growth trend has averaged 0.16 percentage point per quarter, employment rate has increased by 0.61 percentage point per quarter. Hence, economic growth affects the employment rate trend, in addition to a set of factors.

Chart 6 Comparison of the economic growth and employment rate dynamics (2000-2018)

Source: INSTAT, Labour Force Survey (2018)

Productivity of Employed Persons (PEP) –one of the most used indicators of labour productivity, according to OECD (2008), is "Labour productivity per person employed". "Productivity expresses the degree of efficiency in using the main factors of production in an economy [...], and it can be calculated as the ratio between the output measurements and a single production factor – single factor productivity – or multiple production factors – multifactor productivity" (Çeliku & Metani, 2011). In our case, PEP is a single factor, as from production factors it considers only the labour factor (the number of employed persons). Graph 7 shows the performance of this indicator during the last 18 years, calculated by real GDP with year 2010 as a base.

Chart 7 Comparison of employment and productivity of employees dynamics



Source: INSTAT, Labour Force Survey (2018)

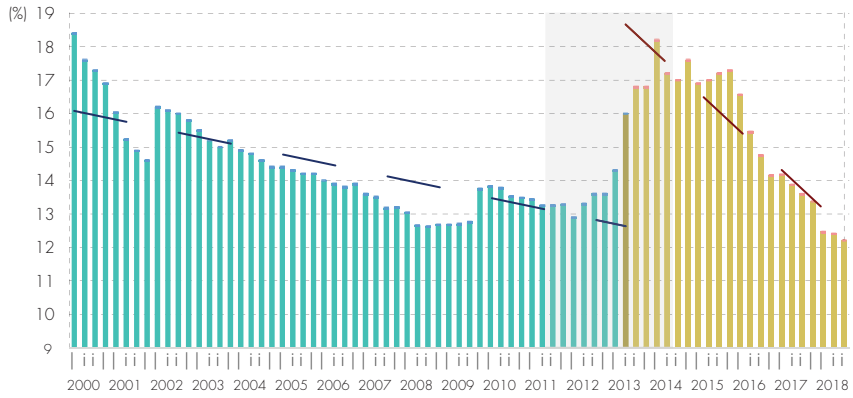
Fluctuations in productivity of the employed persons occur depending on their number in the labour force. The Graph shows that during the period when employment is downward, the domestic product is accomplished by less employed persons, hence the productivity to employ records higher values, and vice versa. In concrete terms, the slight falling trend of productivity to employ noted for the period of 2014 and following, results from the falling trend ratio of real GDP to the increase of the number of employed persons during this period. Year 2018 records a positive turn in the employed productivity trend, as the number of employed persons continues to increase since 2014.

Unemployment – Unemployment people include participants in the labour force who are without a work. Currently, unemployment rate in Albania is 12.2% (2018 Q3). Since 2014, when unemployment recorded its highest level (18.2%) in these 18 years, it has gradually trended downward.

Unemployment rate maintained an average level of 14.7%. Overall, it has a gradual falling trend, down by around 5 percentage points, from 2000 to 2012. This trend increased considerably in 2012-2013, but in 2014 its records the beginning of its continuous gradual fall. Statistical tests2 show a structural break of its performance in 2013 Q2 (see Graph 8), coinciding with the lowering of the economic growth pace in 2011-2013. A falling trend of unemployment rate is noted in the following years. Currently, this rate has exceeded its lowest level during these 18 years, in 2008.

[2] *Test of structural break for unemployment rate series (tests are made available upon the request).*

Chart 8 Unemployment rate progression



Source: Bank of Albania (2018) and INSTAT, Labour Force Survey.

Regarding the differences by age group, the unemployment rate shows considerably different values for the groups aged 15-29 years and 30-64 years. Considering the fact that the group aged 15-29 years includes young people who: [1] have not started yet or has just started their professional career; [2] are having a testing period in the labour market of their producing and creative skills for the profession/career they have to choose; [3] are active and persistent in searching an adequate stable job; it is expectable that unemployment for this age group to have a higher level, compared to the group aged 30-64 years.

Graph 9 shows the 11-years performance (2007-2018) of unemployment trends for each age group. Currently, the percentage of unemployment for the group aged 15-29 years is 23.4% that is 2.5 times higher than for the group aged 30-64 years. During the last 11 years, the increase of unemployment rate for both young persons and the group aged 30-64 years is identical, 0.6% (meanwhile, regarding the increase of employment rate, it is -0.7% for young people, and 0.1% for age group 30-64 years).

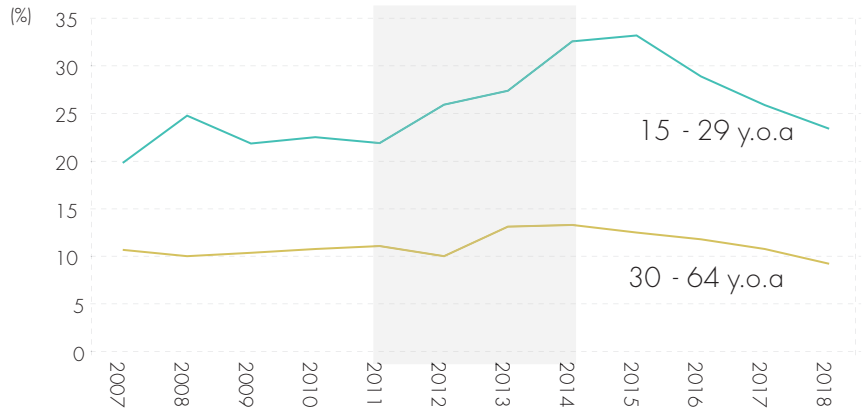
With respect to gender difference, as shown in Graph 103, unemployment rate for men is around 1 percentage point higher than for women. Albeit 1 percentage point is not a considerable difference, it identifies the tendency of men to be more present than women in the number of unemployed persons. We should remember that women are more present in the population that is economically inactive: only somewhat higher than the half (54.7%) of the total number of women in working age included in the labour force. Meanwhile for men in working age, the inclusion in the labour force is around 73.4%. These figures show the tendency of women in Albania to avoid long period

[3] *We should keep in mind that unemployment rate is calculated as a ratio to the respective degree of labour force. In Graph 10, data on men unemployment rate are calculated as a ratio to the degree of the mail labour force; while data on women unemployment rate are calculated as a ratio to the degree of female labour force. The level of mail labour force is around 35% higher than female labour force.*

of no work and in search of work, standing in economic inactivity in absence of secured employment.

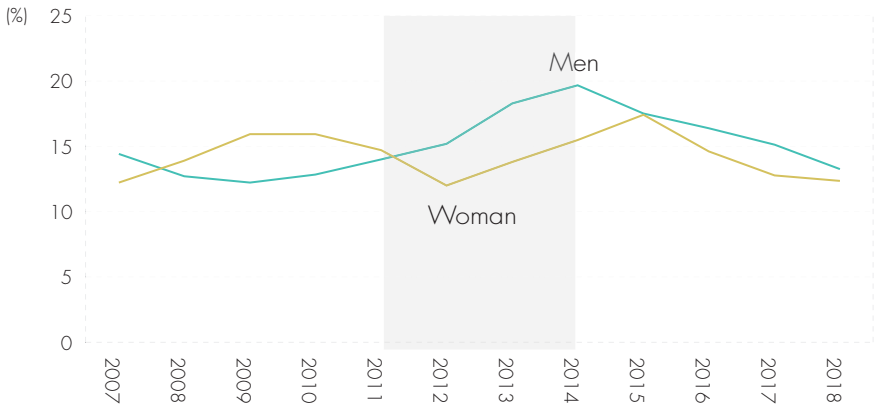
In terms of age group, in the group age 15-29 years, the percentage of unemployed girls (23.4%) is 2.6 times higher, compared to unemployed women of the group aged 30-64 years (9%). This fact evidences the higher trend of girls aged 15-29 years to be unemployed.

Chart 9 Unemployment rate or each of the age groups



Source: INSTAT, Labour Force Survey (2018).

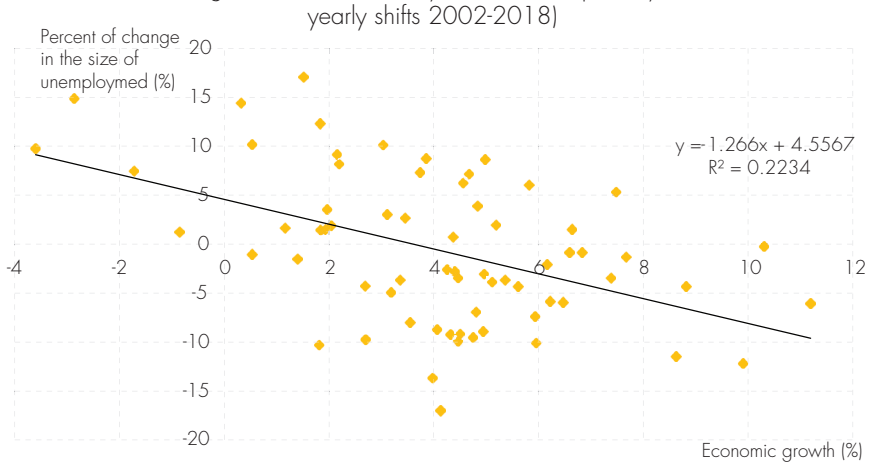
Chart 10 Unemployment rate by gender



Source: INSTAT, Labour Force Survey (2018).

As shown above, economic growth is one of the factors affecting the labour force. Graph 11 shows the presence of the interconnection between economic growth of Albania and the difference rate in total number of unemployed persons. Assessments identify a negative connection between the two indicators, showing that, in the last 17 years, a growth of real GDP by 1% has affected the decrease of total number of unemployed persons by 1.3%.

Chart 11 The correlation between the percent change in the size of unemployment and the economic growth as theorized by Okun's Law (quarterly data with yearly shifts 2002-2018)



Source: INSTAT, Labour Force Survey (2018).

The measurement in Graph 11 shows a considerable relation (R2 = 22%) between the economic growth and difference rate in the total number of unemployed persons in Albania. Also, the Granger causality tests show that changes in economic growth drive to changes in unemployment and not the opposite, in the period under review. Nevertheless, this exercise requires further detailed elaborations of data and assessments, which go beyond the purpose of this analysis.

SESSION III - HETEROGENEOUS COMPOSITION OF THE INACTIVE ECONOMICALLY POPULATION

Graph 12 shows schematically the composing components of working age population (Bureau of Labor Statistics, USA (2016), Eurofound (2017) and INSTAT (2018)). Its main components are: employed persons, unemployed

Chart 12 Economic partaking of the working age in the society

Source: Eurofound (2017), INSTAT (2018), and Bureau of Labor Statistics (2016).

persons and the economically inactive population. According to Bureau of Labor Statistics, USA (2016) and Eurofound (2017), the economically inactive population is composed of three categories: [I] hidden employment; [II] population partially related to the labour force (including the discouraged workers); and [III] economically inactive population.

The economically inactive population, in case of Albania (see Graph 1), has a considerable share of individuals in working age population. Data about the economically inactive population show the high disproportionally levels of the presence in it of women and young people. Around 65% of this population are women, and 56% are young people aged 15-29 years (for comparison purposes that in the population of working age, young people share only 37%). The concentration in these levels of young people in the economically inactive population occurs because the major part of them is graduating, and thus joins the labour force after the graduation.

If the component economically inactive population is categorised by age group, 55% of individuals aged 15-29 years are girls. Meanwhile in the group aged 30-64 years, 72% are women. The reasons behind this gap of women's percentage in both age groups of the economically inactive population relate to: [1] the trend that boys, after the age of formal education, shall join the labour force at higher percentages, compared with girls; and [2] tendency of women to distract form labour force after 30 years age, mainly due to the dedication to raise children[4] and other non-economical family commitments.[5] The economically inactive population in Albania includes a considerable number of individuals who, albeit not categorised and not reported as unemployed[6], are rather available to start a job as soon as a possibility arises. This segment includes at major part, those individuals that current literature of economy refers as "partially related to the labour force"[7] (U.S. Department of

[4] *According to Eurostat data (2017) across the EU Member States, in the female economically inactive population, mothers of children 0-6 years old are around 36% more frequent, compared to women that are not in the same situation. Meanwhile, fathers of children 0-6 years old share around 1/4- of mail economically inactive population, the rest is composed of men who are not in the same situation.*

[5] *According to Eurostat data (2017) across the EU Member States, the economically inactive women made up 48%. Around 5.p.p of them report inactivity due to family or personal responsibilities (this percentage is even higher across the Southern European countries). The economically inactive men made up 34%. Their percentage reporting inactivity due to family or personal responsibility, practically is 0.*

[6] *INSTAT includes in unemployed persons those individuals that: [1] are unemployed during the reference week; [2] are disposable to work during the reference week, and within two weeks after the reference week; [3] search for a job actively, by undertaking specific steps to search for a job with a salary or to establish a business, during the 4-week period that ends with the reference week. Persons available for a job included in the economically inactive population are not categorises as unemployed persons, as they do not meet the thirst above-mentioned condition. (Instituti i Satistikave, 2016)*

[7] *"Marginally attached to the labour force" - Bureau of Labor Statistics (2016), this category includes individuals that wish to work, they have been actively seeking for a job for a 12-month period preceding the reference week, but have stopped seeking actively for a job during the four-week period ending with the reference week. A category of these individuals are the discouraged workers.*

Labor, 2009), and their sub-category known as discouraged workers.[8] These individuals manifest the behaviour of typical unemployed persons versus the demand for work in the market, taking a considerable part of vacancies when finding the opportunity.

The last report by (2018) on the quarterly survey of labour force includes data on discouraged workers. According to this report, the discouraged workers made up 9% of the economically inactive population in 2018 Q3. They have lost hopes to find a job from weeks, months or even longer and have stopped looking actively for a job. In addition to the category partially related with labour force, they compose that economic phenomenon known as "labour market slack"[9] in the labour market of a country. In addition with the underemployment phenomenon[10], labour market slack shows the underutilized workforce[11], present in the economy, when the latter is not able to provide employment opportunities adequate to the population.

The Unemployment rate in Albania shows the features of a long-term uniformity, as the work demand in the market is meet by two categories of possible employees (the unemployed persons and those who are partially related with the labour force), albeit reacting against this demand. There are a set of difficulties to have correct quantitative definitions of labour slack, if data series are not available. The economic literature has ample evidence on the presence of a number of sub-division of individuals within the number of economically inactive population. These sub divisions should be exactly identified, to make possible genuine categorisations of this share of population.

SESSION IV – CONCLUDING REMARKS

This analysis aimed at reflecting and examining the main features of the labour market in Albania, which reflect the structure and dynamics in time of its main components. They include: unemployment, employment, labour force, working age population, the economically inactive component of the society; and the problems related with the insufficient demand of labour factor in Albania labour market. The main findings are provided following:

Data published by INSTAT show a constant growth of the share of working age population, during the last 18 years. The projections show this growth has already peaked and is expected a gradual fall in the working age population in the years to come. It is the first time our country records such a demographic

[8] *"Discouraged workers" - according to Eurofound (2017), this group captures the category of economically inactive individuals, who wish to work, but have no hope and stopped looking for work because they believe the market does not provide job opportunities for them. INSTAT identifies this category through their declaration that the reason of not looking for a job is the conviction that there are no available job for them.*

[9] *"Labour market slack" (European Foundation for the Improvement of Living and Working Conditions, 2017)*

[10] *"Underemployment". According to ILO (1996-2018) persons in under-employment consist of all employed persons who work during the reference period and who wish to work adequately, as reported in the relevant surveys.*

[11] *"Labour underutilization" (ILO, 1996-2018).*

development, so far unknown to our economy. Its consequences are going to be felt quickly in all fields of human activity in Albania, from the various levels of education to the most important economic implications related with the domestic product, productivity, insurance schemes and living standard.

In the last 18 years, participation in labour force is characterised by continuous volatilities ranging 58% and 72%. Its current trend is recovering from a historical minimum of these 18 years, recorded in 2014.

Currently, participation in labour force is around 68%, and in recent years it has positively affected the performance of its both components: employment and unemployment.

Employment calculated as the ratio against the working age population is relatively constant, averaging 54% of the working age population. Employment rate is characterised by a fluctuation which performs almost identically with that of the participation in labour force. Employment grew in the last six years, at around 60% of the working age population. Current employment rate is around 1% lower, compared with the best reported period for this indicator. Figures show difficulties of employment mainly for young people. More frequent volatilities of both unemployment and employment are noted in the 15-29 years age group, showing difficulties to keep the job.

Unemployment rate (measured as a percentage to labour force) does not show considerable volatilities. Notwithstanding, an overall downward trend is noted in the last years. Currently, unemployment is around 12.2%, the lowest level since 2000. In terms of different age groups, the 15–29 years age group suffers more the unemployment, which although having a downward trend, again is high (the current unemployment rate for this age group is around 23%).

The economically inactive population is an important component in the labour market flows, sharing averagely 36% of the working age population. Women continue to mad up a high share of this component in the Albanian society (around 63%), showing a continuation of the non-optimum utilisation of the female potential workers from the labour market.

On the other hand, the economically inactive population shows the features of a heterogeneous composition. In addition to the economically inactive individuals, this share of population may include also a considerable number of individuals related to the labour force (having similar trend of employment with the unemployed persons), and of discouraged workers

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