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C O N T E N T

EXPORT STRUCTURE AND ECONOMIC GROWTH

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INTRODUCTION

Understanding the factors that lead to economic growth is one of the most central topics in economics. The role of international trade is a dimension that has received considerable attention in this discussion, driven also by the globalization processes during the last decades. Trade openness and trade structure are among the main elements related to the role of international trade in economic growth. If we label the discussion around trade openness as "liberalization vs. autarky", in general, there is a consensus in favour of trade liberalization, although different forms of protectionist voices and policies are not missing even in developed countries. On the other hand, if the parallel label for the discussion around trade structure would be "specialization vs. diversification", there is far less agreement about the optimal trade structure. This lack of consensus is the primary motivation for this article.

The concept of trade structure in this article will be limited only to the export dimension. This focus implicitly leads us to discuss the role that production structure, in general, has on economic growth - as long as countries' exports are an adequate mirror of countries' production. The concepts and the respective indicators that we use also follow this logic, starting with export diversification and extending to economic complexity and productive capabilities.

We employ the fixed-effects regression model to analyze the impact of these indicators on economic growth, using panel data that include two time periods (1999-2008 and 2009-2018) and around 134 countries. When we compare the results between indicators, we find that considering economic complexity or productive capabilities, on the whole, is more useful in explaining economic growth than considering export diversification particularly. Moreover, our results suggest that we should focus more on understanding the interaction between specialization and diversification, rather than hand-picking one of them as more important.

The article is structured as follows. In the following chapter, we review the literature that studies the relationship between export diversification and economic growth. Then, we define the indices that measure export diversification, economic complexity, and productive capabilities. The fourth chapter is dedicated to the empirical results, and then we focus on the performance of these indicators in Albania and Western Balkans, before concluding in the last chapter.

2. LITERATURE REVIEW

The economic models and the empirical estimations that study a possible negative relationship between export concentration and economic growth have been present in the economic literature at least since the middle of the last century, with articles from Singer (1950) or Prebisch (1962). Later authors, like Neary and van Wijnbergen (1985), Gelb (1988), or Sachs and Warner (1995), argued in favor of a negative correlation between natural resources abundance and economic growth, also known in the literature as the "natural resources curse". Moreover, Syrquin (1988) argues through a structural model that countries should diversify their exports from primary products towards manufacturing products to achieve sustainable growth. Even more recent studies like those by AlMarhubi (2000), Lederman and Maloney (2003) or Dutt et al. (2008) support the growth lead by diversification hypothesis. Regarding small countries, McIntyre et al. (2018) argue that the benefits of diversification are related firstly to the protection from large negative shocks in international trade, and secondly, diversification raises opportunities to learn new production processes, thus improving human capital - which in long term can contribute to higher productivity levels. We find similar ideas also in the theoretical models of Krugman (1979) and Grossman and Helpman (1991). On the other side, there is a part of the literature that in one way or another calls into question the monotone positive relationship between export diversification and economic growth. Michaely (1977) shows that this positive relationship is significant only for developed countries. citebrunnschweiler2008cursing and Brunnschweiler and Bulte (2008) on the other hand remark the endogeneity problems that exist in the empirical estimations of this relationship and question the "natural resources curse" hypothesis, by suggesting that the appropriate management of natural resources can be a key ingredient for sustainable growth.

The seminal work by Imbs and Wacziarg (2003) studies the relationship between production diversification and economic growth. They show that the sectoral concentration in an economy follows a U-shape during the economic development process. Firstly, countries diversify their production - their economic activity becomes more uniformly distributed among sectors - and then, there exists a turning point during the development phase where countries start to specialize and therefore re-concentrate. Cadot et al. (2011) show that the U-shape relationship exists even for the export structure. Consequently, they suggest that export diversification should not be taken as a policy objective per se. To support this perspective, they emphasize two ideas from the classical international trade literature. Firstly, according to Ricardo's model, countries should specialize, not diversify. Secondly, according to the Hesckscher-Ohlin model, the export structure would be strongly related to the country's endowments. This implies that countries should worry more to accumulate more production factors related to their endowments, rather than diversify. These articles have encouraged a lot of discussions, both in academia and policy-making. Lastly, we should note that there is a vast literature also regarding economic complexity and productive capacities but reviewing it in detail goes beyond the focus of this article.

3. INDEXES FOR DIVERSIFICATION, ECONOMIC COMPLEXITY, AND PRODUCTIVE CAPACITIES

The literature does not offer a unified measure of export diversification or concentration. However, among the most widely used indices are the Herfindahl-Hirschmann Index (HHI), the Theil's index and the Gini coefficient. We must note that these indices measure the export concentration, meaning that diversification in these cases has more of an interpretative meaning - the more concentrated the less diversified - rather than being formally defined. In this section, we will define HHI and Theil's index, following the notation used by Cadot et al. (2011).

There is also a vast set of concepts, definitions, and indices even regarding economic complexity and productive capacities. Andreoni (2011) offers a very comprehensive review of these indicators. In this article, we consider two of them, - the Economic Complexity Index (ECI) and the Productive Capacities Index (PCI) - mainly due to data availability for countries that we analyze during the respective period. ECI is estimated and published by the Growth Lab at Harvard University. The main idea behind this index by observing the export basket of a country - regarding the diversity and the ubiquity of its products - we may infer a good indicator for the complexity of its economy. PCI on the other hand is published by the United Nations Conference on Trade and Development (UNCTAD), considering a wide range of indicators. Therefore, PCI is a composite index based on a variety of data.

3.1 INDEXES FOR EXPORTS' DIVERSIFICATION

Herfindahl-Hirschmann Index measures the concentration of exports, in our case according to export's products. The normalized version of it can take values from 0 to 1 and can be defined as:

$$HHI = \frac{\sum_k (s_k)^2 - 1/n}{1 - 1/n},$$

where $s_k = x_k / \sum_{k=1}^{n} x_k$ is the share of the export line[1] k, therefore x_k is the export value of line k and n is the number of export lines. Values closer to 1 of the index mean a concentrated basket of exports, while values closer to 0 reflect more uniformly distributed values among the export lines.

On the other hand, using the same notation, we can define Theil's index as:

$$Theil = \frac{1}{n} \sum_{k=1}^{n} \frac{x_k}{\mu} ln\left(\frac{x_k}{\mu}\right), \quad \text{ku} \quad \mu = \frac{1}{n} \sum_{k=1}^{n} x_k.$$

[1] *By export line we mean the merchandise trade categories according to Standard International Trade Classification (SIIC) Revision 3 at 3-digit level.*

One of the main advantages of Theil's index is its decomposability. As shown also by Cadot et al.

(2011), this index can be decomposed into extensive and intensive margins. Diversification along the extensive margin happens when the number of active export lines is increased. On the other hand, diversification along the intensive line happens when the distribution of export values among the existing lines becomes more uniform. Cadot et al. (2011) show that the U-shape relationship between export concentration and economic growth is driven mostly by the variation of the extensive margin through the development path.

3.2 ECONOMIC COMPLEXITY INDEX

In this article, we will follow the ideas and the notation used by Hausmann et al. (2014) to define the ECI. Let Mcp be a matrix in which rows represent different countries and columns represent different products. An element of this matrix will take value 1 if country c exports product p and 0 otherwise. Thus, the sum across columns shows how many products exports the country c, offering in this way a measure of diversity. The sum across rows shows how many countries have exported the product p, offering a measure of its ubiquity. Defined formally,

$$\text{Diversity} = k_{c,0} = \sum_p M_{cp} \tag{1}$$

$$\text{Ubiquity} = k_{p,0} = \sum_c M_{cp} \tag{2}$$

To generate a more accurate measure of the number of capabilities that a country has or the capabilities that are needed to produce a certain product, the "gross" information that Diversity and Ubiquity carry can be corrected by using each one to correct the other. For countries, this can be done by calculating the average ubiquity of the products that it exports, the average diversity of the countries that make those products, and so forth. For products, we need to calculate the average diversity of the countries that make them and the average ubiquity of the other products that these countries make. This can be expressed by the recursion:

$$k_{c,N} = \frac{1}{k_{c,0}} \sum_p M_{cp} \cdot k_{p,N-1} \tag{3}$$

$$k_{p,N} = \frac{1}{k_{p,0}} \sum_c M_{cp} \cdot k_{c,N-1} \tag{4}$$

We then insert (4) into (3) to obtain:

$$k_{c,N} = \frac{1}{k_{c,0}} \sum_p M_{cp} \frac{1}{k_{p,0}} \sum_{c'} M_{c'p} \cdot k_{c',N-2} \tag{5}$$

$$k_{c,N} = \sum_{c'} k_{c',N-2} \sum \frac{M_{cp} M_{c'p}}{k_{c,0} k_{p,0}} \tag{6}$$

and rewrite this equation as:

$$k_{c,N} = \sum_{c'} \widetilde{M}_{cc'} \cdot k_{c',N-2} \tag{7}$$

where

$$\widetilde{M}_{cc'} = \sum_{p} \frac{M_{cp}M_{c'p}}{k_{c,0}k_{p,0}} \tag{8}$$

Notice that the equation (7) is satisfied when $k_{c,N} = k_{c,N-2} = 1$. This corresponds to the eigenvector Mf_{cc0}, which is associated with the largest eigenvalue. As long as this eigenvector is a vector of ones, it is not informative. Therefore, we look for the eigenvector associated with the second largest eigenvalue. This is the eigenvector that captures the largest amount of variance in the system and is the measure of economic complexity. Hence, Hausmann et al. (2014) define the Economic Complexity Index as:

$$ECI = \frac{\vec{K} - avg(\vec{K})}{stdev(\vec{K})} \tag{9}$$

where K~ represents the eigenvector of Mf_{cc0} associated with the second largest eigenvalue, and avg, stdev stand for the respective avarage and standard deviation.

To explain more the intuition behind these equations, we recall the example described by Hausmann et al. (2014). If we compare Switzerland to Egypt, they both export a similar number of different products, around 180. On the other hand, Switzerland has a much smaller population size and a much higher GDP per capita. The type of products that these countries export can help us explain the differences in the level of development that exist between these two countries. Firstly, Egypt exports products that are on average exported by 28 other countries, while Switzerland's export products are exported on average by only 19 other countries. Secondly, Switzerland exports products that are exported by highly diversified countries, while those that Egypt exports are exported by poorly diversified countries. These differences, of first, second, third, and higher-order, are exploited and incorporated in the mathematical procedure described above to get the measure of economic complexity.

3.3 PRODUCTIVE CAPACITIES INDEX

Productive Capacities Index (PCI) - differently from other indexes described so far that use only foreign trade data - takes into account a variety of factors and data to determine the productive capacities of a country. There are eight groups of data that are used to construct this composite index: human capital, natural capital, energy, transport, information and communication technology, institutions, private sector, and structural change. These groups represent also the PCI components or indicators that are also published by UNCTAD. We need to mention that two of the elements that are used to construct PCI are HHI and a version of UNCTAD for the economic complexity index.

Data sources that are used to construct this index are also diverse, including UNCTAD's data, World Bank's data, World Health Organization's data, UNESCO's data, etc. As shown in the methodological report[2] of UNCTAD for PCI, the compact formula for this index can be written as:

$$PCI = \sqrt[n]{\prod_{i=1}^{N} X_i^{PCA}} \qquad (10)$$

where N is the total number of the categories and X_i^{PCA} is the weighted category score extracted using the principal component analysis of category i. PCI takes values from 0 to 100 and the largest values correspond to countries with the largest productive capacities. The procedures to calculate this composite index include imputations for missing values, forecasts, multivariable analysis, and econometric techniques for intermediate valuations.

4. EMPIRICAL ESTIMATIONS

4.1 DATA AND METHODOLOGY

This section aims to investigate the performance of the indexes on a series of regression that intends to explain economic growth through variables related to country size, trade openness, export concentration, economic complexity, and productive capacities. The main structure of these estimations is borrowed by Hausmann et al. (2014) and consists of a set of time fixed effects regressions. There are two main differences between our estimations and this main structure. Firstly, we focus our analysis on the indexes described in the previous section and also include the Theil's index and PCI, aiming to derive more insights for the "specialization vs. diversification" discussion. Secondly, we consider a more recent period than the main structure and also try to unify as much as possible the data sources that are being used.

Our time period includes two decades, 1999-2008 and 2009-2018, and around 134 countries, chosen mainly due to data availability reasons. The dependent variable is the compound annual growth rate of GDP per capita for each decade. The main explanatory variables are the indexes discussed above. We take their initial values for the respective decades, and we normalize them to take values from 0 to 1 to make the comparison easier. Other explanatory variables include the initial values of GDP per capita and population size in the respective decades, and also the increase of total exports and the increase of natural resources rent - both as a share of GDP during the respective periods. The main data sources that we use are the Atlas of Economic Complexity

[2] *UNCTAD/ALDC/2020/3 (2021)*

(atlas.cid.harvard.edu) for ECI, the statistics of UNCTAD (unctadstat.unctad.org) for HHI and PCI, the database of IMF for the Theil's index, and World Bank's data for all other variables. A detailed description of the variables, data sources, and also a list of 134 countries included is in the appendix of this article.

4.2 ESTIMATIONS

Following the empirical model used by Hausmann et al. (2014), economic growth is estimated as

$$Y_{it} = \beta_0 + \beta_1 Index + \beta_2 Period + \beta_i X_{it} + \epsilon_{it},$$

where Y_{it} is the compound annual growth of GDP per capita during 1999-2008 and 2009-2018, Index represents one of the indexes described above, Period is a binary variable which takes the 0 value for the first period and 1 for the second period, and X_{it} is a matrix of other explanatory variables. To evaluate the impact of diversification, complexity, and productive capacities on economic growth, we firstly estimate a regression for each of the indexes. At the results shown in Table 1, we can see that we do not include any index at regression (1). The only explanatory variables are the logarithm of initial GDP per capita for each period, the growth of rent from natural resources as a share of GDP during each period, and binary variable to capture the fixed effects of the time periods. The negative sign of the initial GDP per capita coefficient and its statistical significance are in the same line with the convergence idea in the economic literature - ceteris-paribus, developing countries tend to grow at faster rates than advanced countries and therefore they will converge. Regarding the variable related to natural resources rent, its low statistical significance is an indication that this variable has little power in explaining economic growth. On the other hand, the negative sign of the coefficient related to time period corresponds to the fact that economic growth during the 1999-2008 period has been higher than during the 2009-2018 period for the group of countries that are considered.

At regressions (2)-(5) of Table 1, we include respectively each of the indexes at the baseline regression (1). Their high statistical significance is a clear indication that diversification, economic complexity, and productive capacities considered separately are important elements in explaining economic growth[3] To compare the results between these regressions, we emphasize the differences between the absolute values of the indexes' coefficients and the differences between the coefficients of determination R^2 of the regressions, rather than on the magnitude of growth that contributes one or another index[4].

[3] *HHI and Theil's index have negative coefficients because as mentioned above, these indexes measure exports' concentration - higher index values correspond to more concentrated exports. On the other hand, the higher the values of ECI or PCI, the more complex is the economy and the larger are its productive capacities, respectively.*

[4] *The formal statistical interpretation, for example of ECI's coefficient, would be: The increase with one standard deviation of the normalized ECI value is estimated to accelerate the compound annual economic growth with 4.5 percent. However, the one standard deviation of the normalized ECI value is far from being a concrete and sensible economic concept.*

AS we can observe, the values of R^2 at the regression (4) of ECI and the regression (5) of PCI, are larger than the corresponding values of regression (2) of HHI and regression (3) of Theil's index. Moreover, the absolute values of ECI's coefficient at regression (4) and PCI's coefficient at regression (5) are larger than the respective values of diversification coefficients at regressions (2) and (3)[5]. These two facts suggest that taking into consideration economic complexity or productive capacities is more useful to explain economic growth than considering exports' diversification separately.

Table 1 The performance of indexes on growth regression

	Depended variable: Growth of GDP per capita				
	(1)	(2)	(3)	(4)	(5)
log(inital GDP)	−0.004*** (0.001)	−0.006*** (0.001)	−0.007*** (0.001)	−0.009*** (0.001)	−0.015*** (0.002)
Gr. rent NatRes/GDP	0.0001 (0.0002)	0.0004* (0.0002)	0.0004* (0.0002)	0.0004* (0.0002)	0.0004* (0.0002)
Period	−0.008*** (0.003)	−0.006** (0.003)	−0.006** (0.003)	−0.005* (0.003)	−0.004 (0.003)
HHI_n		−0.038*** (0.007)			
Theil_n			−0.032*** (0.007)		
ECI_n				0.045*** (0.008)	
PCI_n					0.081*** (0.013)
Constant	0.072*** (0.009)	0.093*** (0.010)	0.100*** (0.011)	0.091*** (0.009)	0.128*** (0.013)
Observations	261	259	257	261	260
R^2	0.111	0.197	0.192	0.218	0.221
Adj. R^2	0.101	0.184	0.179	0.206	0.209
F Statistic	10.735***	15.578***	14.972***	17.863***	18.109***

**p<0.1; **p<0.05; ***p<0.01*

To further investigate this hypothesis, we rely on the results shown in Table 2 and Table 3, where we incorporate respectively ECI and PCI as explanatory variables in each regression. These regressions include other explanatory variables related to trade openness (exports to GDP ratio), trade success in the respective periods (an increase of exports as a share of GDP), country size according to population, and we control for time fixed effects in all regressions. We note from the results that the growth of exports, their diversification measured

[5] *It may be recalled that all the indexes are normalized to take values from 0 to 1 across the estimations*

by Theil's index, and the population size are not statistically significant variables as long as we include in the same regression ECI or PCI. Even in the case of HHI, its statistical significance and its absolute value are smaller compared to regression (2) of Table 1, where we do not include ECI or PCI. The variable that represents trade openness is also not statistically significant. All these statistical insights support the hypothesis that taking into consideration economic complexity or productive capacities on the whole, is more useful to explain economic growth than taking into consideration diversification, trade openness, trade success or country size particularly.

Table 2 ECI interaction with other indicators

	Depended variable:					
	Growth of GDP per capita					
	(1)	(2)	(3)	(4)	(5)	(6)
log(inital GDP)	–0.009*** (0.001)	–0.009*** (0.001)	–0.009*** (0.001)	–0.009*** (0.001)	–0.009*** (0.001)	–0.010*** (0.001)
Gr. rent NatRes/GDP	0.0004* (0.0002)	0.0001 (0.0002)	0.0002 (0.0002)	0.0004** (0.0002)	0.0004** (0.0002)	0.0004* (0.0002)
ECI_n	0.045*** (0.008)	0.040*** (0.008)	0.041*** (0.008)	0.033*** (0.010)	0.036*** (0.011)	0.046*** (0.008)
EXP/PBB		0.0001 (0.0001)				
Gr. EXP/PBB			0.0001* (0.0001)			
HHI_n				–0.018* (0.010)		
Theil_n					–0.011 (0.009)	
log(population)						–0.0005 (0.001)
Observations	261	252	253	259	257	261
R^2	0.181	0.177	0.177	0.193	0.186	0.182
Adj. R^2	0.168	0.160	0.160	0.177	0.170	0.166
F Statistic	18.841***	13.207***	13.286***	15.093***	14.367***	14.146***
Period FE	yes	yes	yes	yes	yes	yes

**p*<0.1; ***p*<0.05; ****p*<0.01

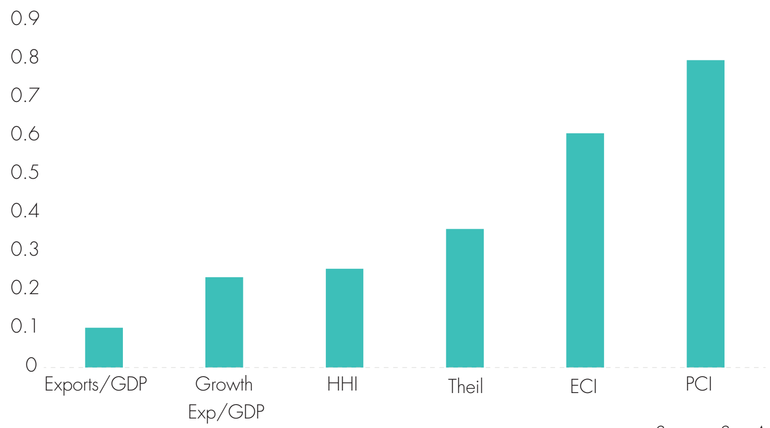
Table 3 PCI interaction with other indicators

	Depended variable: Growth of GDP per capita					
	(1)	(2)	(3)	(4)	(5)	(6)
log(inital GDP)	−0.015*** (0.002)	−0.015*** (0.002)	−0.015*** (0.002)	−0.013*** (0.002)	−0.014*** (0.002)	−0.015*** (0.002)
Gr. rent NatRes/GDP	0.0004** (0.0002)	0.0002 (0.0002)	0.0003 (0.0002)	0.0005** (0.0002)	0.001** (0.0002)	0.0004** (0.0002)
PCI_n	0.081*** (0.013)	0.074*** (0.014)	0.074*** (0.013)	0.059*** (0.017)	0.067*** (0.017)	0.081*** (0.014)
Gr. EXP/PBB		0.0001 (0.0001)				
EXP/PBB			0.0001* (0.0001)			
HHI_n				−0.018** (0.009)		
Theil_n					−0.012 (0.008)	
log(population)						0.00003 (0.001)
Observations	260	251	252	259	256	260
R^2	0.186	0.186	0.185	0.198	0.197	0.186
Adj. R^2	0.173	0.170	0.169	0.183	0.181	0.170
F Statistic	19.367***	14.023***	13.990***	15.658***	15.369***	14.468***
Period FE	yes	yes	yes	yes	yes	yes

**p<0.1; **p<0.05; ***p<0.01*

Figure 1 can offer another visualization of this idea. It shows the correlations between initial values of GDP per capita and the respective variables for countries included in the regressions during the corresponding periods. As we can note, the correlation between ECI and PCI is notably higher than other variables. In the case of PCI, this high correlation can be explained primarily by the construction of this index because some of its components are directly linked to GDP. Nevertheless, this fact does not disparage the importance of PCI, because optimally composing different data to measure productive capacities is not a trivial task that has always preoccupied economists.

Figure 1 Correlation of indicators with GDP per capita



Source: See Appendix.

The high correlation of ECI with GDP seems very thought-provoking. Essentially, ECI and the concentration indexes HHI and Theil's index use the same set of data - the merchandise export basket of the countries. To explain the better performance of this index in our estimations and the higher correlation that it has with GDP, we need to revisit ECI's construction. As shown in section 3, besides products' diversity, ECI contains information also for their ubiquity, an indicator that measures the scarcity or the abundance of a product in the world market. In general, the scarcity of a product in the world market stems from two main directions, the natural monopoly of the country that possesses the product (i.e diamonds) and the "monopoly" of capacities and capabilities to produce that product (i.e complex technological products). In reality, the ranking of countries according to ECI clearly shows that what matters more is the second direction, which in itself resembles a lot to the concept of specialization. In other words, the construction of ECI and its relative performance in the estimations to intuit that we should focus more on understanding the interaction between specialization and diversification, rather than in hand-picking one of them as more important.

LIMITATIONS

Our analysis is limited at least in three main dimensions. The first issue is related to the data sources of international trade that are used to construct the indexes that measure the exports' concentration and ECI. There exist many sources that report these data at cross-country level and they do not always offer fully similar data. The differences exist for a variety of reasons, which include the methodological differences that are being used to measure international trade data, measurement errors, different tax systems, different exchange rates being used, etc. Moreover, we should remind that these indexes use only data for the trade of goods, leaving aside the trade of services mainly because unified disaggregated data at cross country level are still missing.

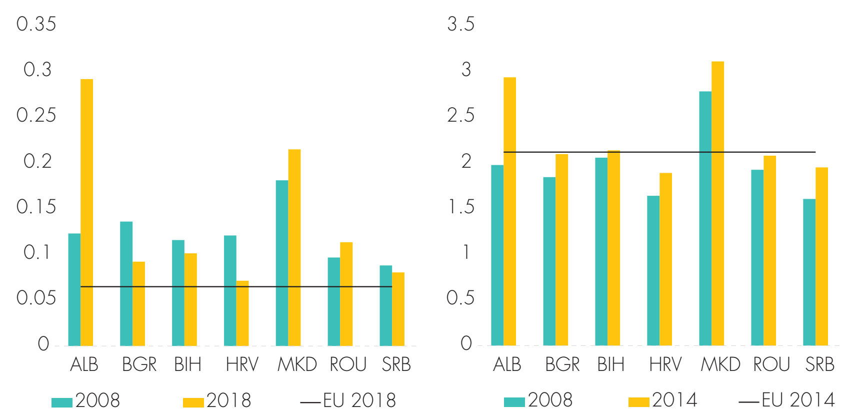
The second limitation is related to the empirical estimations. As shown also by Durlauf et al. (2005), in the cross-country estimations that aim to explain economic growth, the problems and discussions related to endogeneity, multicollinearity, and heteroskedasticity are almost always present. To address the first two issues, besides following the estimation structure used by Hausmann et al. (2014), we have tried a set of variable combinations to arrive at the exposed results. In addition, the statistical significance of the coefficients remains virtually unchanged if we consider standard errors corrected for heteroskedasticity, which suggests that our specification does not suffer - at least considerably - from this concern.

Thirdly, estimations of this kind are constructed on the cross-country perspective, which in a way or another constrains the importance of their findings when we discuss the industrial policy of a specific country. In such cases, the analysis should be focused more on the specifics of each country. Therefore, we should be very thoughtful and cautious in the messages that we receive from these results.

5. INDEXES FOR ALBANIA AND OTHER COUNTRIES OF THE REGION

In this section, we discuss the performance of indices[6] discussed so far for Albania and other countries in the region. In Figure 2 we can see that Albania is one of the least diversified countries in the region. Moreover, the increasing values of these two indices during the period indicate a worsening tendency of exports' diversification. According to HHI, Croatia is the best-performing country in the region followed by Serbia and Bulgaria. According to Theil's index, countries having the best performance in the region in 2014 were Croatia, Serbia, and Romania. In the case of HHI, all the countries in the region perform worse than the EU-28 average.

Figure 2 HHI (left) dhe Theil's index (right) for countries of the region

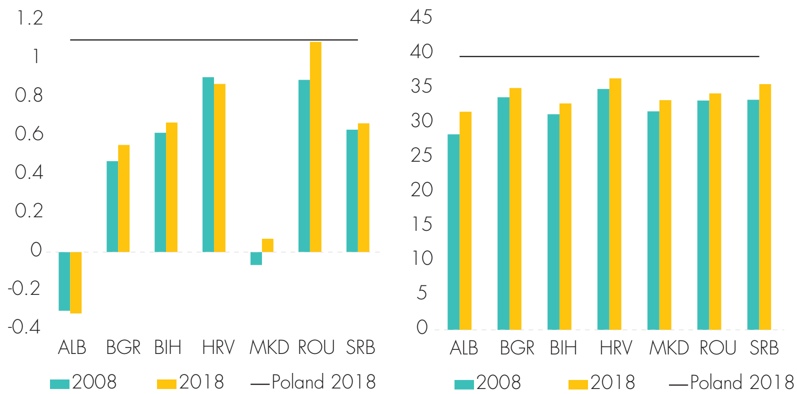


Source: UNCTADSTAT and IMF data.
Note: Higher values correspond to countries with more concentrated exports.

[6] *As we mentioned earlier, we normalize the values of indices when we perform the estimations to make the results more comparable. In this section, we use their standard (non-normalized) values.*

Albania shows a similar performance even in the cases of economic complexity and productive capacities. In 2018, Albania was ranked the last among countries of the region according to ECI and PCI. ECI for Albania has been worsening during the 2008-2018 period, while PCI has been improving. In 2018, Romania has scored the highest level of ECI among these countries, and Croatia the highest level of PCI. Given the way these two indices are composed, we find it more relevant to take as a benchmark a given country rather than the EU average. Poland is among the countries that are closest to the EU arithmetic average.

Figure 3 ECI (left) and PCI (right) for countries of the region



Source: Atlas of Economic Complexity and UNCTADSTAT.
Note: Higher values correspond to countries with more complex economies and higher productive capacities.

Figure 4 shows PCI and its main categories for the countries of the region. Two categories where Albania scores the lowest values compared to other countries are "Information and Communications Technology (ICT)" and "Structural Change". The first one measures the accessibility and integration of communication systems within the population. "Structural Change" refers to the movement of labor and other productive resources from low-productivity to high-productivity economic activities. "Private Sector" category - which measures factors like ease of cross-border trade, support to business in terms of domestic credit, the velocity of contract enforcement, and time required to start a business - is the only one in which Albania performs slightly better than other countries of the region.

Figure 4 PCI in 2018 and its categories

Burimi: UNCTADSTAT.

The performance of these indices indicates that Albania during the 2008-2018 period has scored lower results than the average of other countries in the region related to exports' diversification, economic complexity, and productive capacities. This performance signifies important barriers that hinder the potential of economic growth. The insufficient spread of ICT and the lack of structural changes are among the most problematic issues that PCI identifies.

CONCLUSIONS

In this article we analyze the performance of the indices related to export diversification, economic complexity, and productive capacities in explaining economic growth, considering around 134 countries during a period of two decades (1999-2018). Our findings suggest that considering economic complexity or productive capacities, on the whole, is more useful to explain economic growth than considering diversification, trade openness, trade success, or country size particularly. Moreover, despite possible divergences in literature, our findings and the experience of developed countries also suggest that higher synergies arise from the interaction between specialization and diversification, rather than by hand-picking one of them as more important.

When we compare the countries of the region, in 2008-2018 period Albania has scored a lower performance than the average of the region. Relatively low accessibility and low integration of information technologies and insufficient structural changes are among the most problematic factors identified. In general, countries of the region continue to remain under European Union's average for these indicators. Lastly, the concerns related to data sources and methodological limitations of the empirical estimations are important issues that we should keep in mind about our findings and conclusions.

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APPENDIX

List of countries:

Angola, Albania, United Arab Emirates, Argentina, Armenia, Australia, Austria, Azerbaijan, Belgium, Burkina Faso, Bangladesh, Bulgaria, Bahrain, Bosnia and Herzegovina, Belarus, Bolivia, Brazil, Botswana, Canada, Switzerland, Chile, China, Cˆote d'Ivoire, Cameroon, Democratic Republic of the Congo, Republic of the Congo, Colombia, Costa Rica, Cuba, Cyprus, Czech Republic, Germany, Denmark, Dominican Republic, Algeria, Ecuador, Egypt, Spain, Estonia, Ethiopia, Finland, France, Gabon, United Kingdom, Georgia, Ghana, Guinea, Greece, Guatemala, Honduras, Croatia, Hungary, Indonesia, India, Ireland, Iran, Israel, Italy, Jamaica, Jordan, Japan, Kazakhstan, Kenya, Kyrgyzstan, Cambodia, South Korea, Kuwait, Laos, Lebanon, Liberia, Libya, Sri Lanka, Lithuania, Latvia, Morocco, Moldova, Madagascar, Mexico, North Macedonia, Mali, Myanmar, Mongolia, Mozambique, Mauritania, Mauritius, Malawi, Malaysia, Namibia, Nigeria, Nicaragua, Netherlands, Norway, New Zealand, Oman, Pakistan, Panama, Peru, Philippines, Papua New Guinea, Poland, Portugal, Paraguay, Qatar, Romania, Russia, Saudi Arabia, Senegal, Singapore, El Salvador, Serbia, Slovakia, Slovenia, Sweden, Eswatini, Togo, Thailand, Tajikistan, Turkmenistan, Trinidad and Tobago, Tunisia, Turkey, Tanzania, Uganda, Ukraine, Uruguay, United States of America, Uzbekistan, Venezuela, Vietnam, Yemen, South Africa, Zambia, Zimbabwe

Table 4 Variables and data sources

<table>
<tr><th>Variable</th><th>Description</th><th>Source</th></tr>
<tr><td>Annualized economic growth</td><td>CAGR of GDP per capita of countries during 1999-2008 and 2009-2018</td><td rowspan="5">World Bank Data https://databank.worldbank.org/</td></tr>
<tr><td>Initial GDP</td><td>Logarithm of GDP per capita value of countries in 1999 and 2009
(the initial years of analyzed periods).</td></tr>
<tr><td>Growth of rent from natural resources</td><td>Growth in percentage points of total natural resources rents as share of GDP during 1999-2008 and 2009-2018. Total natural resources rents are the sum of oil rents, natural gas rents, coal rents
(hard and soft), mineral rents, and forest rents.</td></tr>
<tr><td>Initial exports as share of GDP and their growth</td><td>Exports of goods and services as share of GDP in 1999 and 2009
(the initial years of analyzed periods) and growth in percentage points of their share in GDP during 1999-2008 and 2009-2018.</td></tr>
<tr><td>Population</td><td>Logarithm of population for countries in 1999 and 2009 (the initial years of analyzed periods).</td></tr>
<tr><td>HHI</td><td>See section 3.1
Values of HHI in 1999 and 2009
(the initial years of analyzed periods).</td><td>UNCTAD's statistics https://unctadstat.unctad.org/</td></tr>
<tr><td>Theil's index</td><td>See section 3.1
Values of Theil's index in 1999 and 2009 (the initial years of analyzed periods).</td><td>IMF Data https://www.imf.org/external/datamapper/datasets</td></tr>
<tr><td>ECI</td><td>See section 3.2
Values of ECI in 1999 and 2009
(the initial years of analyzed periods).</td><td>The Atlas of Economic Complexity https://atlas.cid.harvard.edu/</td></tr>
<tr><td>PCI</td><td>See section 3.3
Values of PCI in 1999 dhe 2009
(the initial years of analyzed periods).</td><td>UNCTAD's statistics https://unctadstat.unctad.org/</td></tr>
</table>

REMITTANCES AND THEIR IMPACT OF POVERTY: THE CASE OF ALBANIA[1]

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ABSTRACT:

The purpose of this article is to assess the impact of remittances on poverty in Albania, based on household level data obtained from the first wave of Household Wealth Survey in Albania, conducted by the Bank of Albania in collaboration with Instat during 2019. Survey data show that 23% of Albanian households receive remittances, which an average annual inflow of remittance per year around 2000 euros, which varies according to different groups of households and region. The data show that remittances are the second most important source of household income, after income from work. Estimations based on probit regressions show that remittances have a positive and significant impact on the reduction of household poverty in Albania.

Keywords: Remittances; Household Behavior, Poverty
JEL Classification F24, D10, I32

1. INTRODUCTION:

Migration has been identified as one of the most important factors of the 21st century affecting economic relations between developed and developing countries (Adams and Page, 2003). The United Nations, at the beginning of this century has estimated that 2.8% of the world's population or about 174 million people live and work outside their country of birth. In addition the latest figures show that migration is a growing phenomenon and that the world in this period is facing the deepest migration crisis it has seen in its entire history (World Bank, 2019). Estimates for 2017 done by United Nations, show that the total number of migrants in the world is 274 million people, increased by 98 million (or 56%) compared to the figures of year 2000. Emigrants in 2019 make up 3.5% of total world population, where Europe and North America represent the countries with the largest stock of migrants in the world, at 82.3 million and 58.6 million, respectively (World Bank, 2019).

Migration is a multidimensional phenomenon that affects both the economies of sending and receiving countries in many ways. In addition to the economic, social and cultural impact that migration has mainly on countries that export

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migrants, the income they send to their country of birth is probably the most direct link between migration and the economic development of the country (Ratha 2007). Globally, in 2019 remittance reached the level of $ 689billion (World Bank, 2019) and represent the largest source of income for many developing countries. Remittance flows tend to be more stable and more countercyclical than capital flow and during the latest financial crisis remittances proved to be more resilient (Ratha, 2011). The main data source of recorded international migrant remittances are based on balance of payment data. However the estimation of the exact size of remittances is hard because mostly of remittances are send through unofficial channels. However empirical literature based on cross-country and country-level analysis have showed that remittances have reduced the share of poor people in the population (Adams and Page 2003, 2005; Gupta, Pattillo, and Wagh 2009) and are an important source of household income. Remittances are used to increase the level of consumption, saving, investments, financial intermediation of household, by contributing in reducing poverty and improving the overall economic growth perspective (Ratha et al, (2011)).

Albania, represent an interesting case where migration is a very widespread and well-known phenomenon. Many Albanians have relatives or friends, who work or live abroad. In 2017, it is estimated that 1.21 million Albanians or 42.7% of the Albanian population live outside the borders of Albania (UN DESA 2017, 2019, World Bank 2017) and 98 % of Albanian migrants have moved to the top five destination countries (World Bank, 2019). At the macroeconomic level, remittances in Albania constitute at one of the largest foreign exchange inflows coming from abroad and are an important source of financing the balance of payments. On average during the period 2008-2018, remittances are estimated at 11.7% of GDP (Bank of Albania, 2019). Aggregate remittance data, although indicate their importance at macro level, show less about their importance at the household level. Most of the paper that have discussed the phenomenon of remittances in Albania are focused mainly on the characteristics of emigrants and their motives for remit (Gëdeshi (2000), Frashëri, (2007), Zanger-Siegel, (2007), (Abazaj (2011), Gëdeshi-Jorgoni (2012)), without analyzing the impact of remittances on poverty.

This article based on household level data from the first wave of the Albanian Household Wealth Survey (AHWS), developed by the Bank of Albania in early 2019 analyzes the impact that remittances have on poverty in Albania. The data obtained from this survey show that 23% of Albanian households received income from migrants during 2018, and it is estimated that remittances are the second most important source of income. In addition empirical results based on probit model show that remittances negatively affect the probability of Albanian households being poor.

The article is organized into three parts. The second part makes a summary of the methodology and the data collected from the Albanian Household Wealth Survey and continues with the presentation of the empirical model. While in the third and fourth part are discussed the results and the main findings of this article.

2. METHODOLOGY:

In this article, the main source of data are households level data obtained from the first wave of the Albanian Household Wealth Survey (Dushku, 2019), conducted by Bank of Albania in 2019. This survey was based on the HFCS (Household Finance and Consumption Survey) methodology, applied by all national central banks in European Union and was adapted based on the features of Albanian households. The main purpose of this survey is to obtain detailed information on Albanian households, in terms of income, expenditures, real and financial assets of households, employment status and education level of all household members, etc. Albanian Household Wealth Survey was conducted in cooperation with Instat (Institute of Statistics), which collected the data through face-to face interviews methods, during the period March-April 2019 and provided the household sample. The sample design was based on the use of probability sampling, in order to have a full representation of all households and the population size on twelve region in Albania were used as stratification criteria. Despite different data on balance sheet of Albanian households we have collected data whether households have received remittances and to what amount. So, the two main questions from the survey that we have taken in consideration related to migration and remittances are:

- Have you or any households member received remittances during 2018?
- How much (annual) remittances did you or your family receive during 2018?

We have to emphasize that this is not a migration or remittance survey, so we have shortage of information about the reasons that Albanian migrate, remit or for what they use remittances. However, taking into account the advantage of disaggregate data on household level, our aim is analyze the impact that remittance have on poverty on Albanian households.

Dushku, (2019) by using the data of AHWS has found that 23% of the total households have received remittances in 2018. On average, households have received 2018 euro annual inflow remittances, which varies on different household groups and regions. The data showed that remittance-receiving households were mostly located in the region of Tirana, Elbasan and Vlora. While based on the inflow of remittances, the most beneficiaries households were those located in the region of Elbasani, Durrësi and Tirana.

In addition we have estimated the importance of remittances for household income. Based on the detailed information that we have for all sources of household income we have found that remittance are the second most important source of income, accounting for 14 % -23 % of total income, after labor income which accounts for 49% to 64% of the total income. While other sources of income such as social contribution, rent or interest income comprise 20 % or less of total labor income.

Since we attempt to explain the impact that remittances have on household poverty first we will describe some characteristics of households taking into consideration the differences among the remittance-receiving households and no-remittance-receiving households. The data in table 1 show that remittance-receiving households have on average fewer household members, fewer children under the age of 5 and low number of male over the age of 15 comparing to the no-remittance-receiving households. In addition the no-remittance-receiving households have on average more female over the age of 15 and older household head. The data reveal minor differences on the number of household members over age 15 with primary and secondary education but show that remittance-receiving households have less household members with tertiary education. Both groups differentiate in terms of average monthly household per capita expenditure (excluding remittances), which show that remittances are very crucial for the remittance-receiving households group.

Table 1: Features of No-Remittance-Receiving Household and Remittance-Receiving Household

	No-Remittance-Receiving Household	Remittance-Receiving Household
Human capital		
Mean number of member over age 15 with primary education	1.77	1.76
Mean number of member over age 15 with secondary education	1.14	1.12
Mean number of member over age 15 with university	0.42	0.38
Households characteristics		
Mean age of household head (years)	55	60
Mean education of household head (years of education)	10.3	9.7
Mean household size	3.8	3.2
Mean number of males in households over age 15	1.68	1.58
Mean number of females in household over age 15	1.64	1.69
Mean number of children in household under age 5	.16	.13
Wealth		
Mean value of house (in million ALL)	5.98	5.73
Median monthly household per capita expenditure (excluding remittances) in ALL	10,851.25	3,388.34
Median monthly household per capita expenditure (including remittances) in ALL	10,905.08	11,525.51
area (1=Nord, 2=Centre, 3=South-East, 4=South)	2.22	2.26
Number of households	1,569	537

Through our econometric analysis, we aim to model the impact of receiving remittances on household poverty. Based on the work of Raihan et al. (2009), Wurku and Marangu (2015) and Abbas et al. (2014), we have estimated a probit regression model as follows:

$$P\_H^*_i = x_i`\beta + \mu_i$$

Where P_H_i is a dummy variable, which is used to define whenever the households is consider poor or not, x_i are exogenous variables and μ_i is a random disturbance. A households is consider poor if the gap between poverty threshold line[4] and household income $(H\_income^*_i)$ is positive, otherwise non-poor. Poverty threshold line is determine as the minimum of income needed

[4] *Determine as the minimum of income needed to cover basic needs (World Bank, 2019)*

to cover basic needs (World Bank, 2019) based on Foster-Greer-Thorbecke index[5].

$$\boldsymbol{P\_H_i} = \begin{cases} \mathbf{1}\ \boldsymbol{if}\ Poverty\_line^{*} - H\_income_i > \mathbf{0} \\ \mathbf{0}\ \boldsymbol{if}\ Poverty\_line^{*} - H\_income_i \leq \mathbf{0} \end{cases}$$

While the probability of a household being poor is determined as follows:

$$Pr\ (y_i = 1|x_i\ \beta) = Pr\ (Poverty^{*}_i > 0\ \ = Pr\ (\ x_i`\ \beta + \mu_i > 0) = 1\text{-}F_u\ (\text{-}x_i`\ \beta)$$

Where $\boldsymbol{F_u}$ is the cumulative distribution function of $\boldsymbol{u}$,

Both income and consumption observations are available from the AWHS data, however our measure of poverty indicator is based on consumption data. One reason for this preference is that consumption is less subject to short term economics shock and usually income are underestimated. As exogenous variables we have include those variables, which tend to capture the characteristic of households head and those of the households. We have added dummies variables for the gender, marital and occupation status of the household head and also the years of education for him. We have entered the numbers of people in the households and the number of children under 5 years old to take to account the difference between households. In addition we have included a dummy variable equal to one when household had received remittances during the past year to investigate the impact that remittances had on poverty. Also, we have added household expenditure per capita (excluding remittance) to estimate the effect of income on the probability of households on being poor.

3. RESULTS:

Since our aim is to investigate the impact of remittances on poverty, the estimated results for 2,106 households are shown in the table 2. In the column 1 we have presented the impact that remittances have on household poverty, whereas as poverty line we have used the World Bank definition. In order to test the robustness of our results in the column 2 and 3 we have presented the results, where household poverty is based on the OECD definition[6].

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5 *The index is calculated as follows* $Poverty_\alpha = \frac{1}{N}\sum_{i=1}^{H}\left(\frac{z-y_i}{z}\right)^{\alpha}$*:*
Where, H is the total number of poor households, whose income lie below the poverty line, y_i is the expenditure (or income) of the ith individual households, N is the total number of households and z is the poverty line. We have used as a measure of the poverty line the daily per capita income proposed by World Bank in 2019 which is 3 $ per day for developing countries. α is a parameters index, which takes the value of 0, 1 and 2 and is used to calculate different measures of poverty..

6 *The at-risk-of-poverty rate is the share of people with an equalized disposable income (after social transfer) below the at-risk-of-poverty threshold, which is set at 60 % of the national median equalized disposable income after social transfers. The equalized disposable income is the total income of a household, after tax and other deductions, that is available for spending or saving, divided by the number of household members converted into equalized adults; household members are equalized based on two scale, the number of households and their square.*

Table 2: Estimated results based on probit model regressions

	I-wb poverty line	II-60 % of the median of expenditure per capita	III-60 % of the median of equalized expenditure
Head: Male	0.248***	0.352***	0.226***
p-value	*(0.009)*	*(0.002)*	*(0.040)*
Head: Age	0.016**	-0.031***	0.007
p-value	*(0.053)*	*(0.001)*	*(0.458)*
Head:Age2/100	-0.020**	0.013	-0.012
p-value	*(0.024)*	*(0.205)*	*(0.228)*
Head: Married	0.072	-0.075	-0.239**
p-value	*(0.496)*	*(0.554)*	*(0.047)*
Head: Years of education	0.059*	0.030	0.042
p-value	*(0.085)*	*(0.461)*	*(0.302)*
Head: Years of education2/100	-0.774***	-0.685***	-0.709***
p-value	*(0.000)*	*(0.003)*	*(0.003)*
Head: Unemployed	0.300***	0.316***	0.271***
p-value	*(0.003)*	*(0.001)*	*(0.006)*
Number of persons in the households	*0.251****	*0.215****	*-0.031*
p-value	*(0.000)*	*(0.000)*	*(0.227)*
Number of children under 5 years old	0.115	0.188*	0.136*
p-value	*(0.125)*	*(0.010)*	*(0.075)*
Household expenditure per capita (excluding remittances)	-0.088***	-0.013***	-0.061***
p-value	*(0.000)*	*(0.000)*	*(0.000)*
Receipt of remittances	-0.701	-0.405	-0.712
p-value	*(0.000)****	*(0.000)****	*(0.000)****
Number of households	2102	2102	2102

*Note: ***, **, * denote significance at the 1%, 5% and 10% level, respectively*

The estimated results show a negative and significant results of remittance on poverty, which is in line with literature that remittances increase the level of income of households receiving remittances, as result increase the level of consumption and savings. Then this rise of income diminish household vulnerability and as results reduce household poverty. We have found that larger households are more likely to be poor. Also our results show that occupation status of household head affect positively the probability of household being poor. Education level of the household head has a u-shaped effect on the probability of being poor, which confirm that higher level of education is associated with lower probability of household to be poor. We have found that household expenditure per capita effect negatively the probability of household being poor, while about the impact of household head age we have found mixed results.

4. CONCLUSIONS:

Generally households are characterized by a considerable level of heterogeneity, not only in terms of their finances, but also in terms of the behavior towards them. This has led to greater attention to micro-level data analysis in order to better illustrate the heterogeneity that exists in households data. Following the latest financial crisis, household's data are used to assess the financial vulnerability of the household based on different socio-economic

factors. Furthermore, these data are used to identify those groups that are most vulnerable to various risk factors and how they may impair financial stability.
The results of the first wave of Albanian Household Survey data confirm that remittances continued to be an important source of Albanian household income during the last decade. In Albania 23% of households have received remittances, with an annual average flow of remittances per household at around 2,000 euro. Tirana, Elbasan and Vlora were the most beneficiaries regions in terms of amount and percentage of households, which received remittances. The empirical results confirm that remittances have reduced the probability of household on being poor, which is in line with literature that remittances increase the level of income of households receiving remittances, as result increase the level of consumption and savings and reduce poverty. When controlling for other variables, we find a u-shaped relationship between education and poverty. We find that household size and occupation status of household head as unemployed affect positively the probability of households being poor.

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THE BANK LENDING CHANNEL AND MONETARY TRANSMISSION IN CENTRAL, EASTERN AND SOUTH EASTERN EUROPEAN COUNTRIES

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1. INTRODUCTION

Determining the nature of the monetary transmission mechanism in a market economy is quite difficult, but this task becomes even more difficult for transition economies (Wróbel and Pawlowska, 2002; Golinelli and Rovelli, 2005). During the planned-economy era and the early-transition period, there was no market type economy monetary transmission mechanism in these economies due to the underdevelopment of financial institutions and markets. Furthermore, this mechanism couldn't be evaluated, since there was no data generation and collection process. By the mid-90s, institutions and financial markets developed sufficiently for policymakers to start utilizing traditional monetary transmission mechanisms, monetary policy tools, resulting in consistent and purposeful monetary policy. Data availability still limits policy experts to perform quantitative analyses (Gavin and Kemme, 2004).

The analysis of the monetary policy transmission mechanism in transition economies is crucial for a comprehensive understanding of the way in which a change in a central bank's interest rate instrument affects inflation. The latter is at the focus of an inflation targeting regime, which is adopted by a large number of transition countries as a monetary policy framework. This article investigates the functioning of the bank lending channel of the monetary policy transmission in ten Central, Eastern and South Eastern European (CESEE) countries over the period 2010-2018, using micro bank-level data mainly from Bankscope database, but also other supplementary sources, and controlling for cross-country heterogeneities. It aims at examining: (i) whether monetary conditions affect bank lending in selected CESEE countries; (ii) whether there is any linear relationship between certain bank characteristics (size and capitalisation) and the loan growth rate; (iii) the effectiveness of the bank lending channel, by looking whether there are distributional effects due to the bank's characteristics in the impact of monetary policy on bank lending. Most of existing literature on this topic consists of country-specific studies, whereas in this article the analysis is performed for a pool of selected CESEE countries controlling for cross-country heterogeneities.

The monetary transmission mechanisms in Central and Eastern Europe that use micro data-based evidence, applies mainly the generally used approach of Kashyap and Stein (1995, 2000), which relies on discovering asymmetric movements of loans quantities, with respect to certain bank characteristics. De Bondt (1998, 1999) was among the first to provide empirical evidence on

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bank lending channel in Europe using individual bank data. However, these two studies did not conclude on a clear-cut conclusion since the results were dependent on the monetary policy indicator, as well as on the econometric methodology used. Favero et al. (1999) investigated the response of bank loans to a monetary tightening in 1992 in France, Germany, Italy and Spain. They found no evidence on the bank lending channel in any country they considered.

Wróbel and Pawlowska (2002) analyse the bank lending channel for Poland for 48 commercial banks, from 1995 to 2002. They find that the long-run effect of an increase in the interest rate on bank lending is smaller for a bigger bank; for capitalisation, the long-run effect of an increase in the interest rate on bank lending is smaller for more capitalised banks. Credit channel appears to operate mainly through small, poorly capitalised banks. A more recent study by Havrylchyk and Jurzyk (2005) is conducted on the existence of the bank lending channel in Poland for the period 1997-2002 and 67 banks (commercial banks and a few biggest cooperative banks). When the usual bank specific characteristics (size, liquidity and capitalisation) are considered, there is no evidence on bank lending channel of the monetary policy transmission. The inclusion of a variable which accounts for the ownership structure changes the results. In the latter case, small, less liquid banks expand their loan portfolios faster, while capitalisation becomes less important (as foreign banks are much better capitalised).

Juks (2004) studies the bank-lending channel in Estonia, using quarterly data from 1996 to 2004. The empirical results provide evidence in favour of the bank-lending channel. First, well-capitalised banks seem to experience a smaller outflow of deposits after a monetary contraction. As a consequence, a monetary policy shock that leads to a drain of deposits from the banking sector has the highest effect on deposits of less capitalised and more risky banks. Second, the liquidity position of banks seems to be an important determinant of loan supply, suggesting that more liquid banks are able to maintain their loan portfolios; yet, less liquid banks must reduce their loan supply after a monetary policy contraction.

Using quarterly data for the period 1996 to 2001, Pruteanu (2004) analyses the overall effect of the monetary policy changes on the growth rate of loans and the characteristics of the supply of loans in Czech Republic. Monetary policy changes alter the growth rate of loans with stronger magnitude in the period 1999-2001 than during 1996-1998. For the period 1996-1998, the cross-sectional differences in the lending reactions to monetary policy shocks are due to the degree of capitalisation and liquidity. For the subsequent period of 1999 to 2001, the distributive effects of the monetary policy depend on the bank size as well as the bank's proportion of classified loans.

The existence of the bank lending channel in Hungary is examined by Horváth, Krekó and Naszódi (2006) using quarterly data, from 1995 to 2004. Besides the usual bank specific variables (size, liquidity and capitalisation), the authors consider the foreign ownership as well. The novelty of this study is that it tests whether demand of loans can be considered homogenous across banks with respect to some bank-characteristics. The empirical evidence shows that the demand for loans can be considered reasonably homogenous across banks with respect to the share of foreign ownership and the size of banks. The main findings in terms of bank lending channel are that an increase in the policy rate induces a larger increase in the average cost of funding for smaller, less capitalised banks and for banks with a higher domestic share.

The following section describes the model applied, as well as the data used for the empirical analysis of this study.

2. METHODOLOGY

2.1 EMPIRICAL MODEL

Kashyap and Stein (1995) develop a theoretical model and use disaggregated bank balance sheet data to assess whether a lending channel exists in the US. They argue that the loan portfolios of banks of different sizes are expected to respond differently to a monetary policy contraction. In line with their model and other more recent empirical studies (see, e.g., Gambacorta, 2005; Gambacorta and Mistrulli, 2004; Bertay et al., 2012), this article uses an autoregressive model, in which the presence of a lending channel is tested by considering two bank characteristics: bank size (log of total assets) and capitalization (equity to asset ratio), Kashyap and Stein (1995a, 1995b, 2000) and Kishan and Opiela (2000) claim that small banks are more prone to the problem of information asymmetry than large banks, which should be reflected in the higher sensitiveness of small banks to monetary policy shocks unlike large banks that can issue market instruments such as certificate of deposits. Evidence provided by Kishan and Opiela (2000, 2006) show that poorly capitalised banks reduce their loan supply more than well capitalised banks after a monetary contraction, due to their limited ability to utilize uninsured sources of funds.

In this article, we examine how changes in the short-term interest rate affect the total loans supplied by banks and whether banks with varying characteristics react differently to monetary policy shocks, using the following model specification, as proposed by Kashyap and Stein (1995):

$$\Delta lnL_{i,t} = \sum_{j=1}^{p} \alpha_j \Delta lnL_{i,t-1} + \sum_{j=0}^{p} \beta_j \Delta MP_{t-j} + \gamma z_{i,t-i} + \sum_{j=o}^{p} \delta_j \Delta MP_{t-j} z_{i,t-1} + \sum_{j=0}^{p} \varphi_j \pi_{t-j} + \sum_{j=0}^{p} \eta_j \Delta lny_{t-j} + \mu_i + \varepsilon_{it} \qquad (1)$$

Individual banks are denoted *i (i =1, ..., N), and t (t=1, ..., T)* indicates the time observation for each variable; T is the number of time periods available for each bank i, and p is the number of lags. L is the dependent variable, namely (the natural logarithm of) the volume of loans supplied by bank i in year t; the parameter MP is the monetary policy stance indicator for each of the countries, captured by the short-term interest rate, and computed as the annual average of the monthly interest rate values. According to lending channel theory, the coefficient β should be negative: as interest rates increase, banks decrease the amount of loans supplied.

Since the main objective of this article is to investigate whether the monetary authorities can affect loans supply, it becomes necessary to account also for loan demand movements, which are captured by real GDP growth and inflation, that are denoted as y and π, respectively. Variables such as real GDP or inflation rate have traditionally been added to the model. The introduction of these two variables allows us to capture the cyclical movements and serves to isolate the monetary policy component of the interest rate changes (Gambacorta, 2005). To control for the existence of distributional effects of monetary policy among banks, the following indicators are utilized for the bank characteristics, incorporated in the variable (z): bank size and capitalization, in line with the empirical studies mentioned earlier in this article. Size is computed as the natural log of total assets and capitalization as the share of equity to total assets.

The banks' individual characteristics are normalized with respect to their mean across all banks in the sample, in order to make the average measure of a characteristic to add up to zero over all the observations. This means that for the regression (1), the mean of the interaction terms $\Delta MP_{t-j}\, z_{i,t-1}$ is also zero, and the parameters β_j are directly interpretable as the average effect of the monetary policy on loans.

$$Size_{it} = logA_{it} - \frac{\sum_{i=1}^{N} logA_{it}}{N_t}$$

$$Capitalization_{it} = \frac{E_{it}}{A_{it}} - \frac{\sum_{t=1}^{T}\left(\frac{\sum_{i=1}^{N}\left(E_{it}/A_{it}\right)}{N_t}\right)}{T} \qquad (2)$$

The categorization of a large bank may change with varying market conditions, since banks which are considered to be small on a market with a deeper financial sector, might be regarded as medium-sized or large in a smaller market. Therefore, size is a variable that captures the possible bank-specific asymmetries as deviations from each period's mean. This removes the upward trend which can be observed in banks assets. Contrary to size, capitalisation is a less relative measure. For capitalisation, the overall sample mean (across banks and over time) is removed from each observation, allowing the interpretability of parameters β_j, without removing the trend from a possibly changing financial market (Ehrmann et al., 2003).

The model allows for bank-specific effects (μ_i). The parameters of interest are those in front of the monetary policy indicator (β_j), which capture the direct overall impact of monetary policy changes on bank lending growth, and the coefficients before the first order interaction terms (δ_j). The latter capture the distributional effects of monetary policy stance which is expected to be weaker among larger or better capitalized banks. Here the fundamental assumption is that size is a proxy for information friction or problems (adverse selection, moral hazard) so that smaller banks being more opaque have bigger difficulties in restructuring their portfolio of loans and other assets. Large banks on the other hand, may find it easy to raise funds to compensate for the effects of a contractionary monetary policy. They can use these funds to grant loans. But, as rates increase, they can lose loans to substitute source of financing. The effect of capital on the response of loans to monetary policy changes is expected to be positive. As banks become better capitalized, the amount of loans it provides becomes less sensitive to the policy. A positive and significant parameter (δ_j) implies that smaller and less capitalised banks react more strongly to monetary policy changes. Furthermore, if the coefficients on these cross terms are positive and statistically significant while the coefficient associated to ΔMP is negative, then the lending channel is at work. Conversely, if the coefficients on the interaction terms do not differ significantly from zero, then there are no loan supply effects from monetary policy at least based on this methodology. The coefficient in front of the bank characteristics has an illustrative role; it describes whether there is a linear relationship between the growth rate of loans and the bank characteristics. In other words, the situation when the coefficient β_j is statistically significant and negative, and the coefficient δ_j statistically positive represents the existence of the bank lending channel in these countries.

Specifically, in this article we will focus on the following hypotheses:

$$\text{Hypothesis 1: } \frac{\delta^2 L_{i,t}}{\delta size_{i,t} \delta MP_t} > 0$$

$$\text{Hypothesis 2: } \frac{\delta^2 L_{i,t}}{\delta cap_{i,t} \delta MP_t} > 0 \qquad (3)$$

where $L_{i,t}$, $size_{i,t}$, and $cap_{i,t}$ represent bank i's loans, size and capitalization in year t, respectively, while MP denotes the proper interest rate measuring the monetary policy stance, where higher values of MP correspond to tighter monetary policy. It should be emphasized that the rationale behind accounting for the first order interaction terms is that the effect of monetary policy on bank loans should depend to a large extent on the balance sheet strength of the bank. It is worth noticing that bank characteristics variables, either in their linear forms or in the first order interaction terms, have been included in their lagged forms, as it can be understood from equation (1) specification. The reasoning behind this is that since bank characteristics are items of bank balance sheet, they might be highly correlated with the loan variable $L_{i,t}$.

The dynamic structure provided in the model specification (1) leads to more efficient and consistent estimates through the one-step difference Generalized Method of Moments (GMM) as proposed by Arellano-Bond (1991). This technique tackles the possible endogeneity issue present in the model and ensures consistent parameter estimates by choosing instruments for the lagged dependent variable so that the sample correlations between the instruments and the model's error term are as close to zero as possible (see Hamilton, 1994). This estimator instruments a first-differenced endogenous regressor in equation (1) with its lagged levels. The main idea behind this estimator is that past (lagged) levels are often predictive of current changes (Δx_{it}). Further, second or even deeper lagged levels of an endogenous regressor ($x_{i,t-p}$ for $p \geq 2$) are available as instruments for its first-differenced endogenous regressor (Δx_{it}) because, unlike the mean-deviations transform in standard fixed-effect estimations, second or deeper lagged levels of the endogenous regressor ($x_{i,t-p}$ for $p \geq 2$) remain orthogonal to the error term ($\Delta v_{it} = v_{it} - v_{it-1}$) (Roodman, 2009).

Consistency of the GMM estimator depends on the validity of the instruments, which is verified by two specification tests suggested by Arellano and Bond (1991), Arellano and Bover (1995), and Blundell and Bond (1998). The first is the Sargan (1988) (or Hansen) test of over-identifying restrictions, which examines the overall validity of the instruments. Under the null hypothesis of the validity of the instruments, the statistic associated with this test has a chi-squared distribution with (J-K) degrees of freedom where J is the number of instruments and K the number of the independent variables in the regression. The second test, the so-called Arellano-Bond test, is applied to control for the presence of autocorrelation in the first-differenced residuals, and to determine the number of lags available for instruments. Under the null hypothesis of no second-order correlation, the statistic associated with this test has a standard-normal distribution. Failure to reject the null hypotheses of both tests confirms the validity of our specifications.

2.2 DATA DESCRIPTION

This study employs disaggregated data based on financial statements derived mainly from Bankscope, provided by Bureau van Dijk (BvD), but also supplemented with the data and information from annual reports of the banks, from the respective central banks of the countries and from the International Monetary Fund, International Financial Statistics. The dataset (at an unconsolidated level) consists of annual observations from 10 CESEE countries[2] over the period 2010-2018 covering 266 individual banks, characterized by different types of ownership: commercial banks, savings

[2] *Albania, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Hungary, North Macedonia, Poland, Romania and Serbia.*

banks, cooperative banks and investment banks, but it is an unbalanced panel, since there are some missing values at some time observations for some of the countries. Ashcraft (2006) and Gambacorta (2005) provide a discussion and evidence indicating that annual observations are appropriate for lending equations, thus affirming the utilization of this database for our study. Moreover, disaggregated data on banks can effectively capture the distributional effects of monetary policy through a lending channel (Bernanke and Blinder, 1992).

Two worries about the quality of the data arise from the wide variation in practices regarding the writing off of non-performing loans and the absence of consistent information on the amount of non-performing loans across banks. First, the degree to which estimated loan growth is distorted by this consideration depends on how the misreporting of total loans net of write-offs changes over time for each bank. Second, any under-provisioning against non-performing loans results in an overstatement of both bank equity and total assets. These potential data problems must be considered when interpreting the regression results (Fries, Taci, 2002).

Due to the short time span and sample heterogeneity, the banks are clustered in groups according to the progress in banking reform captured by the EBRD (2020) transition indicators as published in the Transition Reports and ATC scores database. A simple mean of this indicator is computed for the period 1989-2016, in order to take into account both the initial conditions and the entire evolution of banking reform for each of the considered countries. The countries are divided in three groups: the first one comprises the least developed ones, such as: Albania, Bosnia and Hercegovina and Serbia (economies where the average index of banking reform is situated between 2.14 and 2.67); the second group consist of Bulgaria, Romania and North Macedonia (an average banking reform index between 2.74 and 2.86), and the third group includes: Croatia, Poland, Hungary and Czech Republic (with an average index of the banking reform between 3,14 and 3.55).

3 EMPIRICAL RESULTS

3.1. EVIDENCE ON THE AGGREGATE LEVEL FOR EACH GROUP OF COUNTRIES

First, a 'benchmark model' is estimated for all country groups, which does not include the bank characteristic (z) and the interaction between the bank characteristics and the monetary policy indicator $\Delta MP_{t-j}\, z_{i,t-1}$. This will give us a preliminary insight into whether the loan growth responds to monetary policy changes and to macroeconomic conditions. The full model, given by the equation (1) will be referred to as the 'extended model'. The estimations are done separately for each group of countries.

The tables below summarise the results of the estimation of the 'benchmark' and the 'extended' models for total loan growth, first for the whole sample, and then separately, for each group of countries. The reported figures represent the long-run elasticities of the models.

The long-term coefficient of a variable is computed as the sum of its coefficients (of its lags and current values, where applicable) divided by one minus the sum of the coefficients of the lags of the dependent variable. For instance, the long-run elasticity of the dependent variable with respect to monetary policy for the average bank is given by $\sum \beta_j / (1 - \sum \alpha_i)$.

Table 1. 'Benchmark model' (equation (1)) (long term coefficients).

Dependent variable	Growth rate of total loans		
Specifications	(1st group)	2nd group)	3rd group)
Monetary policy	-0.048*** (0.002)	-0.069* (0.069)	-0.028* (0.064)
GDP growth	0.067*** (0.000)	0.004 (0.661)	0.024** (0.037)
Inflation	0.097*** (0.000)	0.073*** (0.000)	0.023* (0.809)
p-value Hansen	0.293	0.247	0.166
p-value AR1/AR2	0.0035/0.248	0.006/0.534	0.144/0.603
No. obs./ No. banks	261/56	244/51	470/124

Note: p-values in parentheses.
, **, * denotes significance at 10%, 5%, and 1% level, respectively.*

Several diagnostic tests are performed to verify that the individual models satisfy all of the necessary assumptions. Throughout all tables we report the outcomes of the Arellano-Bond (1991) test for first and second order autocorrelation of the residuals, which constantly show that we cannot reject the null hypothesis of no second-order autocorrelation. Since the estimator is in first differences, first-order autocorrelation does not imply inconsistent estimates. Robust estimators are used to correct for heteroscedasticity. The Hansen test does not reject the overidentification conditions. If the null cannot be rejected, the model is supported (Roodman, 2009) and this is the case throughout the paper (see the p-values at the bottom of the tables).

Regarding the monetary policy effects on the growth rate of total loans, changes in the policy-induced interest rate have a negative and significant impact in the three groups of countries; thus, the theory of bank lending channel holds for the all the groups based on this version of the model: loans tighten after a monetary policy contraction. With regards to the impact of macroeconomic conditions, the influence of GDP growth is positive for all the groups, but statistically significant only for the first and third one, while inflation affects positively and significantly the loan growth in all the country groups.

In the extended version of the model, we add consecutively banks' characteristics and their interaction with monetary policy rate and we concentrate on the significance of the linear relationship between the growth rate of total loans and the banks' characteristics - the coefficient γ in equation (1) - and of the distributive effects of monetary policy on the growth rate of loans due to these bank characteristics, i.e. the interaction coefficients δ_1 in the same equation. As in the case of the benchmark model, we estimate the extended version for all the three country groups. The estimated results are presented in Table 2.

Table 2. 'Extended model' (equation (1)) (long term coefficients).

Dependent variable	Growth rate of total loans					
Specification	1st group		2nd group		3rd group	
MP	-0.055* (0.052)	-0.033* (0.069)	-0.086** (0.016)	-0.079** (0.042)	-0.045 (0.380)	-0.048** (0.0362)
Size	-0.372*** (0.000)		-0.0159 (0.478)		0.229*** (0.000)	
Size*MP	0.025*** (0.003)		0.001 (0.923)		0.006 (0.612)	
Cap		0.025** (0.016)		0.036*** (0.000)		0.020*** (0.000)
Cap*MP		0.001 (0.648)		0.004 (0.591)		0.002 (0.235)
GDP growth	0.049 (0.191)	0.042*** (0.001)	0.034*** (0.009)	0.011 (0.329)	0.034*** (0.004)	0.011** (0.030))
Inflation	0.015** (0.041)	0.014 (0.251)	0.091*** (0.000)	0.05*** (0.001)	0.043*** (0.0003)	0.032*** (0.000)
p-value Hansen	0.346	0.279	0.141	0.295	0.403	0.209
p-value AR1/AR2	0.0269/0.1833	0.0361/0.164	0.037/0.521	0.013/0.38	0.05/0.747	0.217/0.554
No. obs./ No. banks	261/56	249/56	194/39	243/51	359/106	467/123

Note: p-values in parentheses.
, **, * denotes significance at 10%, 5%, and 1% level, respectively.*

The theory of bank lending channel still holds for all the groups, but the size of the effects of monetary policy on banks' lending varies across the different specifications. The results reveal a linear negative relationship between bank size and the loans growth rate for the countries with the least developed financial system and those with a moderate level of financial development (i.e. the first and second group, respectively), even though for the latter the effect is statistically insignificant. This indicates that on average, for these countries, small banks enjoy higher loan growth rates; while the opposite holds for the most advanced countries, where the coefficient before the bank size is positive and statistically significant. The interaction term between monetary policy and bank size presents a significant positive coefficient only for the first group of countries, supporting the previous findings that small banks are more sensitive to monetary contractions compared to bigger ones; whereas for the two other group of countries, bank size does not affect the loans growth in the aftermath of a monetary policy tightening for none of the banks.

Capitalization seems to be an important variable in explaining bank loan supply behaviour for all the groups: better capitalized banks are less likely to decrease their lending (ceteris paribus). This means that well-capitalised banks enjoy higher loan growth rates. The overall analysis demonstrates a positive coefficient for the interaction term between capitalisation and the monetary policy for all the groups, but none of these coefficients result to be significant, implying that capitalisation does not influence the growth rate of total loans to clients in the aftermath of a monetary policy change based on this specification of the model and on country group level analysis.

The effects of the macroeconomic indicators that account for demand movements are robust across the different models. The long-run elasticity of credit to GDP is always positive and significant in most of the cases. The response of credit to prices is always significant and positive as well. It is worth noting that the coefficient on inflation picks up both the positive effect of inflation on nominal loan growth and the potential negative effects of higher inflation via higher nominal interest rates. It seems that the first effect has dominated for all groups in our case.

The analysis at the aggregate level for each group of countries does not show significant results in terms of bank characteristics for all the cases, which could come from the existing heterogeneity among banks, inside each group. Consequently, it would be more appropriate to examine the impact of bank characteristics on the growth rate of loans through an analysis on single countries in a pooled regression for each group.

3.2 EVIDENCE ON SINGLE COUNTRIES

In this section, we extend our model with some dummy[3] variables, in order to account for cross-country differences within each group, by allowing the parameters of interest, i.e. those of the monetary policy indicator and the interaction between banks' characteristics and the monetary policy indicator to vary across countries. The loan demand elasticities with respect to GDP and inflation are supposed to be homogeneous across banks inside each group. This extended version of the model can be written as below:

$$\Delta lnL_{i,t} = \sum_{j=1}^{p} \alpha_1 \Delta lnL_{i,t-1} + \sum_{j=0}^{p} \beta_j \, \Delta MP_{t-j} * dcountry + \gamma z_{i,t-i} + \sum_{j=o}^{p} \delta_j \, \Delta MP_{t-j} z_{i,t-1} * dcountry + \sum_{j=0}^{p} \varphi_j \pi_{t-j} + \sum_{j=0}^{p} \eta_j \, \Delta lny_{t-j} + \mu_i + \varepsilon_{it} \qquad (2) \qquad (4)$$

Table 3 summarizes the estimation results, which reveal differences between the three groups of countries, both in terms of magnitude and significance.

[3] *These variables are binary and take value 1 for a certain country and 0 for all the others.*

Table 3. 'Extended model' for bank size (equation (2)) (long term coefficients)

Dep. variable	Growth rate of total loans					
	1st group		2nd group		3rd group	
Control variables						
MP	Albania	-0.14* (0.09)	Bulgaria	-0.082** (0.038)	Croatia	-0.02** (0.04)
	Bosnia-Hercegovina	-0.01* (0.084)	Romania	-0.031** (0.019)	Poland	-0.02** (0.028)
	Serbia	-0.01* (0.08)	North Macedonia	-0.09** (0.016)	Hungary	-0.036** (0.028)
					Czech Republic	-0.057* (0.092)
Size		-0.71*** (0.000)		-0.001 (0.971)		0.060*** (0.003)
MP*size						
	Albania	0.206*** (0.000)	Bulgaria	0.007 (0.680)	Croatia	0.016** (0.049)
	Bosnia-Hercegovina	0.171*** (0.002)	Romania	0.005 (0.652)	Poland	0.024*** (0.001)
	Serbia	0.005 (0.354)	North Macedonia	0.035* (0.06)	Hungary	-0.006 (0.269)
					Czech Republic	0.005 (0.934)
GDP growth		0.018* (0.05)		0.029** (0.011)		0.022** (0.028)
Inflation		0.01 (0.627)		0.046*** (0.000)		0.024** (0.043)
p-value Hansen		0.626		0.251		0.508
p-value AR1/AR2		0.015/0.280		0.029/0.678		0.01/0.692
No. obs./ No. banks		261/56		194/39		359/106

Note: p-values in parentheses.
, **, * denotes significance at 10%, 5%, and 1% level, respectively.*

As regards the effects of monetary policy on the growth rate of total loans, changes in the policy-induced interest rate have a negative and significant impact in all the considered countries, which complies with the results of the analysis performed earlier in this article. This reconfirms the bank lending channel theory: loans fall after a monetary policy tightening. These results represent the average impact of the monetary policy across all banks, which are considered to have the same weight, regardless of their market share or other characteristics.

Next we focus on the significance of the linear relationship between the growth rate of total loans and the bank characteristics and the distributive effects of monetary policy on the loans growth rate due to these bank characteristics for the three groups of countries. The test for the bank lending channel consists in checking whether the coefficients of interaction terms are statistically significant or not. If the coefficients on these cross terms are positive and statistically significant while the coefficient associated to ΔMP is negative, then the lending channel is at work. Conversely, if the coefficients on the interaction terms do not differ significantly from zero, then there are no loan supply effects from monetary policy at least based on this methodology.

The estimations reveal a significant linear negative relationship between bank size and the loans growth rate in the case of the 1st group of banks, implying that small banks from this group enjoy higher loan growth rates; while for the second group of countries this coefficient is insignificant. The most advanced countries are characterized by a significantly positive coefficient of size, indicating that large banks in these countries are the ones that take advantage of higher rates of loan growth. The interaction term between the monetary policy and bank size that represent the distributive effect of monetary policy changes due to bank size, results significant for some of the countries: Albania, North Macedonia, Croatia and Poland, meaning that size, as a bank characteristic, influences the loans growth in the aftermath of a monetary policy change for the banks of these countries, but not for the rest of the countries.

Table 4. 'Extended model' for bank capitalization (equation (2)) (long term coefficients)

Dep. variable	Growth rate of total loans					
	1st group		2nd group		3rd group	
Control variables						
MP	Albania	-0.16* (0.08)	Bulgaria	-0.103*** (0.000)	Croatia	-0.033*** (0.002)
	Bosnia-Hercegovina	-0.011* (0.087)	Romania	-0.038*** (0.001)	Poland	-0.025** (0.001)
	Serbia	-0.08** (0.010)	North Macedonia	-0.05* (0.054)	Hungary	-0.009** (0.000)
					Czech Republic	-0.051* (0.020)
Capitalization		0.033*** (0.000)		0.038*** (0.000)		-0.005 (0.226)
MP*cap						
	Albania	0.008 (0.645)	Bulgaria	0.009*** (0.003)	Croatia	0.004*** (0.000)
	Bosnia-Hercegovina	0.007 (0.865)	Romania	0.008** (0.048)	Poland	0.005*** (0.000)
	Serbia	0.002 (0.787)	North Macedonia	0.002 (0.831)	Hungary	0.001 (0.142)
					Czech Republic	0.003 (0.182)
GDP growth		0.055*** (0.000)		0.012* (0.066)		0.013*** (0.000)
Inflation		0.007 (0.627)		0.041*** (0.000)		0.027*** (0.000)
p-value Hansen		0.389		0.263		0.172
p-value AR1/AR2		0.002/0.691		0.01/0.174		0.22/0.586
No. obs./ No. banks		249/56		243/51		467/123

Note: p-values in parentheses.
, **, * denotes significance at 10%, 5%, and 1% level, respectively.*

Based on our results, capitalisation presents an overall significant linear and positive effect on the growth rate of total loans for the first two groups, but negative and insignificant for the third one. For the distributive effects of the monetary policy, the overall analysis reveals, in the case of the least advanced banks (first group), a positive coefficient for the interaction term between capitalisation and the monetary policy in all the countries, but the interaction coefficient is statistically significant only for Bulgaria, Romania, Croatia and Poland, confirming the theory: less capitalised banks are more affected by the monetary policy conditions in these countries. For the group of least advanced banks (first group), the coefficient of the interaction term is not significant, meaning that capitalisation, as a bank characteristic, does not influence the growth rate of total loans in the aftermath of a monetary policy change.

As regards the macroeconomic conditions' impact, the influence of GDP growth is positive and significant for all the groups; inflation which is also meant to account for demand factors, impacts positively the loan growth in all the groups, but not significantly in all the cases. These results are robust across the different model specifications comprising the ones in the former estimation results for country groups.

Other empirical studies have found similar results on the bank lending channel and the monetary transmission in these CESEE countries (see for instance Skufi (2020); Vika, Suljoti (2015); Vika (2007) for Albania; Kovacevic, D. (2015) for Bosnia Herzegovina; Kujundžić and Otašević (2012) for Serbia; Eliskovski (2018) for North Macedonia; Nenova et al. (2019) for Bulgaria; Wróbel and Pawlowska (2002) for Poland; Pruteanu (2004) for Czech Republic; Horváth, Kréko and Naszódi (2006) for Hungary; Vizek (2006) for Croatia, Jimborean (2007) for Romania and other selected CEEC countries etc.).

4. CONCLUSIONS AND POLICY IMPLICATIONS

This article investigates the functioning of the bank lending channel in 10 CESEE countries over the period 2010-2018, classifying the commercial banks of these countries in three groups according to the development level of their banking sector, captured by the EBRD banking reform criteria. Using disaggregated data mainly from Bankscope database, but also other supplementary sources, this article analyses: (i) whether monetary conditions affect bank lending; (ii) whether there are linear relationships between some particular bank characteristics (size and capitalisation) and the loan growth rate; and (iii) we examine the effectiveness of the bank lending channel, by looking whether there are distributional effects due to the bank's characteristics in the impact of monetary policy on bank lending.

The results reveal that bank lending contracts significantly after a monetary tightening both on group and country level. We find some significant linear effects of bank size on the growth rate of loans for the countries with the least developed financial system and the most advanced ones (i.e. the first and third group of countries, respectively), but with reverse signs (positive in the first case and negative in the second one), indicating that on average, for the least developed countries, small banks enjoy higher loan growth rates, whereas the opposite holds for the most advanced countries. Capitalisation presents an overall significant linear and positive effect on the growth rate of total loans for all the country groups, meaning that better capitalized banks are less likely to decrease their lending (ceteris paribus).

As regards the distributive effects of monetary policy on the loans growth rate due to these bank characteristics, our findings suggest that changes in the cost of funding engineered by monetary policy actions exert their maximum impact on small banks in Albania, North Macedonia, Croatia and Poland, and on less capitalised banks in Bulgaria, Romania, Croatia and Poland, confirming the theory that small and less capitalised banks are more affected by the monetary policy conditions in these countries, correspondingly. Furthermore, these banks are best placed to refinance the real economy, in particular small- and medium-sized firms, which are the biggest generator of employment in the economy. Large and more capitalized commercial banks, on the other hand, appear to be more competent to isolate their lending activities from changes in monetary policy conditions.

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THE IMPACT OF A CRISIS-INDUCED ECONOMIC SHOCK ON ALBANIA'S UNEMPLOYMENT RATE

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ABSTRACT:

The COVID-19 pandemic created, across the world, an unprecedented tribulation in the dynamics of most economic indicators, where as a result of this socioeconomic crisis, Albania's output growth experienced a deep negative shock. This research study examines the relationship between the unemployment rate and the output growth, under the condition that output growth undergoes drastic drop, as in the case of one triggered by the COVID-19 pandemic. The employed econometric model for the unemployment rate in Albania uses net labor flows, estimated by officially supplied labor market data. It is a VAR specification used to describe the responses of the unemployment rate to any simulated shock on each of the net labor flows, as well as the output growth series. The findings of this analysis rely on VAR's Impulse response functions, and the most important result is that for a single quarter 10 p.p. drop in the output growth, the annual change in the unemployment rate increases about 1.84 p.p. over 4 consecutive quarters.

KEY WORDS:

Okun's law, COVID-19, net flows, unemployment rate, labor market.

INTRODUCTION:

Since the 2007='08 financial crisis, the world entered an uncertain terrain of economic progression, hence traditional assessment methods of general economic activities started to become more and more archaic. Ever since, standard research analysis procedures and forecasting approaches are continuously updating to better tackle and keep up with the rapidly shifting trends of economic indicators. In 2020, the worldwide health-related, social and political decision-makings and policies – advanced as a result of the COVID-19 pandemic – have plunged the global economy in a seemingly prolonged depth of depression and uncertainty. Such drastic developments in the sphere of the real economy call for far-reaching means in the much needed discipline of research analysis and forecasting. One of the most reliable approaches in the resource arsenal of the latter is the class of autoregressive analyses, particularly vector autoregressive models.

The analysis in this research focuses on the case of a small developing economy such as Albania, and it attempts to examine the negative impact of the COVID-19 pandemic on the unemployment rate. To this end, the relationship between the unemployment rate and output growth is to be observed. The output growth of a small free market economy is certainly very sensitive to external shocks, particularly crises of such magnitude as COVID-19. This ties fittingly to Okun's (1962) seminal article known as Okun's Law, thus the theoretical foundation for the interrelation between the unemployment rate and output growth is provided by this law.

The research question is: How much would the annual change in the unemployment rate rise, in association with a sudden drop in output growth caused, by an external negative shock? (The external negative shock in this case, is a shock caused by a health-related crisis, such as COVID-19.) The goal of the study is to provide a quantified answer to this question.

LITERATURE REVIEW:

Research endeavors to provide labor market models stem from the necessity to develop realistic economic scenarios upon which fiscal and monetary policies can be developed. Several central banks, such as the US Federal Reserve and the Reserve Bank of Australia, use their monetary policy tools to ensure maximum sustainable employment (Federal Reserve Bank of Chicago, 2019; Lowe, 2019) in their respective labor markets. Other banks, including the Bank of Albania, consider price stability as their main policy target. Nonetheless, they should closely monitor their labor market climate and indicators, in order to adequately administer the monetary setting of their respective economies.

Labor market theory posits that output growth is among the most central statistics in helping estimate the dynamic of the unemployment rate. Efforts to relate changes in the unemployment rate to real output growth trace back to the 1960s, specifically to Arthur Okun's (1962) seminal article, better known as Okun's Law. The law arises from the assumption that a production of additional amounts of goods and services (output) in an economy requires additional labor. The latter can be assumed (among other economic occurrences) to emerge in the form of increased employment, thus decreased unemployment. Therefore, in theory, output growth is expected to be negatively correlated with unemployment. The so-called 'Okun changes equation' is as in the form below:

(i)

$$\Delta_i ur_t = \alpha + \beta \frac{\Delta_i RGDP_t}{RGDP_{t-i}} + \xi_t$$

where ur denotes the unemployment rate, RGDP denotes inflation-adjusted Gross Domestic Product, t denotes the current period, i denotes a constant number of periods, α denotes the percentage point increase in the unemployment rate associated with conditions of zero real output growth in a given period, and β is the so-called Okun's coefficient, which in essence reveals unemployment's degree of responsiveness to changes in real output growth.

One key aspect Okun did not focus on, at the time he conducted his groundbreaking research, is the possible presence of a lead-lag effect between economic activity and labor market developments in an economy, which may also appear in the inverse correlation between output growth and the unemployment rate. Several authors, including Sayfried (2005) and Brault & Khan (2019) have remarked and investigated this occurrence. Using quarterly data, the Reserve Bank of Australia (2014) has documented the lagging relationship between output growth and labor market indicators, concluding that the highest correlation between the two sets of variables is observed when labor market indicators lag output growth by 1 to 4 quarters.

Among the researchers who sought to theoretically expand on Okun's work were Dixon & Thomson (2000), Ball, et al. (2012), Lim, et al. (2018; 2019), and others. Dixon and Thomson (2000) were among the first who endeavored to conceptually identify the unemployment rate in terms of other indicators of labor market activity besides output growth, introducing levels and flows variables such as participation rate, working age population rate, and labour force and unemployment:

(ii)
$$\Delta_i ur_t = \left(\frac{\Delta_i L_t}{L_{t-i}} + \frac{\Delta_i POP_t}{POP_{t-i}}\right) - \left(\frac{\Delta_i RGDP_t}{RGDP_{t-i}} - \frac{\Delta_i APL_t}{APL_{t-i}}\right) + \xi_t$$

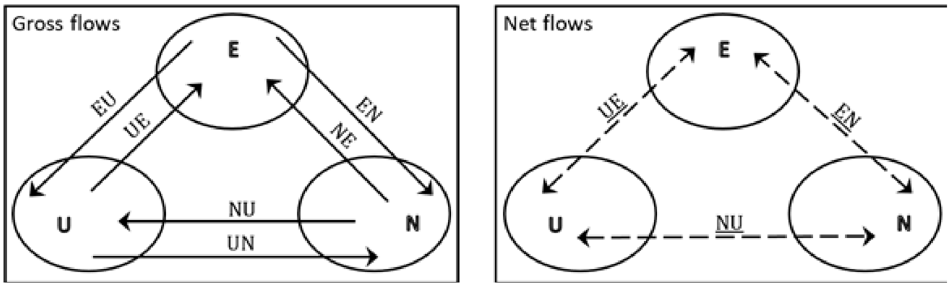
where POP denotes the working age population, L denotes the labor force, and APL can be computed (provided that levels' data on unemployment [U], labor force [L], and $RGDP$ are given) as:

(iii)
$$APL_t = \frac{RGDP_t}{L_t - U_t}$$

Using output growth data and some indicators of a labor market alone, (ii) provides a reasonably accurate estimate of the periodic change in the unemployment rate, which could in turn be used as a key routine in more elaborate econometric specifications.

A set of newly utilized macroeconomic regressors used to investigate and perform historical analyses on the evolution of labor market rates is that which comprises labor market flows (Figure 1). The latter are regular frequency records of the actual numbers of citizens transitioning from one labor market stock to another, within a given period. They are six in total and track the shifts from and to: [i] employment and unemployment, [ii] unemployment and economic inactivity, and [iii] economic inactivity and employment. Although not substantial in terms of actual figures, these flows are very informative for revealing the tendencies of the most important labor market rates. Few administrations, generally those of developed economies, maintain and offer official statistics on labor market flows.

Figure 1: Schematic representation of labour market gross and net flows between labour market stocks



Dixon, et al. (2015) implemented a labor market flows' vector autoregression approach to analyze the main indicators of labor market performance, namely employment, unemployment, and economic inactivity. Dixon, et al., (2015) used 34 years of monthly Australian data, from 1979 to 2013. They have not included the unemployment rate in their vector autoregression analysis, only labor market flow variables. However, one highlight that can be deducted from their data is that in cases of economic course shifts (such as recessions and recoveries) the unemployment rate exhibited positive correlation with the rate of net flow from employment to economic inactivity.

Lim, et al. (2018; 2019) analyzed labor market flows too, but they also build on the theoretical principles of Okun's Law by incorporating RGDP in their research analysis. They used 27 years (1990-2017) of quarterly US data to implement an autoregression analysis based on a SUR system, in which the one-lagged change in the unemployment rate (chur) and output growth were on the side of the independent terms, and were used to explain the variabilities of labor market net flows: eu, nu and en. Their specifications and pertaining results were based on the conjectural argument that labor market "rates are determined simultaneously, as a consequence of changes in the net flows" (Lim, et al., 2019). Their results showed that chur's first lag was a statistically significant regressor only for the eu and en equations of the SUR system. In the case of eu equation, the relationship with chur resulted positive[1]: a 1 percentage point increase in the eu rate was associated with a 0.31 pecentage points increase in chur. In the case of en equation, the relationship with chur resulted also positive: a 1 percentage point increase in the en rate was associated with a 0.19 pecentage points increase in chur. Furthermore, their results showed that output growth had a limited effect on labor market flows. Only in one of the equations of the SUR system – the eu equation – output growth resulted statistically significant as a regressor. In this case eu's relationship with growth was negative: a 1 percentage point increase in the eu rate was associated with a 0.25 pecentage points decrease in growth.

[1] *It is important to emphasize that in this study this particular net flow results in the direction of employment (higher flow of people from unemployment to employment, than vice versa), therefore the relationship between ue and chur is expected to be negative.*

METHODOLOGY AND DATA:

This study's methodology is anchored on the theoretical considerations set forth in Dixon and Thomson (2000), Dixon, et al., (2015), and Lim, et al. (2018). The authors employ labor market data to detect structural characteristics and effects in the unemployment rate. Dixon and Thomson (2000) utilize stock data, while Dixon, et al., (2015), and Lim, et al. (2018) utilize flow data. The vector autoregressive model itself makes use of the available labor market data on Albania and its RGDP growth indicator, all of which are official statistics published by Albania's Institute of Statistics. It is based on the theoretical grounds provided in Dixon, et al., and Lim, et al. Besides output growth and the change in the unemployment rate, estimates of net flow rates will be used as regressors to provide robustness and reliability to the model.

The study's vector autoregressive specification is considered to be of the form:

$$B_t = \alpha + \beta_1 B_{t-1} + \ldots + \beta_h B_{t-h} + S08 + S12 + R + \xi_t$$

where:

- Bt is a matrix of five 5×1 vectors, arranged in no sequential order and with a lag order extending up to to h, representing the output growth series, the change in the unemployment rate, and the 3 rates of net flow estimates;
- α is a 5×1 vector of constants;
- β_h is an h number of 5×5 matrices for the coefficients of the endogenous components of the VAR;
- S09 is a 5×1 vector for the coefficients of the dummy accounting for the structural deviancy taking place in 2009, as e result of the 2007-08 global financial crisis domestic impact on the labor market;
- $S14$ is a 5×1 vector for the coefficients of the dummy accounting for the structural deviancy taking place in 2012, as a result of the 2009 Greek public debt crisis domestic impact on the labor market;
- R is a 5×1 vector for the coefficients of the dummy accounting for the government-led implementation of economic reforms on employment and economy formalization measures from 2014 onwards;

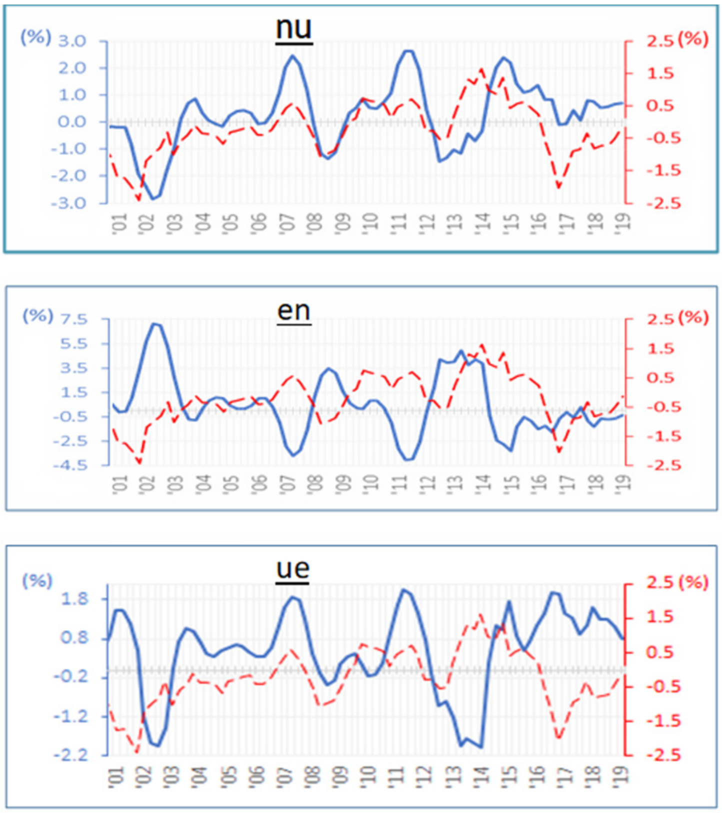
The dummy variables are coded 1 for the surmised timespan during which an identified economic shock takes place, and 0 otherwise.

- ξ_t is a 5×1 vector of residuals, following i.i.d. white noise processes, taking place at time t.

The time series data used in this research work are exclusively obtained from Albania's Institute of Statistics database: Labor Force Survey. Data frequency is quarterly, covering the period from 2001 first quarter through 2019 fourth quarter, and the main indicators used are the states of employment (E), unemployment (U), economic inactivity (N), and working age population (POP) levels. The labor market flows are computed form the above indicators, and the computing method is Iterative Proportional Fitting[2] (IPF).

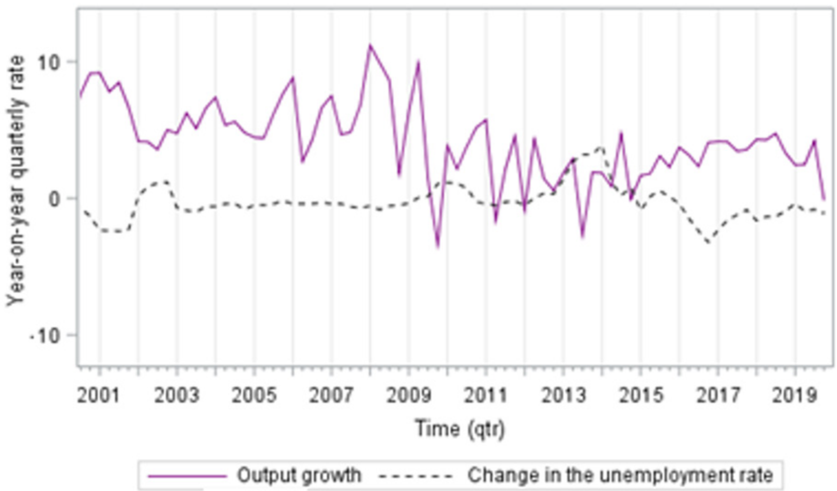
[2] *IPF is an algorithmic procedure used to adjust (fit) contingency table cells, given a set of constraints. By way of IPF, the investigator can obtain time series of table cell values that are maximum likelihood and maximum entropy estimates (Založnik, 2011) of the target (unobserved) time-series. This is achieved by feeding the algorithm with margin totals for table's rows and columns, and getting the probable cross-tabulated values of the table in return.*

Figure 2: Net flows compared to the change in the unemployment rate (annualized, quarterly data)



I apply IPF to labor market levels to derive flows, then I calculate flow rates by annualizing these labor market flows (year-on-year change), but preserving their quarterly frequency, and using working age population in the denominator. The [i] 3 net flow estimates, in addition to [ii] output growth and the change in the unemployment rate, to be used as endogenous variables in this study's model, are shown in the set of graphs below:

Figure 3: Output growth and the change in the unemployment rate (annualized, quarterly data



Granger causality/Block exogeneity Wald tests reveal that exogeneity order in the model begins with output growth, being the most exogenous, continues with change in the unemployment rate, then nu, ue, and lastly en being the most endogenous. So, the order: growth, chur, nu, ue, en, is considered – in preliminary results – the Cholesky order by which the variables enter the recursive VAR, to produce the FEVD results and IRF plots.

RESULTS:

After obtaining preliminary VAR estimates, we get the following IRF plots (the focus is on the response of change in the unemployment rate):

Figure 4: Impulse-response plots for the change in the unemployment rate

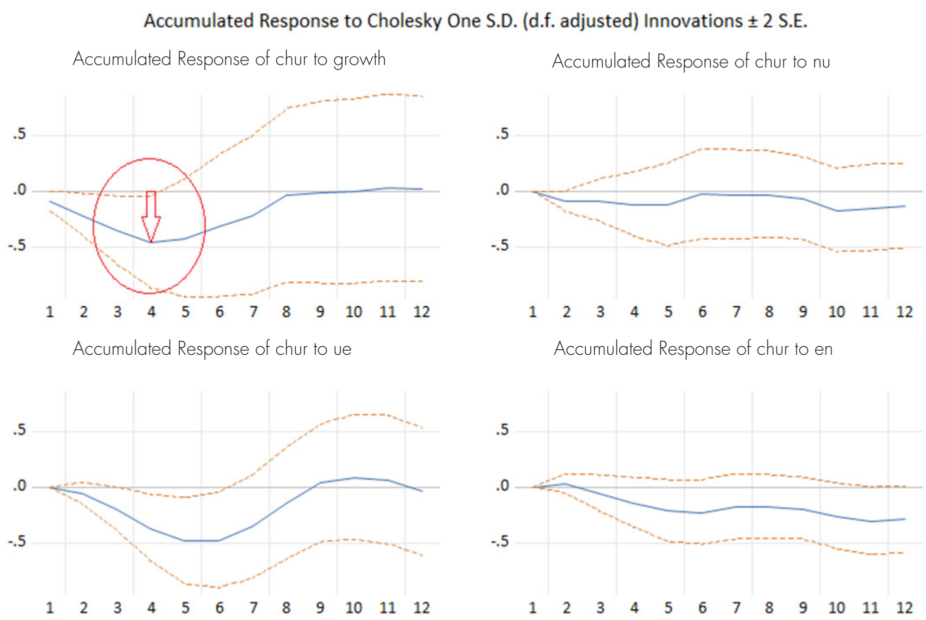
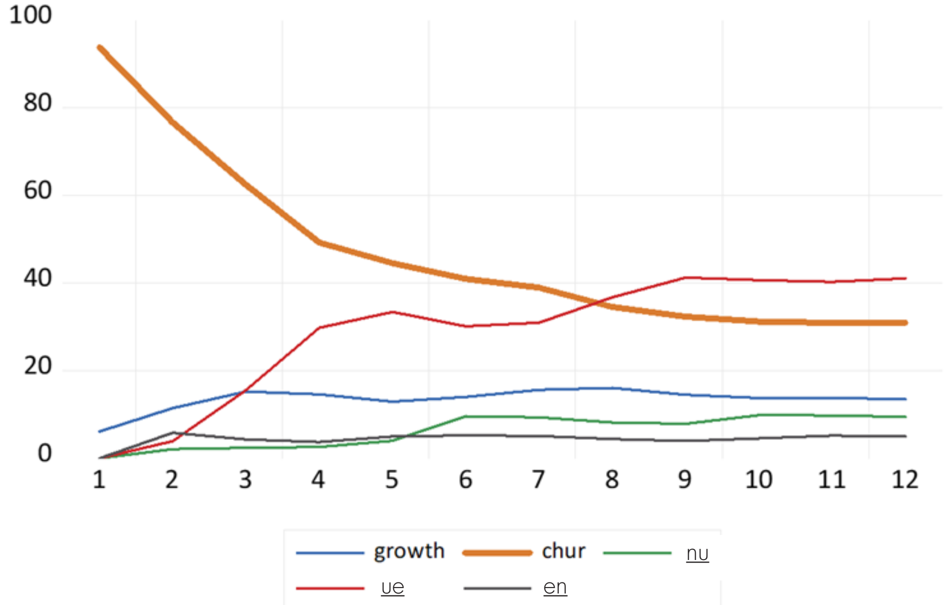


Figure 4, upper-left plot shows a 1 standard deviation positive shock in output growth would be associated with an accumulated response in the change in the unemployment rate of an approximate 0.45 p.p. decline, over 4 consecutive quarters. This result validates the theoretical propositions of Okun's law for Albanian labor market data. Also, it can be further expanded to compute the change in the unemployment rate response to a predetermined (say 10 p.p.) drop in output growth.

The next step is to proceed with the variance decomposition analysis. Since the emphasis of the study is the unemployment rate, I focus on the forecast error variance of chur only. The output shown in Figure 5 reveals that the main part (around 48%) of chur error variance is accounted for by chur itself. The second most influential variable is ue, accounting for around 35% of chur error variance. Third in line comes output growth, which accounts for roughly 14% of chur error variance. The impact of nu and en on chur error variance is rather minimal.

Figure 5: Forecast error variance decomposition of chur, using Cholesky (d.f. adjusted) Factors.



A recalculation of the model's output for a scenario of a sudden – one quarter – 10 p.p. decline in output growth, shows that the association with the change in the unemployment rate would result in a cumulative 1.84 p.p. increase of the latter over 4 consecutive quarters. More specifically, if the 10 p.p. output growth decline is observed in quarter 1, the change in the unemployment rate is expected to increase by: 0.35 p.p. in that very quarter, an additional 0.5 p.p. in the second quarter, an additional 0.6 p.p. in the third quarter, and an additional 0.38 p.p. in the fourth quarter. From the fourth quarter onwards, no further increases in the unemployment rate are expected, and the fifth quarter anticipates the decline leading to the long term equilibrium between these two variables. The one year 1.84 p.p. cumulative increase in the unemployment rate translates into 23`056 labor force participants being unemployed over that year.

CONCLUSIONS:

This study relates to research in the area of labor market flow data, which is a fairly recent development in labor market research. It adheres to the theoretical propositions of Okun's law, according to which there exists a long-term relationship between output growth on one hand and the unemployment rate (as well as other labor market indicators) on the other. It finds that output growth and labour market flow rates are pertinent quarterly frequency variables to estimate unemployment rate for Albania. Its main contribution to the existing literature in this field is to develop a vector autoregressive framework that can quantify the negative impact that a sudden health crisis, such as the COVID-19 pandemic, can have on Albania's unemployment rate.

As expected, results from VAR analysis for Albanian data show that the change in the unemployment rate exhibits a measurable, statistically significant negative relationship with the output growth. Of all the variables included in the model, output growth seems to be the second most decisive – right behind ue (the rate of net flow from unemployment to employment) – in driving the dynamic of the unemployment rate. Variance decomposition analysis shows that the impact of output growth on the unemployment rate seems to be steady and unfluctuating over a time span of 12 quarters, further validating the principles of Okun's law for the Albanian data.

To address the study's research question, recalculating of the model's output for a scenario of a sudden – one quarter – 10 p.p. decline in output growth (practically the same decline Albania's output growth experienced in the second quarter of 2020), a cumulative 1.84 p.p. increase in the unemployment rate over 4 consecutive quarters is predicted by the model. This means that a total of about 23`000 labor force would be unemployed over a year, since the beginning of the output growth decline.

It should be noted that these findings lean on the conservative side. This is because the model's calculations are solely based on the assumption of a crisis-induced shock coming from outside the domestic economy. However the nature of the crises can neither be distinguished nor integrated into the model, thus any important social and economic factors related to life lived – for a prolonged period – under the conditions of a pandemic such as COVID-19, cannot be quantified. Such social and economic factors may include mobility restrictions, virus infection rates in the labor force, financial setbacks as a result of closed businesses and reduced economic activities, etc. Such factors typically stress the labor market and drive unemployment numbers even higher. This research study is just a first step in the area of labor market shock analysis for Albania. In hopes that it will serve as an anchoring point for future analyses in the labor market area of research, I deem essential to emphasize the importance of inquiring into the properties and dynamic behaviors of other labor market components for Albania, such as participation rate, employment-to-population ratio and inactivity rate. The latter-mentioned components are just as essential as the unemployment rate in assessing the status-quo and future developments of a country's labor market.

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