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Tel.: + 355 4 2419301/2/3; + 355 4 2419409/10/11
Fax: + 355 4 2419408
E-mail: public@bankofalbania.org

www.bankofalbania.org

** Views expressed in this review are of the authors and do not necessarily reflect those of the Bank of Albania.*

C O N T E N T S

LERNER INDEX-INDICATOR OF BANKS MARKET POWER IN ALBANIA

Elona Dushku, Research Department

ABSTRACT

Competition in the banking sector has been and remains a considerable interesting issue, not only for the importance it has in the banking and financial system, but also in the whole economy. Recently, more attention is paid to the relation between competitiveness of banking system and banking system risk, the impact on financial stability and on the whole economy [Beck, (2008), Beck et al, (2012)]. The testing of these connections and the obtaining of stable results imposes a quite accurate measurement and assessment of competition. The aim of this paper is to measure competition of banks that conduct their activity in Albania, based on a non-structural approach. The obtained assessments show that in 2004-2014, the competition of banks in Albania stands between the complete competition and the monopolistic one.

I. INTRODUCTION

The competition in the banking system is a complex notion; hence its adequate measurement has driven to the further evolution of methods for its improvement. Economic literature identifies two main approaches to measure competition in the banking system: structural approach and non-structural approach.

Structure-Conduct Performance paradigm (SCP), initially developed by Mason and Bain (1956), tries to explain the competition between companies based on the existing relation of their performance to market characteristics where they operate. The number of companies, which operate in this market, the number of companies, which enter and exit this market and the possible premises to differ products, determine the characteristics of market structure. The market structure, through its impact on the company's performance, the determination of price and of strategic decisions, directly affect the company performance.

The main idea of SCP structural approach is that, concentrated markets are characterised by higher prices and profits. On the other hand, Smirlock (1985), Evanoff and Fortier (1988) highlight the fact that higher profits may result from the higher efficiency in production and in the managerial organisation. Furthermore, the competitive behaviour of companies is also determined by the entry or exit terms and conditions in the market. Thus, Baumol et al., (1982) affirm that a concentrated industry may behave in a competitive way if the entry barriers into this market are low. The main indicators employed in this approach to assess competition are the indicators of market share,

market concentration, Herfindahl-Hirschman indices. The main advantage in using the concentration indicators relate to the low number of data that are needed to calculate these indices, while the main disadvantage of the SCP approach and its indicators is the lack of theoretical support and underlying arguments for these indicators. Claessens and Leaven (2004), underline that the structural characteristics of industry are insufficient to assess competition among banks, while the concentration and competition are completely two different ideas. Nevertheless, concentration indicators are broadly used in developing countries, as the data at bank level are limited and lack good quality.

The New Empirical Industrial Organization-NEIO approach is mainly based on the economic theory of oligarchy and static (dynamic) model of Carbo-Valverde et al. competition (2009). Hence, the main measures of competition, according to the non-structural approach, are mainly based on the models as proposed by Lerner (1934), Bresnahan (1982), Panzar and Rose (H-statistic) (1987), Mueller (1977, 1986) and Boone (2008). The first generation of competition indicators is mainly based on the static competition concept, where Lerner, H-statistic is used as its measure. The second generation of competition indicators is based on the dynamic concept of competition, developed by Mueller (1977, 1986) and Boone (2008), who have recently proposed the Boone index to assess competition of banks.

In this article, we will introduce the assessment of banks' competition in Albania based on Lerner index. The reasons for selecting this index are: Lerenr index is based on static theory of oligopoly; it is easy to be interpreted; its calculation is based on easily accessible data, and provides information, in years, on market's power, thus making possible the study of evolution in time of price behaviour by banks. Also, Lerner index is a flexible indicator and may measure the banks market power based on the various banking products or banks' market power after their geographical allocation.

Lerner index is broadly used to assess the market power of a company. The latter is assessed by the divergence between the company's price and its marginal cost. In a market of a complete competition, the price and marginal cost are equal, and the high gap between them (price and cost) shows lack of competition and increase of market power by some companies. A disadvantage is the fact that the Lerner index is more an indicator of a bank market power than an proxy of competition, as an increase in market power may be consistent to the increase in competition (Stiglitz, 1987, 1989). Recently, Boone, (2008), Boone et al. (2013), have shown that, if Lerner index becomes lower compared to the competition, the average market power may increase, decrease or remain unchanged due to the reallocation effect by efficient companies to inefficient companies. Another disadvantage of the Lerner index is the assumption of the perfect technical and allocating efficiency. However, in reality, banks do not operate in conditions of perfect efficiency, driving the operative costs and efficiency to vary according to the economic conditions of the countries where banks operate (Chaffai et al., 2001). Hence, changes, in time and among countries, of the Lernner index

may be justified by changes or differences that derive from non-competitive factors.

Notwithstanding the various measures of competition in the banking system that are found in the empirical and theoretical literature, there is no broad consensus between the measure of competition in the banking system, as each of them assesses a specific part of competition (Liu et al., 2013).

The aim of this paper is to assess the competition of banks in Albania, based on the Lerner methodology, to see the evolution in time of the banks market power in Albania, during the period 2004-2014.

The paper is structured as follows: The second part introduces the methodology and data that are employed to calculate Lerner index. The third part introduces and discusses the obtained assessments on Lerner index, and the final part outlines some conclusions.

II. METHODOLOGY

As mentioned at the beginning, Lerner index is an alternative indicator of competition, where its main advantage is based on the equilibrium price theory, where one of its disadvantage is that the data of banks' balance sheet which are used to assess price and cost, are proxies to them, making their selection arguable (Bikker et al,. 2007).

To assess competition in the banking sector at bank level, like Fernandez de Guevara et al (2005), Jimenez, Lopez and Saurina, (2007), Berger et al (2009), we have calculated Lerner index for each bank in each period, as follows:

$$I\_Lerner_{(i,t)} = (P_{(i,t)} - MC_{(i,t)}) / P_{(i,t)} \quad (1)$$

Where $P_{(i,t)}$ is the total assets price measured as a ratio of total income (interest and non-interest income) to total assets of *i* bank in *t* period. Meanwhile, $MC_{(i,t),}$ is the marginal cost of total assets of bank *i* in period *t*, generated from the trans log function of bank costs according to Berger et al (2009), where the total bank cost $C_{(i,t)}$ is a function of an only one output, $Q_{(i,t)}$ and of the three prices of input $w_{(i,t)}^{j}$, where $j \in (1,2,3)$. In a more detailed way, trans log function of costs is defined following:

$$lnC_{(i,t)} = \alpha_0 + \alpha_1 \, lnQ_{(i,t)} + 1/2 \, \alpha_2 \, (lnQ_{(i,t)})^2 + \sum_{(j=1)}^{3} \beta_j \, lnw_{(i,t)}^{j} + \sum_{(j=1)}^{3} \sum_{(k=1)}^{3} \beta_{(j,k)} \, ln \, w_{(,t)}^{j} \, lnw_{(i,t)}^{k} + \sum_{(j=1)}^{3} \gamma_j \, lnw_{(i,t)}^{j} \, lnQ_{(i,t)} + \varepsilon_{(i,t)} \quad (2)$$

Where $C_{(i,t)}$, is the total cost for each bank, including interest expense, personnel expenses and other expenses. The bank output is approximated to total bank assets for *i* in *t* time (Fernandez de Guevara, Maudos and Perez, 2005). Three are the main input prices $w_{(i,t)}^{j}$ which are used: fix costs price w_1,

calculated as other operating and administrative expenses ratio to total assets, labour price w_2, calculated as personnel expenses ratio to total assets and the the price of lent funds w_3, measured as interest expense ratio to total deposits and funds of money market.

The coefficients obtained from the assessment of trans log cost function (equation 2) are used to calculate the marginal cost (equation 3). Like Berger et al, (2009) and Beck et al, (2012) we have assumed that inputs' prices are homogeneous, thus, marginal cost is calculated as follows:

$$MC_{(i,t)} = C_{(i,t)} / Q_{(i,t)} \ [\hat{\alpha}_1 + (\alpha_2) \ lnQ_{(i,t)} + \sum_{(j=1)}^{2} \hat{\gamma} \ ln(w_{(i,t)}^{j}) / (w_{it}^{3})] \quad (3)$$

Lerner index takes the values between 0 and 1, when the price is equal to marginal cost, that is P = MC, Lerner index takes 0 and the company has no power to decide the price, meaning that banks operate in complete competition, whereas when Lerner index becomes 1, it shows that banks are operating under monopoly conditions (Turik-Ariss, 2009). Lerner index is an inverse indicator of competition. Hence, a high index value shows low competition and vice versa (Pruteanu- Podpiera et al., 2007).

III. RESULTS

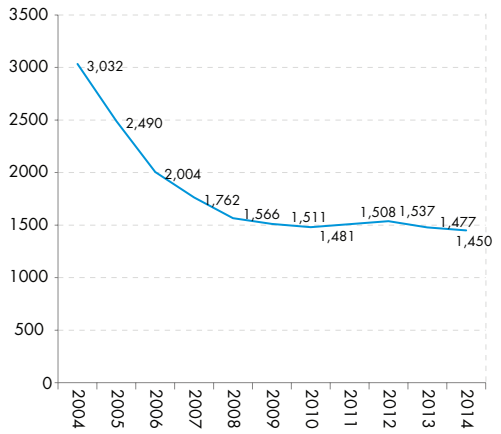
Also, we have calculated Herfindahl-Hirchman (HH) index, that is the indicator of banking sector concentration to differ the information derived from this index from that derived from Lerner index. This index is calculated as a ratio of the share of each bank assets to total assets, at the second degree (Bikker and Haaf, (2000).

$$HH_{it} = \sum_{(i=1)}^{n} (q_i / Q)^2 \quad (4)$$

The values of this index vary between 1/n and 1, where the lowest value corresponds to the fact that all banks have same share, and take value 1 in case of monopoly. The values of this index are multiplied by 10,000, where a value of HH below 1000 shows a low level of banks concentration; a value of index standing between 1.000 – 1.800 shows a moderated concentration level of banks. A value of HH index above 1,800 shows a high concentration of banking sector, whereas a value of index equal to 10,000 shows the presence of monopoly.

The results are shown in the following. Overall, a downward trend of HH index is noted, implying a fall in the bank market concentration.

Chart 1 HH index



Source: Bank of Albania, author's calculations.

The assessments show that, mainly during 2004-2006, there was a high concentration of banks, whereas from 2007 to 2014, a moderated concentration level of banks is noted.

To calculate the Lerner index, we used individual data of banks' balance sheets, during the period 2004-2014. The following table shows some descriptive characteristics of the aggregated data being used to calculate Lerner index.

Table 1 Descriptive statistics of indicators[1]

	Mean	Median	Maximum	Minimum	Standard deviation
- price of assets	0,132	0,079	1,705	0,041	0,189
-price of fixed costs	0,061	0,001	1,646	0,000	0,192
-price of labour	0,037	0,036	0,126	0,011	0,016
-price of funds granted as loans	0,015	0,011	0,064	0,003	0,011
-total cost	55.983	31.203	319.150	745	71.910
-total assets	4.611	1.386	78.307	48	9.470
No. of observations	165	165	165	165	165

Source: Bank of Albania, author's calculations.

To calculate Lerner index, at the beginning, we assess equation 2 and then equation 3. The assessment results of trans log function are shown in table 3, total cost of banks is stated as a function of output and of the three prices as input. The method 2SLS in panel of fixed effects, is used to assess the equation, aiming to avoid the endogeneity between variables, where the explanatory indicators of a one time lag are used as instrumental indicators. Results of J-statistic test show that we do not have problems in identifying the used instruments.

Table 2 Assessment of cost trans log function

Explanatory variable	Dependent variable	
	Method: Panel Two-Stage Least Squares-Fixed effects	
	Coefficient	Probability
	-5.383062***	0.0013
	2.589416***	0.0000
	-0.184106***	0.0000
	0.605009***	0.0000
	-2.080289***	0.0001
*	-0.079235***	0.0008
	0.064057***	0.0000
	-0.297986***	0.0004
*	-0.018914	0.1083
*	0.282586***	0.0000
R-squared		0.994907
Adjusted R-squared		0.993977
S.E. of regression		0.144123
F-statistic		103.2884
Prob (F-statistic)		0.000000
Instrument rank		25
Mean dependent var		11.74992

[1] *The data are shown annually for 15 banks that operate in Albania, which share 90% of banking system total assets.*

S.D. dependent var	1.857039
Sum squared resid	2.617195
Durbin-Watson stat	1.699975
Second-Stage SSR	25.88063
Prob(J-statistic)	0.120628

Source: Author's calculations.

The coefficients obtained from the assessment of trans log cost function, which have resulted statistically important, are used to calculate the marginal cost MC (equation 3). After generating the marginal cost, we have calculated Lerner index for each bank and in each period. Chart 2 shows the performance of Lerner index for the whole banking system. The calculation of Lerner index for each year is conducted as simple mean of Lerner indices for each bank, being equally weighted.

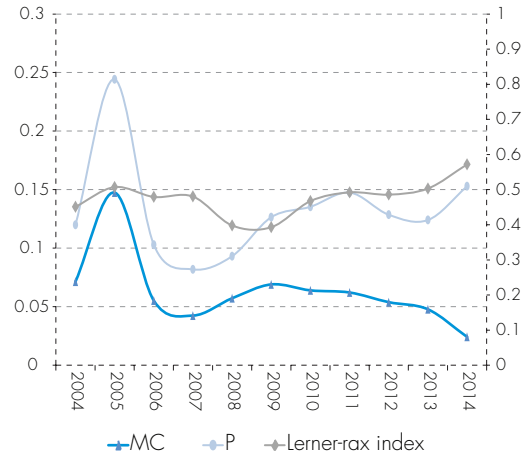
Table 3 Lerner index

	Mean	Median	Standard deviation
2004	0,451	0,467	0,186
2005	0,507	0,560	0,156
2006	0,479	0,470	0,176
2007	0,480	0,468	0,149
2008	0,398	0,436	0,193
2009	0,393	0,401	0,217
2010	0,467	0,545	0,248
2011	0,492	0,513	0,267
2012	0,486	0,473	0,264
2013	0,503	0,477	0,278
2014	0,572	0,585	0,309
2004-2014	0,475	0,490	0,222

Source: Author's calculations.

The privatisation of the Savings Bank, at the beginning, was followed by an increase of Lerner index, meaning a deterioration of competition, and after 2005 till 2009 the index fell. Assessments show that banks increased competition among them and decreased the market power during this period, due to the decrease in assets price and marginal cost (See Chart 2). After 2009, Lerner index was up, showing a fall of competition from banks. This trend is affected by the increasing assets prices, against the downward trend of marginal cost. Overall, in average terms, we may say that competition in banking system stands between the complete competition and the monopoly.

Chart 2 Assets price, marginal cost and Lerner index



Source: Bank of Albania, author's calculations.

IV. CONCLUSIONS

The contribution of the banking sector to the whole economy and competition among banks remains an important issue to decision makers every time. The last financial crisis brought into attention, once

more, the important role of competition and banking and financial stability to the whole economy. Furthermore, competition in banking system is more special than competition in other sectors, due to its impact on financial stability, efficiency and access of financial services (Claessens (2009)). Thus, many studies seek to assess the impact of competition in the banking system, where the assessment of a rather good indicator of competition is a quite important step. The literature identifies two main approaches to measure competition, the structural approach and non-structural approach. The structural approach assesses competition based on market structure, whereas the non-structural approach assesses the competition among companies by considering the behaviour of companies in a given market.

This article proposes the use of non-structural measures to assess competition in the banking system in the case of Albania, against the use of concentration indicators. Each of indicators as proposed under non-structural approach is based on different assumptions; each of them measures different elements of competition, so there is no consensus on which of indicators is the best one.

In this article, we introduce the assessment of competition based on Lerner index, which is a measure of bank market power. We chose this index, among the other indicators, because it is a better measure of competition than the other concentration indicators, is based on oligopoly theory and may be calculated individually to see its evolution over time.

The assessment of Lerner index for 15 banks in the banking system, sharing 90% of total banking system, show that averagely this index for the whole period stands at 0.48, that means, we are not either in a monopoly situation or in complete competition situation, but somewhere in between, of a moderated market power. During 2004-2009, Lerner index dropped, showing a fall of bank power market and increase in competition, affected by both the decrease in as assets prices and marginal costs. From 2009 to 2014, Lerner index trended up, implying an increase in market power by banks and decrease in competition. This trend is affected by the reduction in marginal cost of banks, in one hand, and the increase in assets prices, on the other, due to the deteriorated macroeconomic conditions, increased uncertainty in market and information asymmetry.

Nevertheless, when interpreting the results, we should consider that Lerner index is mostly an indicator of the company price-determinant power than of competition, and take into account the restrictions of this index while analysing its performance.

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FINANCIAL STABILITY MAP IN ALBANIA

Arisa Saqe, Odeta Minka and Vasilika Kota[1]
Financial Stability and Statistics Department

INTRODUCTION

The financial stability assessment remains one of the most difficult tasks for all central banks, which have actually included this objective among the main tasks of their mandate. In the absence of a single indicator that would comprise financial system developments and determine whether the system is under stress conditions, central banks have constructed a number of methods to assess financial stability[2].

The purpose of this article is to introduce a new method of processing information coming from various risks facing the financial system, using a cobweb diagram. Often known as the Financial Stability Map (FSM), this model introduces the conditions and main risks facing the financial stability in a given country and beyond. To construct the map, we have followed the methodology introduced by the IMF according to Dattels et al. (2010), Norges Bank according to Dahl et al. (2011) and Reserve Bank of New Zealand according to Bedford and Bloor (2009).

The rest of the article is structured as follows: section one explains in theory the construction of a cobweb diagram[3]; section two introduces the methodology for measuring the risk level; section three details the construction of the financial stability map in the case of Albania. Section four describes the actual performance of the FSM; and section five outlines the conclusions and proposals for future research.

1. CONSTRUCTING A FINANCIAL STABILITY COBWEB

The purpose of using a cobweb diagram in financial stability analyses, often known as the Financial Stability Map (FSM) is: first, summarising the main sources of potential risk to financial stability called as "categories of risk" and second, timely following up the evolution of these sources of risk. Each

[1] *The authors are grateful to Elsida Orhan, Financial Stability and Statistics Department (BoA), for her assistance and comments.*

[2] *Dahl et al. (2011) summarises the main methodologies central banks apply in relation to indicators on financial stability assessment.*

[3] *Cobweb, also known as "radar" or "spiderweb" -style diagrams are a two-dimensional representation of a group of data that may be quantitative and qualitative, to conduct a performance analysis in a given moment in time. Data are standardised in such a way that they are comparable with each other and may be used for constructing the "web". These diagrams have been widely used in a number of areas such as management, agriculture, and industry. Recently, they have been used in financial stability analysis by central banks.*

"category" is based on a group of sub-indicators, which are considered as more appropriate in reflecting risk or weaknesses to the stability related to this category. The selection of the sub-indicators to include in each category depends much on the structure of the economy and the financial system, and the authors' judgement. For that reason, the cobweb diagrams of various central banks have different shapes and designs[4]. However, based on the work from Dattels et. al (2010), we take into account certain criteria when selecting each category and the compounding indicators of the FSM:

a. The FSM aggregates several risk indicators into one single instrument which supplements the existing financial stability-related information. As such, it serves to promote discussions about main risks to financial stability and does not aim to determine whether the financial system is stable or unstable. From this perspective, the FSM should be used together with other instruments that assesses the financial stability, but not overlapping with them;
b. The FSM should include frequent data, which allow for its periodic update, including forecasting elements;
c. The FSM aims at providing diagnosis information in relation to economic and financial developments that include not only the relevant technique, but also the experts' judgement;
d. The indicators included in each category of the map should provide adequate information, but be limited in number. If we include a small number of indicators, the information provided on various risks will be inadequate. On the other hand, including a large number of indicators overlaps the provided information, hence offsetting each-other. For this reason, it is desirable to have 4 to 8 indicators for each category;
e. Composing categories of FSM should contain information on risks that are easily identifiable from each other, measurable and relevant to financial stability.
f. The construction of each category sub-indicators may result difficult, as the variables included may belong to several sub-indicators simultaneously. Nevertheless, the relevance of information provided by each sub-indicator may justify this overlap.

2. ASSESSMENT METHODOLOGY ACCORDING TO RISK SCORE

After selecting of the main categories and the respective sub-indicators, the latter are assessed against their historical values. The assessment process starts by obtaining the data series for each sub-indicator, which are also subject to various transformations (see Annex 1). The second step is the "translation" of sub-indicators series values into risk scores and then the aggregation of the scores series into a sole series for each category. Prior to the scoring assessment process, each sub-indicator is assessed if the increase (or decrease) of the

[4] *The FSM constructed by the IMF has six categories (Datters et. al, 2010), the FSM of the Bank of Norway has eight categories (Dahl et. al, 2011), the FSM of the Reserve Bank of New Zealand has five categories (Bedford and Bloor, 2009).*

series values leads to an increase (decrease) of risk or vice versa. Hence, it is judged if the series values for each sub-indicator move in the "same" direction with the risk scores, or in the "opposite" direction.

Then, the scores of risks are determined, while the relevant literature suggests two main methods: "standard method" at percentiles and "alternative method"[5].

According to "standard method", the time series data are ranked in ascending order and then are divided into 11 equal sub-groups (percentiles). The first sub-groups correspond to the lowest values of the time series, whereas the 11th sub-group correspond to the highest values. Following the contribution of each series to risk (either positive or negative), these 11 percentile assumes scores from 0 (first percentile) to 10 (last percentile) or vice versa. The median of each sub-indicator equals 5, implying the average assessment value of the series and not a "normal" level of risk. This step highlights once more the importance of including sub-indicators of long time series, which possibly include some economic and financial cycles. This extended period is different for various indicators. The main advantage of the "standard method" is the transparency and simplicity in use. Also, it doesn't depend on the assumption related to the data distribution, which is especially relevant in case data do not show a normal distribution. The application of the "standard method" is not suitable if the series are characterised by tail event, as small fluctuations in the series may be translated into large fluctuations of risk scores, which would distort the reality. In these cases, Dahl et.al (2011) use an "alternative method", where instead of distributing the number of observations into 11 data sub-groups (percentiles), they divide the series range of the sub-indicator (the difference between maximum and minimum values) is divided into a number of equal length intervals. Then risk scores are determined according to the relevant assessment direction. In the case of certain indicators, the above authors recommend to establish by discretion outer boundaries, which take respectively the extreme values 0 and 10, whereas the rest of the data within these boundaries are given risk scores from 1 to 9 using the standard method as already explained.

Following the "translation" of sub-indicators into risk scores, the obtained scores series are aggregated for each category. The literature recommends that aggregation be carried out by simple average, assigning the same weight to each sub-indicator, because the construction of various shares for each sub-indicator within one category would increase the subjectivity of the map and would make the judgement difficult. On the other hand, the weights might change in time depending on the various developments in sub-indicators. This would complicate the discussion on FSM performance, as it would be difficult to identify if the change in the risk assessment derives from the performance of the sub-indicator or from the assumptions about its weight.

Finally, due to the nature of sub-indicators, they may be included simultaneously in several categories, for example: the increase of households' non-performing loans ratio implies simultaneously an increase of risk in both households' and

[5] *Dattels et. al (2010); Dahl et al. (2011)*

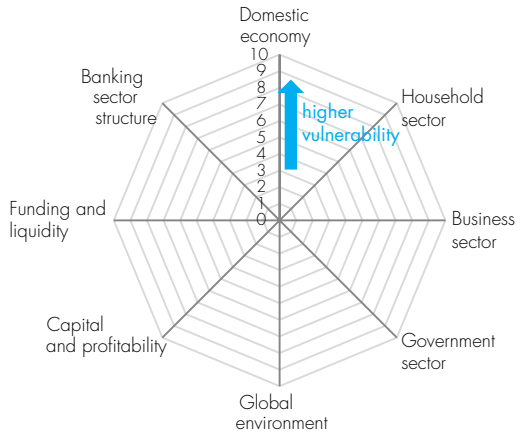
in the banking system categories. It is difficult to eliminate this kind of overlap, hence, notwithstanding the same weights, the used information may imply an unintentional appreciation of a sub-indicator. After completing each category, they should be aggregated at a specific moment of time to shape a diagram of risks, which is frequently known as the Financial Stability Map.

Regarding the data (and scoring) updating process, the IMF approach recommends preserving the FSM's comparativeness in time, which implies that the data extension does not affect the previous scores. It implies that, along with the increase of data, although the new average of sub-indicators may exceed the historical value, it will not be reassessed by score 5, but will maintain the same way of assessment by scores. While, Dahl et al. (2011) suggest that the ranking through percentiles should be recalculated by including the new data as well. This means that a specific indicator that may have been previously scored 5 may take a new score after the recalculation. Consequently, the aggregated score for a specific category in the final map may also change, because of the change in the risk or vulnerability assessment, or because the change in the data. These two effects may be identifiable from each-other if FSM is updated first following the IMF approach and the reassessment of the data average as in Dahl et.al (2011). In the case of a severe financial crisis, Dahl et al. method (2011) ensures the complete inclusion of this new information in the Financial Stability Map. That is why we propose the employment of this method.

4. CONSTRUCTION OF FINANCIAL STABILITY MAP FOR ALBANIA

To construct the FSM, we have firstly identified the main sources of risks or vulnerabilities that arise from the banking sector, as the dominating part of the financial system, as well as from the real sector and the main economic agents. Following this logic, eight categories have been selected: three categories related to the characteristics and structure of the banking sector ("capital and profitability"; "funding and liquidity"; "banking sector structure") and five categories outside the banking sector ("domestic economy"; "global environment"; "households"; "businesses"; and "government"). These eight categories (see Figure 1) fully summarise the internal and external sources of risks to the stability of our financial system and the construction of FSM is introduced as a function of the respective categories and sub-categories:

Figure 1 Financial Stability Map in Albania



Source: Authors

$$HSF: f = (K_1, K_2, \ldots \ldots \ldots .. K_8)$$

where $Kj: f = (T_1, T_2, \ldots \ldots \ldots .. T_i)$

In the diagram (see Figure 1), moving outward from the centre implies increase of risks to financial

stability, related to the respective categories, by signalling the need to discuss these developments. Each category contains four or more sub-indicators, in total 38 sub-indicators.

An important criterion in selecting the sub-indicators is the duration of the data series. They should be long enough to ensure the inclusion of some cycles or various financial crises (Dahl et al. 2011). This criterion is somewhat more difficult to be accomplished, as some series are short. In the case of Albania, it is estimated that the crises in 1997, 2002 and lastly in 2008 are the key points when the main financial and economic indicators reflect a break, deriving from the internal or global crisis. The included series are of quarterly frequency, which is sufficient to provide a regular and frequent updating of the map. This avoids the need for extrapolation, which is a frequently encountered issue in the case of Albania's' economic data. When the available data have another frequency, they are transformed into quarterly data. In case the data series are characterised by high seasonality or trend, the necessary transformations are applied to clear them from seasonality or remove the trend. If there are no data for a specific indicator or the series is considerably short, the series of an approximated sub-indicator is used, which fulfils better the required criteria.

4. A. CONSTRUCTION OF CATEGORIES AND CONSTITUENT SUB-INDICATORS

The next section introduces the eight main categories of the map, and the constituent sub-indicators for each of them. For selecting and constructing these sub-indicators, the criteria introduced in the third section, as well as the literature on Financial Stability Mapping in other countries are considered. An important element considered while discussing each sub-indicator is their performance during the crisis periods or the financial stress in Albania during 1997, 2002 and 2008.

1. Domestic Economy

Domestic economy is one of the main determinants of financial stability, with a direct impact on the economic agents' financial situation, consequently their solvency. According to Dahl et. al (2011), the sub-indicators included in this category should reflect the cyclical performance of the economy, along with its long-term components. Considering the structure of the Albanian economy and the interactions with the financial sector, five sub-indicators are selected, and the scoring process is done following the "standard method".

1.1 ***Output gap.*** It represents the performance of economic activity and is measured as the gap between current GDP and its historical trend[6], as a ratio to current GDP. A high rate of this sub-indicator, which means

6 *The historical trend of GDP is measured by Hodrick-Prescott filter.*

the deepening of the gap between current GDP and the historical trend, signals the slowdown of the economic activity, and hence an increase of risk to the financial stability.

1.2 *Size of external debt.* This sub-indicator considers the exposure of the Albanian economy to external debt and is calculated as the ratio of the external debt stock to annualised GDP. A higher ratio implies higher risk to financial stability; therefore, a higher risk score is assigned.

1.3 *External financing requirement.* This sub-indicator measures if a country has sufficient resources in the current account balance to pay the external debt. It is calculated as the sum of current account balance and external debt payment flows (short-term debt[7] plus the amortisation of the short-term and long-term debt within one year). If the country financial resources are insufficient, the sub-indicator takes positive values, implying exposure to the payments of the external debt. The higher the positive values, the higher the exposure to external payments, driving to a higher risk.

1.4 *Exchange rate volatility.* The stability of the foreign exchange market in Albania is quite important to the stability of financial system, as a large part of banks credit to businesses and households is denominated in foreign currency. To take into account the exchange rate volatility, the REER performance is included as a sub-indicator. It is measured as ALL exchange rate against the currencies of five main trading partners in real terms. The time series is averaged and transformed in terms of annual growth to identify the points of significant ALL appreciation or depreciation. The depreciation of the domestic currency, that is the increase in sub-indicator values, would deteriorate the solvency of bank borrowers', and increase financial stability risk.

1.5 *Inflation rate.* Developments in inflation rate have reflected moments of high stress in the Albanian economy, so this information is useful and should be included in the construction of FSM. The sub-indicator is calculated as the annual change of the Consumer Price Index (CPI). An increase in the CPI is assumed to contribute negatively in the economy, so it is assigned a high risk score.

2. Households

Household and business sector are frequently monitored for the purposes of financial stability regarding their solvency, the financial situation and demand for banking sector services. Since the developments in various indicators related to these sectors might be very different, in the FSM they are represented in different categories

"Households" category consists in six sub-indicators, where the scoring is done following the "standard method".

[7] *In our case, as the series of short-term debt is quite short, starting in 2008, the calculation of this sub-indicator is approximated by using the payment flows series for the whole external debt.*

2.1 *Household borrowing.* The sub-indicator is calculated as the gap between the actual household borrowing to GDP ratio and the historical trend of this ratio. The literature recommends using the households' loan ratio to their disposable income. In the case of Albania, since there are no data for disposable income, the GDP indicator is used as a proxy. A higher gap signals a decreasing risk and a lower risk scoring.

2.2 *Housing Market.* A dwelling makes the largest component of the households' wealth, while the residential mortgages are a considerable part of households' loan portfolio. A fluctuation in houses price will therefore affect both the financial situation of households and banking sector. The sub-indicator is calculated as the gap between the current values of House Price Index and its long-term trend. A positive and increasing gap is considered as improvement of households' financial situation, therefore signalling a lower risk.

2.3 *Registered unemployment rate.* This indicator is also included to assess the financial situation of households. A higher unemployment rate signals an increasing risk and hence it is given a higher score.

2.4 *Household loan portfolio quality.* The quality of households' loan portfolio has a direct impact on the banking sector performance. This indicator has been deteriorating remarkably after the 2008 crisis, hence, its continuous monitoring is crucial to financial stability. The included sub-indicator is constructed as the ratio of non-performing loans to households. An increase in the values of this sub-indicator implies increased risk to financial system.

2.5 *Household expectations.* The inclusion of the expectations aims to add some forward-looking elements to the FSM. In the case of the household sector, the expectation data are extracted by the Consumer Confidence Survey and refer to the household expectations regarding their future financial situation (three months ahead). A higher value of the sub-indicator implies lower risk deriving from the household category.

2.6 *Remittances.* In assessing the households' financial situation, remittances are considered as an income source that can be used to pay the debt liabilities. The sub-indicator is calculated as the annual percentage change of the quarterly remittances inflows. The fall in the values of this sub-indicator implies a fall in remittances. This is assumed to affect negatively the households' financial situation, thus driving to higher risk from this category.

3. Businesses

This category is constructed based on the same principles as in case of "household" category and consists in four sub-indicators, also assessed according to the "standard method":

3.1 *Businesses' borrowing.* This is calculated as the gap between the actual business sector borrowing ratio to GDP and the historical trend of this ratio. The increase of this gap signals a decrease of risk from the business sector, being given a lower score.

3.2 *Business loan portfolio quality.* This sub-indicator is included as the ratio of non-performing loans to businesses. The increase of this ratio implies a higher risk to the financial system.

3.3 *Business' expectations.* Similar to the household category, businesses' expectations regarding their future financial situation one quarter ahead are also included as forward-looking sub-indicator. The data for this sub-indicator are obtained from the Business Confidence Survey, calculated as a weighted average index of different sectors of the economy included in this survey. The fall in its values implies an increase in the risk level.

3.4 *Output Volume Index.* This index is included as a business cycle indicator and is calculated as the gap between the seasonally adjusted index value and its long-term trend. An increasing gap between the index values and its historical trend, signals a decreasing risk to financial stability.

4. Government

Government constitutes the third important agent in the economy, in addition to businesses and households. The impact of the government category developments on the financial stability is addressed in terms of government debt sustainability and debt cost, budget deficit, sovereign risk and revenues collection. As in the previous categories, the "standard method" is also used to score the "government" sub-indicators.

4.1 *Size of government debt.* This sub-indicator is measured as the government debt to GDP ratio. An increase in this ratio implies a higher government debt burden, and consequently a higher risk to financial stability.

4.2 *Debt cost.* The increase in Government's debt cost implies increasing difficulty to repay it, by considerably impacting the expenses, and consequently the government's future debt term. The interest expense to public debt ratio is used as a proxy to this indicator, where the increase of this ratio implies an increase of debt cost and increase of risk deriving from the government category.

4.3 *Sovereign risk premium.* To assess the Albanian government sovereign risk we have constructed the 12-month spread rate of Albanian T-bills against German T-bills. German T-bills are considered as no-risk securities, while Albanian bills are an important investment instrument in ALL to banks in Albania. The financial stress periods are connected with a higher spread due to the fact that interest rates on Albanian T-bills may increase and the interest rates on non-risk T-bills may fall.

4.4 *Size of budget deficit.* The size of budget deficit as a ratio to GDP is another important element of government's behaviour. Thus, a high level of deficit to GDP signals a higher risk from the government category.

4.5 *Performance of tax revenues.* This indicator aims at assessing the government ability to collect tax revenues during the period under review and is measured through tax revenues to GDP ratio. A low level of this ratio signals an increasing risk to the financial stability deriving from the government category; hence it is given a high risk score.

5. External environment

The financial situation of the domestic economic agents and their solvency may be affected in different ways by the developments in the external environment. The last global crisis showed that, albeit our financial system was not directly involved in the first place, some adverse effects spilled over in real economy mainly through trading channel and were latter translated into the increase of banking sector's non-performing loans. This showed the importance of monitoring external shocks as a possible source of risk to the banking sector in Albania and consequently to the whole financial stability. In constructing the FSM, developments in the external environment are addressed as a special category, which includes five sub-indicators:

5.1 ***Real GDP of the main trading partners.*** The slowdown of economic activity of the main trading partners may negatively impact the economic growth in Albania, through reduced demand for exports. Their real GDP growth might be considered as an indicator of the external demand for countries exports. So, to compile this indicator we use the weighted average of quarterly GDP growth of 8 trading partners where Albania exports more than 80 per cent of its total exports[8]. Their shares on total Albanian exports are used as weights. A deceasing value of the indicator means a decrease in the demand for our exports, raising the country's vulnerability, so a higher risk score should be assigned. This indicator has a forecasting nature, as the fall in its values signals a fall in the demand for our exports. This may drive to the slowdown in the economic activity in a second moment and increase of risk to financial stability, due to the weakening of economic agents' solvency.

5.2 ***Weighted unemployment rate.*** Remittances from emigrants are still an important source of funds for the Albanian economy and this indicator is closely linked to the labour market developments in the countries where they live. Since the unemployment rate is one of the main indicators of labour market conditions, we perform the average weighted unemployment rate for the countries accounting for around 90% of Albanian remittances[9]. Increasing value of the indicator means reduced remittances, which increases the vulnerability; therefore a higher risk score should be assigned. The standard method is applied to the indicator.

5.3 ***International oil prices.*** Oil prices impact the economic activity in terms of output cost and domestic consumer prices. As a net importer of oil, Albania is exposed to the international oil price fluctuations, so it is important to include this variable in the dimension of "Global economic environment". This indicator is constructed as the annual percentage change of the IMF crude oil prices. The standard method is applied to assess the risk, where an increasing growth rate means higher vulnerability from the "external developments", therefore a higher risk score.

5.4 ***OECD CLI (composite leading indicator).*** This is one of the main international indices that signal the turning points in the business cycle,

[8] *Italy, Greece, Germany, China, Turkey, Spain and FYROM*

[9] *According to the World Bank data (remittances matrix), around 90% of Albanian remittances steam from: Greece (46.2%); Italy (37.3%), USA (6.4%) and Germany (1.2%).*

that is, the fluctuations of the economic activity around the level of long-term potential output[10]. Low values of this indicator might signal a negative turning point in business cycles, which implies a slowdown in economic activity, so an increasing risk. Since the distribution of the indicators' time series is fat-tailed, fluctuating significantly from the average, the standard method does not apply. Therefore, as in Dahl et.al (2011), we use an alternative method dividing the series into equal intervals, when assigning the risk values to the indicator (See Annex 1).

5.5 ***Three-month LIBOR and EURIBOR average rate.*** International financial markets are an important part of developments in the external environment. LIBOR and EURIBOR rates, as representative of funds' costs in international markets, are included to catch the signals that derive from these markets. The higher these rates, the higher the cost of funds, exposing the banking sector to more funding risk. The indicator is calculated as a simple average of 3-month LIBOR and EURIBOR rates. The standard method is applied to assign the risk level to the indicator, as higher value of the indicator (higher calculated rate) negatively affects the cost of funds and consequently increases the vulnerability.

6. Capital and banking sector profitability

Financial stability is closely connected to the banks resilience against various shocks. In this regard, capital is the indicator of the banking sector's capacity to absorb possible losses, while profitability is directly connected to its potential to increase this capital. Thus, there is a relationship between them, as higher profits contribute to capital increase. The inclusion of this category aims at assessing banking sector risk deriving from banks' capital and profitability and is constructed by five sub-indicators:

6.1. ***Difference between "Capital Adequacy Ratio" and "the regulatory minimum."*** Capital adequacy ratio[11] is one of the main indicators of banks financial soundness. The last financial crisis further highlighted the importance of maintaining it above a level considered as "safe"[12]. The higher the difference between the bank's "Capital Adequacy Ratio (CAR)" and the required minimum, the larger the buffers against eventual shocks, and therefore the less vulnerable the banking sector. A narrow difference implies a lower coverage and consequently a higher risk.

6.2. ***Non-performing loans ratio[13].*** This is the main indicator of banks' portfolio quality. An increasing NPL ratio erodes the bank capital due to increased provisioning exposing it to higher vulnerability thus signalling a higher risk from banking system.

6.3. ***Shareholders' equity to total assets.*** This indicator measures the share of assets financed by the shareholders' equity. As the capital is the first

[10] *This indicator includes a broad gamma of short-term sub-indicators for OECD countries, as: primary commodity prices, labour market data, monetary aggregates, financial variables, etc. This indicator is used to construct the stability maps by IMF, the Central Bank of Norway, the Central Bank of New Zealand, etc.*

[11] *It is calculated as "regulatory capital" ratio to "Risk-weighted assets".*

[12] *In the case of Albania, the minimum required is 12%.*

[13] *It is calculated as "(gross) Non-performing loans" ratio to "Outstanding loans".*

barrier against banks' losses, the high level of this ratio implies a better absorption capacity against possible losses, meaning a lower risk from banking sector.

6.4. *Net interest income to total assets.* Net interest income (interest income - interest expenses), are the main share of banks' income in Albania. The higher their share to total assets, the higher the bank's profit and vice versa. The fall in the value of this indicator implies increase of risk from the banking sector.

6.5 *Earnings before taxes against total assets.* A positive financial result can help to strengthen the bank's capital (Dahl. et. al, 2011). The bank's net result (profit / loss) depends on interest income and losses from non-performing loans, which we have already included in the two previous indicators. This indicator includes also valuable information on other operating income and expenses (income from commissions, personnel expenses, etc.). As in (Dahl. et. al, 2011), we use the before instead of after tax earnings to avoid fluctuations in the profit / loss as a result of possible changes in the taxation policy. The indicator is reversed, meaning a decline in the ratio of "earnings before tax to total assets" leads to increased vulnerability of the banking sector. The standard method is applied to assign the risk score.

7. Liquidity and financing of banking system

The purpose of this category is to assess the risk level to financial stability, deriving from the structure of funds and liquidity of the banking sector. If the structure is vulnerable, then the sector will be less able to withstand possible shocks (Dahl et.al, 2011). "Liquidity and financing" category includes four sub-indicators. Standard method is applied to each sub-indicator to assign the risk scores.

7.1 *Loan to deposit ratio.* This ratio measures the extent the total banks loans are covered by the total deposits as the main source of bank financing. A higher ratio means a better protection against credit risk and funding risk, therefore a less vulnerable banking sector. The indicator is reversed, so to a higher value of the indicator a lower risk score is assigned and vice versa.

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7.2 *Households deposit growth rate.* Households deposits are the main source of banks funds but also very sensitive to shocks in the financial system. They might run quickly out of the banks due to negative news and panic, leaving the banking sector exposed to liquidity risk and even failure. For this reason, the growth rate of deposits is an important indicator of liquidity and confidence in the banking system, where the high values reflect an increasing confidence and high liquidity levels. The global financial crisis 2007-2008, whose consequences were felt in the Albanian banking system during 2009-2010, mostly as an increasing concern fuelled by negative news in neighbouring countries (such as Greece), caused a rapid withdrawal of a part of deposits and a very low

rate of new deposits. Consequently, the households' deposits growth rate decreased rapidly, experiencing some periods with negative value. The indicator is reversed and the standard method is used to assign the risk scores.

7.3 ***Financing from non-residents.*** Non-residents are another financing source to banks, also considerably sensitive to potential shocks in the banking sector. A high financing level from non-residents increases the vulnerability of the banking sector. This indicator is constructed as a share of funding from non-residents to total funding and an increasing value means increasing exposure of the banking sector to funding risk. The indicator is reversed and the risk is evaluated by the standard method.

7.4 ***Difference between "short-term assets" and "short-term liabilities" up to three months.*** To assess the short-term financing risk, the liquidity sub-indicator is used, measured as the difference between "short-term assets" to "short-term liabilities" up to three months[14]. Owing to the fact that "short-term liabilities" has exceeded "short-term assets" throughout the time, the values of this series are negative. The deeper this gap, the less short-term liabilities are covered with liquid assets, thus the more vulnerable the banking sector in terms of financing. The standard method is applied to the indicator.

8. Banking sector structure

The banking sector structure in terms of assets' distribution within the sector, capitalisation level, lending to businesses or diversification of financing sources, may become a risk source from potential systemic shocks. The category of banking sector structure is based on five sub-indicators:

8.1 ***Share of the two largest banks' assets in total assets in Albania.*** The market share of the largest bank in Albania in terms of total assets reveals if this bank dominates the domestic banking sector. The larger this share, the smaller the market share of the remaining banks, which makes the banking sector more vulnerable to the performance of the largest bank. An increasing ratio means increasing vulnerability for the banking sector. As in the Albanian banking system, two main banks are identified, Raifeissen Bank (formerly Savings Bank, before privatisation) and National Commercial Bank, the sub-indicator is constructed as the ratio (in per cent) of these two banks' total assets to the total assets of the sector. As in (Dahl et. al, 2011) we apply an alternative method in evaluating the risk of the indicator. First of all, outer boundaries of 20% and 70% for the indicators values are subjectively set, meaning that: when the market share of the two largest banks falls below 20%, the risk is considered minimal and the sub-indicator risk score is automatically 0; whenever the market share is above 70% of the banking sector, the risk is

[14] *"Liquid assets/short-term liabilities" ratio would constitute a more correct indicator of liquidity, but as the use of this indicator has started at the end of 2009, the time series is shorter to be used in FSM. For, we have used the difference between short-term assets to short-term liabilities up to three months as approximate to liquidity performance in the Albanian banking sector.*

considered maximal, so the indicator's risk score automatically becomes 10. Then, the interval between these boundaries is divided into 9 sub-intervals of equal size which take the risk scores form one to nine (See Annex 1).

8.2 *Lending rate to business sector.* Lending to the business sector implies a more specialized and heterogeneous product compared to lending to households. Business loan portfolio also occupies a large share in the banking sector total portfolio, which makes it even more difficult to replace in case of banking problems. This sub-indicator aims to capture the vulnerability relating to the distribution of lending to the banking sector among banks. The more concentrated (in a small number of banks) this lending is, the higher the risk to the banking sector is. This indicator is based on the lending to businesses from the five largest banks in Albania, and is computed as the ratio of total lending to business sector from the second, third, fourth and fifth bank, to the largest bank's lending to the same market. A decreasing ratio means a high concentration of the lending to business sector (or a low distribution) which makes the banking sector more vulnerable. The scoring is conducted by firstly setting (based on discretion) outer boundaries of 100% and 250%. The lower limit of 100% represents the situation when the largest bank's lending to the business sector is as large as the four other banks' total lending to the same market, which means that the lending to businesses in highly concentrated in the largest bank, presenting therefore a high vulnerability. Whenever the indicator's values fall below 100%, the risk score is automatically valued as 10. Respectively, the upper limit of 250% represents the situation when the lending to business sector from the largest bank is 40 per cent of total lending from the four other banks to the same sector, which means a high dispersion of lending to businesses between the five largest banks, therefore a low vulnerability. Consequently, whenever the indicator's values are above 250%, the risk is considered minimal and the score is automatically valued as 0. The interval between these outer boundaries is than divided into 9 sub-intervals with equal width and the standard method is applied to assign the risk scores (see Annex 1).

The last three sub-indicators of this category assess the distribution of credit structure, financing structure and regulatory capital structure within the banking sector. According to Dahl et. al (2011), banks with similar characteristics, may be affected at the same way by economic shocks. A banking sector consisting of a high number of banks with the same exposure to various borrowers' categories, or relying on the same financing structure, may appear more exposed to shocks. To catch these exposures, two sub-indicators are constructed: the first analyses the differences in lending structure, and the second analyses the differences in the financing structure of the activity based in the calculation of the variance between the exposure of specific banks and the average exposure of the Albanian banking sector. The sub-indicator is reversed and the "standard method" is used to assign the risk scores.

8.3 *Deviation from the banking sector loan portfolio.* To construct this sub-indicator, as a first step banks' loan portfolio is divided into 3 buckets:

1) loans to public sector, 2) loans to business sector and 3) loans to households, stated as shares in per cent to total banking sector. Then the series of deviations between the credit structure of each bank and of the market is constructed. Finally, the variance of deviations is calculated based on lending shares of each bank, against the total lending of banking sector. The higher this variance, the higher the diversification of the lending within the banking sector, the more diversified the banking sector, thus the more resilient to shocks. The indicator is reversed and the risk is evaluated using the standard method.

8.4 *Deviation of banks' funds structure to sector structure.* In principle, the construction of this sub-indicator is similar to the construction of loan structure sub-indicator. At the beginning, the total debt funding sources (liabilities less equity) for the whole banking sector and for each individual bank is grouped into 6 buckets: 1. Treasury and interbank transactions; 2. Current account (public administration + private sector); 3. Demand deposits (public administration + private sector); 4. Time deposits (public administration + private sector); 5. Others (public administration + private sector); 6. Securities + other liabilities. The series of differences of funds' structure in per cent are constructed, between each bank and the structure of funds of total banking sector. At the end, the variance of differences is calculated, by using the share of each bank in the total funds of the banking sector. The higher this variance, the more diversified the banking sector, and thus the more elastic against shocks.

8.5 *Deviation from the banking sector's average capitalisation rate.* The construction of this indicator is based on the banking sector's average capitalisation rate in Albania. Notwithstanding all banks maintain a capitalisation rate above the regulatory rate of 12%, some banks appear close to this minimum, meaning that their capitalisation may be below the average rate of the sector's capitalisation. For this purpose, the difference variance between the capital adequacy ratios of individual banks to the banking sector's average is constructed only for those banks that are below this average level. The higher this variance, the more sensitive the banking sector against shocks. To consider the share of large banks in this sub-indicator, the variance is constructed and weighted with the share of each bank in total assets.

3.2 PERFORMANCE OF THE COMPOSITE INDICATORS FOR EACH CATEGORY

The series of sub-indicators described above, are aggregated using a simple average to construct the respective final indicators for each category of the map. The following figure shows the final indicators for each category and the analysis of their performance in reflecting the crises' moments.

Figure 2 Composite indicators for each category of the Financial Stability Map

Source: Bank of Albania, authors' calculations.

The composite indicators of "Domestic economy" and "External environment" categories reflect a low risk level prior to the crisis of 2007-2008. On the other hand, , the aggregated indicator for the "External environment" assumes risk values above average during 2007Q4 -2008Q3, mainly as a result of increased pressures on financial markets. The risk scores for this indicator also tend to increase during 2011, affected by two main shocks in the external environment: Greek crisis and euro area debt crisis. The fall in the GDP of our trading partners and the increase of unemployment in neighbouring countries,

such as Italy and Greece, provided the main contribution. The final indicator for "Domestic economy" category seems to reflect the financial crisis after 2008 Q4, where risk assessment ranges between the values of 6-8. Output gap and the amount of external debt provided the main contribution in this assessment.

During the pre-crisis period, the composite indicators of "Households" and "Businesses" indicate below average risk. Risk assessment from "Households" category started to increase during the period 2008-2010, mainly due to an increase in unemployment, the decrease in loan portfolio quality, the fall of household's expectations and reduced remittances. After 2012 Q2, risk from this category jumped again above the average and has continued to remain above this level, mainly due to the considerable deterioration of loan portfolio quality of households and lending slowdown to this sector. "Businesses" category seems to reflect the crisis after 2008 Q4, mainly because of the fall in lending pace to businesses below the historical average, and the fall in output volume index. After 2012 Q2, risk level transmitted by this category has reflected a considerable increase due to the slowdown in lending, the worsening of loan quality and businesses' expectations.

The risk assessment for the "Government" category remained above the average till 2004 Q4, due to the increased level of budget deficit, albeit it has been decreasing during the fiscal consolidation period 2005-2006. This trend continued until the pre-crises period, where the risk from this category is assessed as low, with the values of indicator averaging around 1 and 2. In 2009, the indicator increased somewhat above the average level, mainly due to an increase in government debt' size and sovereign risk premium, but it was followed by a decreasing period. From 2012 Q2, the performance of the aggregated indicator for the "Government" category has signalled an increase risk mainly due to the considerable expansion of government debt and budget deficit, and due to the weak performance of tax revenue.

The composite indicator for "Capitalisation and profitability" of banking sector shows low risk values before the financial crises (period 2006-2007) and during the crisis outbreak (2007-2008), reflecting the high profitability and capitalization of the Albanian sector in that period and the non-involvement of our banks in toxic investments. The risk associated to this category increased above the average, since 2011 Q3, and has continued to be above this level, mainly due to the high level of non-performing loans and their eroding effect on the banks' capitalisation and profitability. On the other hand, the aggregated indicator of "Liquidity and funding" category shows a stronger reaction during the crisis outbreak in 2007-2008, with risk values increasing above average. During 2008Q4-2009Q4, bad news regarding the financial crisis raised the public concern on the banking sector soundness, leading to deposits withdrawal and therefore a significant decline of liquidity. As a result, the risk relating to the dimension of "liquidity and funding" is assed as maximal during this period. After this period, risk assessment has been decreasing, due to the return of deposits in the system and the improved liquidity situation during 2010. Also, the risk level of this category continues to remain considerably

above the average level and trends up, being impacted by the continuous fall in deposits pace of households in the system and the down trend of deposits/ loan ratio.

In contrast to the above mentioned categories of the banking sector, the risk level from "Structure of banking sector" is assessed as average or somewhat above the average in the period before crisis (prior to 2007 Q4), while during the crisis and the following period, the assessment of risk drops to the average level. This because during these periods, banks have diversified their funding structures as a response to the crisis, mitigating this way the funding risk. During the last two years, risk assessment from this category has been decreasing further, mainly because of a continuous reduction of Raiffeisen Bank's market share, as the largest bank in Albania, reducing the joint share of the two biggest banks operating in the country (BKT and Raiffesen).

4. MAPPING OF FINANCIAL STABILITY

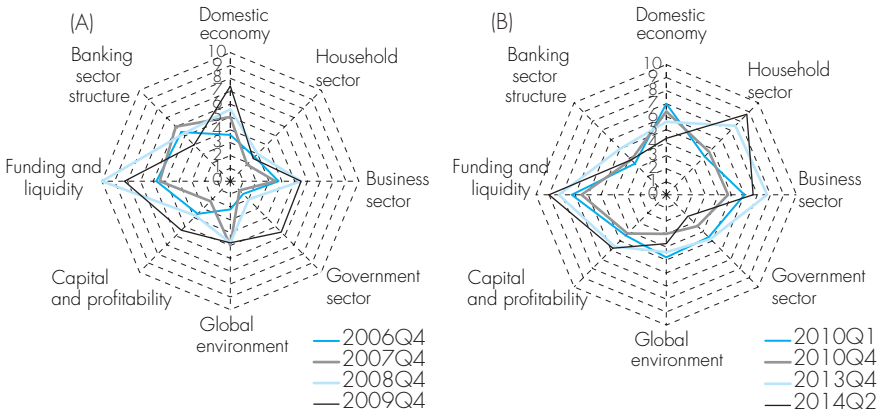
Figure 3 (A and B), shows all categories combined in a single diagram (financial stability map) in some crucial periods, such as prior, during and after the materialization of a financial shock. The display of this diagram at different time moments shows how risks to financial stability deriving from various economic agents/sectors, may shift over time.

Figure 3(A) shows the financial stability map in some key moments, such as prior to the financial crisis (2006 Q4 and 2007 Q4), during the crisis outbreak in international markets (2007-2008) and during the following year (2008-2009), when the crisis consequences started to affect the Albanian economy. Thus, prior to the crisis, the map is mainly located in the centre, meaning that risk level deriving by all the included categories was generally low. The outburst of the financial crisis in 2007 initially did not provide any significant effect on the Albanian economy and on the banking system, as the risk scores in this period resulted below average. On the other hand, risk scores for the category of "external environment" increased considerably at the eve of crisis (2007 Q4), reflecting the shocks in the financial markets because of the increase in the key interest rates (LIBOR, EURIBOR) and the fast increase in oil prices. Along with the further intensification of the crisis during 2008-2009, the map moves away from the centre, towards the indicators outside of the banking sector. This shows that in this period the main risks stem from the real economy and the economic agents: households, businesses and government.

Figure 3(B) shows FSM in some other moments, such as: during the Greek crisis (2010 Q1-2010 Q4), followed by the sovereign debt crisis in euro area (2011 Q2) and during the last two years (2013-2014). As shown in the figure, during 2010-2011, the risks coming from the developments in external environment increased above the average level, while risks from internal factors have shifted from the real economy to banking sector, especially in the indicators of "funding and liquidity" and "capital and profitability". Also, the figure shows the FSM in the last two years (2013-2014), where the shift of

diagram in time shows that risks related to economic agents are up, particularly in terms of households and businesses. This reflects the increase of risks from these sectors due to the contraction of credit and deterioration in its quality, fall in output volume index in businesses and increase of unemployment. In banking sector, risk level related to "sector structure" have decreased below the average level during the three periods under review, mainly due to the fall in the concentration within the sector and the increase in the diversification in the financing structure. Meanwhile, risks related to "funding and liquidity"/"capital and profitability" were high in the previous year, reflecting the high level of non-performing loans and the fall in profits during this period. Also, it appears that risk level from "capital and profitability" is moderated during 2014, mainly due to the improvements of banks' profits.

Figure 3(A) (B) Financial Stability Map in different periods



Source: Bank of Albania, authors' calculations.

6. CONCLUSIONS

The Financial Stability Map, constructed as a cobweb-style model, is a technical instrument that summarises graphically the risks arising in a given moment from factors inside and outside the banking sector. The map constructed for the case of Albania seems to perform well, reflecting the effects of external or domestic shocks to the country's financial stability. Moreover, the performance of the model depends highly on the type of indicators used to construct each category, which makes it a subject of discussion. Also, some categories react faster in signalling risks to stability and this is often related to the moment the indicators' data series are reported, considering that some are reported with several months delay. Taking into account the above-mentioned drawbacks, the FSM should not be considered as an instrument that judges whether the financial system is stable or not, but as a practical tool to anchor discussion, focusing the readers on current risks to financial stability. The financial stability assessment requires the evaluation of a wide range of factors that cannot be

aggregated into a single model. For that reason, it is important to bear in mind that FSM results should be used together with the results from other analysis and instruments regularly performed by the Bank of Albania to judge on the financial stability in the country.

Considering the dynamics of the financial environment and the fact that every crisis is different, it is crucial to frequently update and improve the map, adjusting to the domestic and external economic developments, to better capture the risks to our financial system. This may require including new indicators or further elaborating existing ones.

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CHALLENGES OF IMPLEMENTING THE BASEL II

Lindita Vrioni
Research Department

ABSTRACT

The Basel II aims in aligning better the regulatory capital to the risks, by encouraging systemic risk management practices, especially in the area of credit risk. The new regulation of BoA, "On Capital Adequacy Ratio", that entered into force on 31.12.2014, imposes banks to implement the Standardized Approach (the simple one) for calculating the credit risk. This paper provides an analysis of the two options of implementation (SA and IRB) through discussion of costs and benefits, to display issues of concern for a reliable implementation of the Basel II. As the Standardized Approach brings little impact towards the credit risk management and also the existence of some obstacles in implementing the IRB approach, in this paper we propose an alternative way of implementing the capital standard in the contest of Albanian banking system (by using the Credit Register data). [1]

INTRODUCTION

Now the Basel Accord already is an international law and not an international standard for regulatory capital. About 140 countries apply its provisions, because Basel II in the EU is being implemented in the form of the Credit Requirement Directive (CRD), which was adopted by the E.U. Commission in July 2004, which led to the application of Basel II requirements in consolidated supervision way.[2] The European Directive targets all credit institutions and investment firms, irrespective of their size, encouraging them to upgrade their internal systems, resulting in a more risk-sensitive management of their activities in the future[3].

All countries, especially the advanced ones, considered the implementation of Basel II as a support for improving the quality of capital in banks and increasing the risk sensitivity of bank capital requirements, in such a way that will enhance the ability of the banking sector to serve customers and promote economic growth. With the same aim the BoA approved the new Regulation on Capital Adequacy, which entered into force on 31. 12.2014.

As the Albanian financial system is based on banks and the economy relies mostly on bank financing, the importance of banks and banking system

[1] *This paper is the sole responsibility of the author and the views represented here do not necessarily reflect those of Bank of Albania.*
[2] *For more details, consult Ayadi & Resti (2004) and BCBS (2006a).*
[3] *For the full text of the CRD, see the European Commission's website (retrieved from http://europa.eu.int/comm/internal_market/bank/regcapital/index_en. htm#capitalrequire)*

to financial and economic stability of our economy is of vital importance. Knowing that the essence of banking activity is to take and manage risks, the Basel II helps to better aligning regulatory capital of banks with actual risks they are facing.

There are a lot of academic empirical studies and impact studies from BIS, which support some of theoretical benefits of implementing the Basel II and the key question rises whether this benefits will result, even in practice for the Albanian banking system.

Supporting the creation a more sensitive risk-based capital framework, this paper treats some concerns regarding the approach imposed by the supervision for implementing the capital requirements for the credit risk, i.e Standardized Approach. It is to be considered if this approach will provide banks with enough incentives to improve risk assessment and management techniques and contribute in creating a regulatory environment coherent and in convergence with the European banking system. Also we have to check whether the pre-necessary conditions for the internal rating based approach (IRB) implementation are viable in our case. Both approaches seemingly have their own problems, so by pondering what they offer in the context of Albanian market we offer a viable alternative in order to help the implementation of Basel II in Albania. Such a reliable implementation of Basel will be possible if the supervision will use the information collected in Credit Register. This paper focusing on only credit risk, based on Roger Ferguson[4] saying in 2003:"the Basel II is more a proposal for strengthening risk management than a proposal for improvements of the capital standard".

The first part describes the context of implementation of the new regulation, the reasoning behind each approach, what will bring Standardized Approach in terms of credit sensitivity, what are the shortcoming of this approach for Albanian banking system, what is the option which is not considered from the regulation, what are the challenges of implementing the IRB approach in Albania and its advantages, and finally, in the third part it is proposed an alternative instrument for a reliable implementing of Basel II by using the Credit Register.

THE IMPLEMENTATION CONTEXT

The new requirements will apply to all Albanian banks. The Standardized Approach, as stipulated in the Regulation, proposes changes to the general risk-based capital requirements for determining risk-weighted assets in the denominator of risk-based capital ratios. The new regulation for Albanian banking system entered into force almost 10 years after the Standardized Approach of Basel II was finalized.

The decision for imposing this approach for credit risk capital requirements was taken based on the complexity of banking activity in Albania. The Regulation

4 Roger W. Ferguson, Jr. is an American economist, who was Vice Chairman of the Board of Governors of the Federal Reserve System from 1999 to 2006

stated that banks in Albania do not have the necessary risk measurement and management capacities to qualify for the advanced approaches.

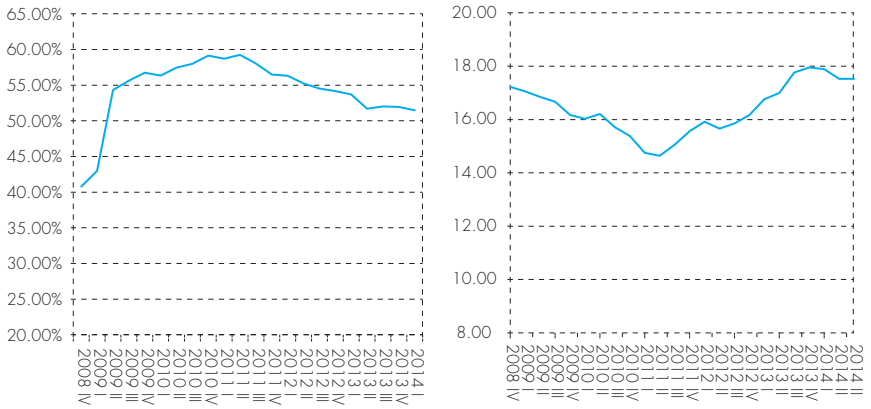
In the meantime, as the regulation was in the "wait and see mode" the European owned banks in Albania, forced by European DIR dedicated time and resources to develop the more risk-sensitive internal models under the IRR approaches capital framework. The data from the Albanian banking system capital structure show that foreign capital continues to contribute mostly to the capital structure, which accounts about 92% of paid-in capital of the banking system.

Currently, since some years, a significant part of banking system is computing 2 sets of capital ratio, one as part of compliance for consolidated supervision to Home country and one as part of compliance to BoA supervision. The situation in Albanian banks is different from the time the decision for the Standardized Approach adoption was taken. Banks now have a history and have collected and stored a lot of information regarding their crediting activity.

The decision for not including the IRR approach as an option to be chosen by the banks for setting capital charges on the credit risk, was taken on the bases that the banks often lack historical data and therefore, at least at an early stage they may not be able to implement stable and conservative internal ratings. At the time of decision the lack of historical data in the level of individual banks resulted from their short financial history and the lack of sufficient credit defaults data for all the system derived from the size of the banking market. This concern is a prudent one as the credit risk is the biggest risk that the banking system faces, especially in Albania. Apart that IRR approach is a good one, regarding the risk managements, at the time of the decision the real concern might have been how to implement in practical terms it, for the banks and the supervision. Besides the fact that analogue internal models are already used by banks for setting capital charges on the market risks, this risk is relatively insignificant for the bulk of Albanian bank compare to credit risk. The improper rating of credit risk brings significant risks for the supervision. Capital adequacy ratio built on inadequate or incomplete data may, therefore, generate dangerously inadequate results.

Taking in consideration the reasoning about the two options we come across the question whether the Standardized Approach, though more simple, it is not affected by the absence of the available data necessary for the assessment of credit risk. Living the burden to ECAI does not mean that the problem is solved. The capital ratio depends on the classification of assets according to risk, while the classification of assets according to risk reflects the assessment of the risks by banks. In the charts below are presented the risk weighted assets and the capital ratio calculated based on them, for the Albanian banking system.

Chart 1 RWA over total assets (left) and ratio of CA (right)



Source: Author's calculations (data from the banking sector).

The chart on capital adequacy ratio shows, that despite the fact that the minimum regulatory benchmark for banks in Albania is 12%, in fact the Capital Adequacy Ratio (CAR) at the end-2013 was almost 18 %. This high level is based on the concern of the risk weighted assets from the supervision side or better said about the right classification of the assets as the reflection of the real risk. Insisting in the same level of CAR (12 %) even in the new regulation (all the countries in compliance with the Basel II have the level of CAR 8%) reflects the concern of the supervision that the Standardized Approach outcome may not produce a regulatory capital in alignment with the real risk that the banking system will face. Is this level of CAR keeping in the old fashion a compensation for the possible understatement of risk weighted assets, avoiding the needs for more complex rules parameters surrounding credit models?

MEASURING RISKS THROUGH TWO DIFFERENT APPROACHES

In the Basel II there are two options for the measurement of credit risks: the standardized approach and the internal rating-based (IRB) approach).

Under the standardized approach, risk weights are to be refined by reference to a rating provided by an external credit assessment institution. That is, ratings to credits will be translated into risk-weight categories according to a predetermined conversion table (see table1).

Tabela 1.1 Peshat e rrezikut në metoden standarde

	AAA	AAA-	AA+	AA	AA-	A+	A	A-	BBB+	BBB	BBB-	BB+	BB	BB-	B+	B	B-	Below	unrated	Past due
Corporate	20%					50%			100%						150%				100%	150%
Sovereign	0%					20%			50%			100%						150%	100%	-
Banks	20%					50%						100%						150%	50%	-
Banks based on their country of incorporation	20%					50%			100%			150%						150%	100%	-
Retail	75%																			150%
Banesa hipotekare	35%																			100%
Commersial real estate mortgages	Nga 100% deri në 50% sipas rregullores së vendit																			150%

Source: BIS.

The exposures are classified into a set of standardized asset classes (sovereign, banks, corporate, retail, residential property, commercial real estate and other assets), and a risk weight is applied to each class, reflecting the relative degree of credit risk. The number of risk buckets is relatively small (corporate exposures, for instance, are weighted at 20%, 50%, 100% or 150%); for unrated exposures, a fixed 100% risk weight is used. In turn, this ensures that banks which take on greater risks also hold additional capital to cover these risks.[5]

I am not going in detail[6] but just to give an example as banks for this approach are expected to rely on ECAIs.

The amount of capital required on an unsecured 1 Euro loan to a private firm – now fixed at 12 cents (12% x 1 Euro), depending on the ratings issued by the ECAI will either decrease to 2.4 cent, or increase to 18 cent.

Better ratings (type AAA-AA) will bring about lower weights in the computation of risk-weighted assets;

For example, a 100 loan euro to a AAA-rated non-financial company will translate into Euro 20 of risk-weighted assets, and will therefore lead to a capital requirement of 20 x 12 % = euro 2.4 (in other words, 2.4% of the un weighted exposure).

Similarly, a euro 100 facility offered to a sovereign state with a rating lower than B- will give rise to a euro 150 risk-weighted exposure, hence requiring a capital coverage of 150 x 12% = euro 18 (18 % of the face value).

The standardized approach offers a simple method to the banks which lack the necessary risk measurement and management capacities to qualify for the

[5] *For more detail on the Basel regulation, see Tarullo (2008) or http://www.bis.org/bcbs/index.htm.*

[6] *Details on the theoretical background are given in Basel Committee on Banking (2005a) and Gordy (2003).*

advanced approaches. However by operating under this approach the banks might not be interested to upgrade their risk measurement and management systems.

Anyhow this approach delivers risk sensitivity only if all corporates are rated and if their ratings properly reflect their risk profiles. Considering the meaningful implementation of the SA the main problem in Albania is the very low penetration of Credit Rating Agencies. This means that most claims will be rated 100%, as in the absence of the capital market, most of corporations are not quoted. The unrated corporates are expected to face the same risk charges as in the Basel I and so there would be no change with respect to Basel I.

In this situation, it is expected that highly risk exposures will be more favored in terms of capital charges when they are simply unrated, since unrated companies incur a lower risk weight than companies rated B and below. A company rated below B carries a 150% risk weight. This means that banks would have an incentive to lend to an unrated company rather than to one with a rating below B-. The weak companies would not be interested to be rated because they would lose the chance to be credited. On the other hand because of the very limited activity of rating agencies in Albania, most probably might cause undesirable prices. Consequently small borrowers (highly creditworthy borrowers) may not afford the services of rating agencies, and banks would tend to have more and bigger borrowers on their loan books. Implementing the standardized approach would enhance the credit bias toward largest borrowers in general. Even if a large corporation will be able to afford the services of a Credit Rating Agencies, the CRA being in front of limited data, the lack of capital market and the uncertainty of differences in accounting practices, most probably will determine a low rating for that corporation.

Earlier –in a previous paper- I have claimed that the low rating penetration in Albania market and the limited data available aren't in support of the use of the Standardized Approach in terms of linking capital to risk. Whether the limited data available do not support implementing IRR approach and how this data will become available for the credit rating agencies, is to be seen.

Also problems regarding the accuracy of the rating from the rating agencies might occur in practice.[7] (For the concerns about the Credit rating see more on Vrioni About ECAI Recognition)

Some other possible scenarios have to be considered, as for instance whether the ECAIs have the needed accurate information in order to reach the right findings. It might happen situations when the ratings estimated internally by the banks to be more accurate – having in mind that the banks are more interested in credit risk assessment of their clients, they would bear the responsibilities of wrong evaluations and also the banks more familiar with the market and the business environment etc. Such scenarios often are met even in Europe where

[7] *http://www.bankofalbania.org/web/Bulletin_of_the_Bank_of_Albania_H_II_2013_7076_2.php?kc=0,22,11,0,0*

CRA's are performed at the best case only 53% of all DAX-30 firms have a credit rating.

Obviously rating small companies for the sake of Basel II might be avoided. Internal credit mechanisms and risk grading of banks are sufficient. Banks may increase their competence from the expertise of the rating agencies, time to time. To be rated repeatedly, time after time it is not cost effective for the companies especially the small ones.

So in summary what's the Standardized Approach brings, would be:

- Use external credit ratings to risk weight
- Use the risk weight of the appropriate sovereign to assign risk weights for exposures to banks.
- Use loan-to-value ratios to risk-weight residential mortgages.
- Lower the risk weights for some retail exposures and small loans to businesses.
- Expand the range of credit risk mitigation techniques that are recognized for risk-based capital purposes, including expanding the range of recognized collateral and eligible guarantors.
- Increase the credit conversion factor for certain commitments with an original maturity of one year or less that are not unconditionally cancelable.
- Revise the risk weights for securitization exposures and assess a capital charge for early amortizations in securitizations of revolving exposures.
- Remove the 50% limit on the risk weight for certain derivative transactions.
- Revise the risk-based capital treatment for unsettled and failed trades for securities, foreign exchange, and commodities.

COSTS OF IMPLEMENTING THE SA

Notwithstanding the fact that the method is conceptually simple (exposure x weight) its implementation for banks is complex. The treatment of collaterals is complex. The transposition of the Basel text into regulation (CRR) was sometimes difficult to interpret (The DIR has 13 annexes with more than 200 pages and the articles of the CRR dedicated to the risk weights assignment mentions lots of specific cases are which bring complexity to the implementation).

The Standardized Approach creates important problems to the Albanian banks as they must change significantly the internal methods and standards in collecting and reporting information to calculate risk-weighted assets.

For instance, as the Standardized Approach recognizes, that banks would be "required to change their internal reporting process," provide "additional personnel training and expenses related to new systems (or modification of existing systems)," and "obtain additional information in order to determine the applicable risk weights". Under the Standardized Approach collecting and reporting information to calculate risk-weighted assets from the banks to determine regulatory capital requirements will be used for being in compliance

with the regulation, and the information will not be used in every day risk managements.

Still is not clear enough whether standardized risk weights would reflect the actual, observed risk of assets or the relative risk across asset classes, as the standard is not taking in account that under the unexpected changes in economic conditions, some of the weights will overestimate or underestimate the actual risks.

Moreover forcing similar risk weightings for the same category of client, regardless of profit mix, business model and environment, is liable with removing the link between capital and risk. Banks are working with borrowers to find workable solutions to their credit needs; banks currently make many categories of loans that often do not fit the standard mode favored by the Standardized Approach.

This approach would require costs from the banks yet deny them any potential benefit from using the more risk-sensitive internal models under more advanced approaches capital framework. In addition to the compliance costs associated with performing two sets of capital calculations removes incentives for banks to develop upgraded internal methodologies that would identify, monitor and manage risk.

The requirements in the Standardized Approach should not be considered in isolation but instead should be considered together with the development and the future changes proposed in the Basel III and in the standing and the objective of European regulators too. Since November 2013 the European regulators (the Joint Committee of the European Supervisory Authorities (EBA, ESMA and EIOPA) adopted the objective of reducing reliance on external ratings in financial regulation substantially within Europe.

Also after the Crises the IIF's 2009 Restoring Confidence Report in "Section4. Financial Stability Through Macro prudential Oversight", recommended for the banking industry.

"Improvements of internal risk models:

Excessive reliance on external ratings in internal risk models meant that senior management in some firms were not aware of the sensitivity of risks to the assumptions being made. A revised approach to internal risk models places greater emphasis on complementary measures such as robust stress testing."

From the financial stability point of view,[8] it would be dangerous for the whole banking system if banks would be obliged to use the standardized approach as their main risk management tool. The standardized approach would encourage all banks to behave in the same way, so increasing the systemic

[8] *It should be noted that the IMF Working Paper Revisiting Risk-Weighted Assets (March 2012) shares") the same analysis.*

risk. Different models of banking activities are more advisable as a prudent stand as it generates less correlation.

In a lot of studies, in different ways suggesting something along those lines as Peter Sands said: "In banking, too much simplicity can be dangerous" Financial Times, August 26, 2013 said "The simplicity of the SA which at the beginning was one of its great virtues, will, in a more complex financial system, become its greatest failing. The financial world has become more complex and the regulatory world must move in step. The issue, therefore, is not whether regulatory arrangements should be modernized, but rather how they can be achieved in a balanced way, in a reasonable time frame."

The banking sector uses sophisticated methodologies and technologies, though not more than other sectors. Moreover, the complexity of the banking industry reflects the evolution of the economy and society in general. Discouraging the further improvement or use of sophisticated risk management tools would not lead to a simpler world, but on the contrary, would make it more difficult and complex to master it adequately.

Allowing the use of internal risk measures is a fundamental innovation, which reduces the likelihood of the regulatory framework becoming outdated as a result of developments in financial innovation and risk management techniques. In addition, banks' informational advantages can be better exploited to achieve a more accurate alignment between the regulatory capital and the target level of economic capital. Finally, placing responsibility clearly with the management gives banks incentives to develop internal risk management systems.

IRB APPROACH

There are numerous studies[9] and models performed by the academic world about the Basel's modeled approaches, and it seems that underlying the Accord is some formal economic modeling. The common finding of all these studies is that the quality of a model depends on the quality of the inputs of the model.

The eligibility for the IRB approach under Basel II [10]is determined by several requirements on bank management and internal controls. But to setting capital charges for credit risk particularly interesting are the quantitative requirements for the bank's rating system and the availability of certain data.

There are two IRB approaches: the foundation and the advanced one. The guidelines of BIS suggests that the IRB foundation is better to be applied in countries where the banking activity is mostly retail one. According to this

[9] *Bank regulation ,capital and credit supply: Measuring the impact of Prudential Standards William Francis Matthew Osborne UK Financial Services Authority*

[10] *"Enhancements to the Basel II Framework" July 2009 Bank of International Settlement Publications http://www.bis.org/publ/bcbs157.htm*

suggestion as the banking activities in Albania are mainly retail ones the foundation approach might be the option to be taken in consideration.

Under the IRB approach, the allocation of exposures to portfolios follows the same rules as in the SA approach, except that the number of asset classes is higher.

The asset classes are sovereign, bank, corporate (Broken down into exposures to small- and medium-sized enterprises, specialized lending, purchased receivables and other corporate exposures), retail (Broken down into residential mortgage loans, qualifying revolving credit exposures, purchased receivables and other retail including loans to small businesses) and equity exposures to which different risk weight functions apply.

In the IRB approach, the risk weights are based on banks' internal ratings of their borrowers to be allowed for this option:

- The bank must have been using a rating system at least three years prior to qualifying for the IRB approach.
- The length of the observation period for the data used for the bank's estimation of PD must be at least five years.
- The length of the observation period for the data used to estimate LGD and EAD must be at least seven years, except for retail exposures for which the period is five years.

If these conditions are met and the banks are allowed to create their own rating system (instead of depending on external agencies), the capital against each credit exposure will be a function of four basic risk parameters: the probability of default (PD), the loss given default (LGD), the exposure at default (EAD) and the remaining maturity of the exposure (m) of the credit portfolio to which the exposure belongs.

In the Foundation IRB Approach the PD must always be provided by the banks, whereas LGD, EAD and M can be provided by the supervision regulation.

The above risk parameters are the inputs needed to estimate the credit risk of a single loan:

PD -The default probability for a borrower over a one-year period. It is also known as the expected default frequency. A starting point of the measurement of PD is the definition of default. In general, the default event arises from the non-payment of principal or interest. It is commonly admitted that default occurs if payment is past due 90 days. These types of loans are characterized as 'non-performing'.

EAD - The expected amount of loss on a facility provided to the borrower when defaults result.

LGD- The amount the borrower owes at the time of default, the exposures outstanding at the time of default.

The expected loss is a simple multiplication of (PD*LGD*EAD). The conversion into risk weights derives from analytical formula that links capital requirements to the unexpected component of credit losses (UL), the idea being that the expected loss component (EL) is already covered by provisions.

The IRB foundation approach therefore contains a deliberate simplification compared with the most advanced techniques currently applied.

This simplification allows for a model that is standardized and can be applied uniformly to banks of different sizes and portfolio compositions. The horizon of the risk assessment is set at one year. The IRB model also assumes a 99.9% confidence level. For more details, see Resti (2002).

BENEFITS OF INTERNAL MODELS

Significant advantages result from a risk-sensitive capital framework (modeled approaches) as follows:

An important requirement for banks to qualify for and retain eligibility to use the internal model approach, is to prove to its supervisors that the information used to determine regulatory capital requirements is also used during the conduction of its regular business, especially in risk management. The risk management systems within a bank may be improved in several ways by the use of internal models. The collection of historical reliable defaults and credit loss data for the IRB foundation models requires a considerable effort which leads to the quality of information used for risk management.

A survey by CEPS Task Force for the Basel II, conducted after the crisis have found that: "credit models quantify the portfolio scorings and ratings in terms of PD, providing a common and objective measure across clients. This offers a great advance from earlier models or manual processes that ordered clients by credit".

The Analysis of BIS Basel impact studies has shown that the use of models in every day banking business, have improved the risk-return assessment process, providing management with data on the credit margin as the first line of defense against credit losses.

The replacement of the accounting "incurred loss" methodology with a more forward-looking approach based on a financial accounting definition of expected loss it is based on the IRR model. IRB models may play a role, not only to determine the required minimum capital, but also supporting the accounting requirements for credit impairment allowances, which after gross income constitute the second line of defense against credit losses.

The use of internal models for credit risk, by definition, turns regulatory capital more risk sensitive and therefore helps to support financial stability.

AN OPTION TO BE CONSIDER FOR THE ALBANIAN BANKING SYSTEM

As above discussed, the challenge of allowing banks to use the internal model is the pre-requisite of the available reliable and appropriate data. Whether the sufficient necessary data are available or not, it is a question that must be confirmed by any empirical studies or survey.

Despite the fact of the existence of Basel Committee's quantitative impact studies on Basel implementation they do not include Albanian financial market, that is why I believe that the new regulation would have been more effective, if the Supervision had first conducted an empirical study (Albanian version) of the impact of the regulation on all segments of the Albanian banking sector, bank customers and the broader Albanian economy. Instead of conducting their own comprehensive quantitative analysis, the supervision has seemingly relied on general statements to justify their imposed approach (Standardized Approach) and have placed the burden on the market of both banks and rating agencies to provide the data for the implementation of Basel II. Is this shifting of responsibility consistent with sound regulatory policy or legal requirements? The data may exist at the level of the banks already for more than five years, since the banks began collecting the data. Of course for the calibration of the models and for the back testing are needed much more data, but the guidelines of the EBA are offering all the options for the appropriate solutions. A joint database aggregating rating information from banks has been proposed in the EU consultative document, for instance, to facilitate reliable implementation of the IRB approach, in particular by smaller banks. Some countries in the similar conditions like Albania are now a compliant Basel II and didn't delay their banking system in meeting the deadlines for the Basel III. A possible solution could be the Information of Credit Register.

INFORMATION OF CREDIT REGISTER

A lot of studies (see the references)[11] have demonstrated that the availability of IRB parameters - Probability of Default (PD), Loss Given Default (LGD), Credit Conversion Factor (CCF) - allows the estimation of the expected loss.

Andrew Powell at his paper on Basel II and Developing Countries: Sailing through the Sea of Standards[12] proposes a centralized rating-based approach as a transition measure.

[11] *Studies of Daniel Porath as for example" Estimating probabilities of default for German banking system"*

[12] *World Bank Policy Research Working Paper 3387, September 200*

What he suggests is that the Credit Register is a useful source of information to estimate probabilities of default and other parameters to feed into credit risk models"

The Albanian Credit Register has started to operate at the Bank of Albania since January 3, 2008. The banks upload everyday new loans and update the loan repayment status at every end of month. The Register contains positive and negative information on borrowers and such data will be retained at the Register for 5 years. My concern is that this information has to be retained in a backup for the purpose of statistical risk assessment. Even in the regulation of Credit Register this purpose is laid down: "the use and/or publication of information from the Bank of Albania for research, statistical and other purposes supporting the supervisory process."

In a simplified, not technical language the parameters necessary for the IRB might be expressed as follows:

- The clients one year probability of default assigned by the banks internal rating (expected default frequency);
- The specific contract's loss given default: type of collateral; percentage of collateral coverage (loan to value ratio);
- The contract's exposure at default;
- The contract's means maturity;
- The portfolio granularity.

According to the IRB Foundation only default probabilities have to be estimated by the banks, while other factors will be decided by the supervisor. Banks shall estimate a PD for each rating grade or pool. Such estimates shall be based on the long-run averages of one-year default rates.

The Credit Register will help for the information on other parameters. The challenge for the Credit register will be the need to classify the existing information according to Basel classification of assets. Some transformation and data refinements will needed as a reconciliation procedure for identifying each exposure with the relevant supervisory class.

The Credit Register includes information on the characteristics of each loan, including the following: type of instrument (trade credit, financial credit, lease, etc), currency denomination, maturity, whether the collateral exists or not, type of guarantor, the coverage of the guarantee, the amount drawn and undrawn of a credit commitment and, finally but very importantly, whether the loan is current or past due (distinguishing between delinquency and default status). The Credit Register also includes information relating to the characteristics of borrowers.(For more on Albania Credit Register).[13]

In the literature are mentioned some countries that have implemented the Basel using the information of Credit Register such as Spain and Argentina.

Through the observation of the logical steps that the guidelines suggest, a way

[13] *http://www.bankofalbania.org/web/Credit_Registry_3306_2.php?kc=0,8,7,0,0*

to assess the parameters would be:.

Firstly, the banks have to assign a grade to the obligator according to the:

a) Obligor's risk characteristics;
b) Transaction risk characteristics, including product or collateral types or both and estimating the risk components.

The rating grades are the ability of the obligor to meet its contractual obligations, carried out on the basis of all reasonably accessible quantitative and qualitative information and expressed in terms of an ordinal grade. The rating grades are ranked on the basis of the credit risk. The probability that an obligor is in default augments as he moves from a lower to a higher risk grade. The definition of default it is similar as in Basel II: at least 90 days overdue, failing to meet financial obligations on.[14]

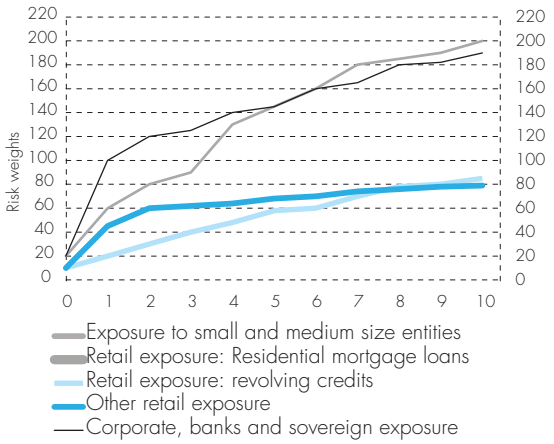
The empirical approach uses historical default data to characterize borrowers in default, performed with logit or probit regressions to define a grade function S of the form:

$S(xi\ ) = b1x1 + b2x2 + \ldots bnxn$

The vector x contains relevant risk factors, which differ based on borrower characteristics. So for business the vector x might be financial statement ratios, profitability market data etc., for retail customers, might include income, work history and other demographic data.

The statistical model generates a grade that ranks borrowers according to their probability of default. After that, the banks will plot the curve of PD respectively to percentage of risk, as in the Chart below proposed by the guidelines of BIS.

Chart 3 The probability of defaults



Source: ECB (2005).

Risk weights are calibrated to cover only unexpected losses which have to be met via capital requirements. Source: ECB (2005).

Then the supervisor has to estimate the other parameters. The information required for explaining the LDG are: type of collateral; percentage of collateral coverage (loan to value ratio). All this information can be allocated by Albanian Credit Register. A real example it is presented by Gabriele Sabato and Markus M. Schmid in their paper "Estimating conservative Loss given default".
The estimation is done by long-run default weighted average LGD. A long-run default weighted average is estimated for each pool. For each considered period (month or year), the number of defaults

[14] *Past due and overdrawn positions include is defied not only by regulation there are some technical " past due that is bank decision*

occurring in that period should be used to weight the final calculated average by following three steps as in the table below:

Table 1.2 Long run default weight average LGD

Steps	Credit ID Year X1	EAD	Recoveries (discounted)	Costs (discounted)	Economic Loss (EAD-(Rec-Costs)	EL/EAD per Credit
Step 1.	AB01	125.000	52 000	12500	85500	68 %
	AB02	95.000	55 000	3500	43500	46 %
	AB03	100.000	40 000	6000	66000	66 %
	AB04	100.000	40 000	6000	66000	66 %
Step 3.	246 % Single year average Default- weighted LGD Year X1 = (1/4 x 68 %)+ (1/4 x 46%)+(1/4 x 66%) =					61.5%
	Over year average					
	Year		Default- weighted LGD		No. Defaults	
	X1		61.5 %		4	
	X2		55.4 %		3	
	X3		61.3 %		5	
	X4		65.4 %		7	
	X5		65.2 %		8	
	27					
Step 4.	Default-weighted LGD average					
	= (4/27 x 61.5%)+(3/27 x 55.4%) +(5/27 x 61.3%)+(7/27x 65.4%)+ (8/27x 65.2%)					
	Over year weighted average: 62.9%					

A much simpler version of IRB is proposed by Gersbach A and Wehrspohn since 2001. Authors have applied their formula by stimulation exercises with real bank portfolio. We may take in consideration these other applications from the academic field for estimating, by using Credit Register. The parameters estimated for the entire population of banks could overcome the data problem mentioned above and in the same time may be used as the benchmarks to compare with those assigned by individual banks. Objective floors can be introduced at different levels, within the IRB formula, on RWA. Some of the floors are suggested from the BIS analyses from the impact studies for each category of assets, such that PD shall not be less than 0.05% for sovereign exposure and the LGD to be 45%.

Nevertheless, in our case it is advisable before taking other steps ahead, in direction of estimation the parameters of the IRB Foundation Approach, to consult and ask the assistance from the countries that already have implemented the IRB foundation through the help of Credit Register information.

Implementing the Basel as cooperation between banks and the supervision is an important contribution by the Modeled Approach, which apart from a more accurate risk measurement, bring a better understanding of the nature of risk for both supervisors and banks.

CONCLUSION

The new regulation of BoA, "On Capital Adequacy Ratio", that entered into force on 31.12.2014, imposes to the banks the Standardized Approach (the simple one) for calculating the credit risk. This Standardized Approach ensures that banks which take greater risks end up in holding additional capital. Living the responsibility of credit risk assessment on ECAI's does not bring a substantial impact in terms of risk management. On the other hand the IRB approach is excluded as an option from the regulation, mostly because of the lack of sufficient credit default data, necessary for the estimations of the credit parameter. As the lack of available data does not support the implementation of IRB approach, the question rises how this insufficient data will help the credit rating agencies in performing accurately their duty, will be a serious challenge for a reliable implementation of Basel II.

In order to find up a solution to avoid a superficial implementation, the information collected since the 2008 from the Credit Register and the internal information of the banks may lead to a realistic way out. The Credit Register is a useful resource that can be in use of the supervision in estimating the risk parameters necessary for implementing the IRB foundation approach altogether with the internal system of the banks.

Because the implementation of Basel II, already it is delayed, by using an advanced option, we will compensate the time, avoid lagging behind the global banking and come closer towards the financial integration, consequently opening new perspectives to our economy.

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SUPPLY-USE AND INPUT-OUTPUT TABLES OF ALBANIA: STRUCTURE AND MULTIPLIERS

Enian Çela, Reserch Department

1. PREFACE

In February 2015, the Institute of Statistics issued the so-called Social Accounting Matrixes (Instat, 2014). These statistics set out in totality the transactions taking place within a time-frame in a certain economy harmonizing the production, expenditure and revenue approaches.

The issue includes 7 tables: 3 supply tables (2009-2011), 3 use tables (2009-2011) and1input-output table (2011). All statistics are published in annual nominal terms featuring 25 sectors of our economy. Future publications are supposed to include constant price statistics enabling price analysis as well.

At first, this material will produce a presentation of the respective matrixes emphasizing the particular characteristics, the general structure and the format of the included statistics. Next, we calculate the standard multipliers for production, value added, imports and net domestic product featuring a short analysis for each of them. This is followed by a broad description of the industrial-economic structure focusing on certain strong points and risks associated with it. The last part will emphasize future broader research prospects that are enabled by these statistics.

2. THE TABLES

Social accounting statistics have their genesis in the Input-Output Tables of economic transactions developed by the well-known economist Wassily W. Leontief (Leontief, 1936). In the following times, these statistics were further improved but they still preserved the general spirit of the moment they were born. The associated input-output model was the cornerstone of computable general equilibrium and has found broad applications in terms of industrial and sectorial analysis. The broad table can be decomposed in sub-components which are to be explained in the following sections.

2.1 USE TABLE

The use table in Instat format is shown in Annex 1. The first column of the matrix includes the sellers of products and services. Buyers are included in the row. The first portion includes intermediate consumption expenditure (the

green area) which features industrial purchases for production purposes. We emphasize that intermediate consumption serves the purpose of realization of output from the producing sectors. Although the table shown is 2 by 2 format there are actually 25 sectors included in the matrixes.

The blue area includes final demand for goods and services by type. The purchasers include public and private consumers. Final demand is decomposed into: household consumption, public and non-profit organizations'consumption, capital formation (public and private in one), inventories and exports. It is important to point out that the matrixes feature a "non-competitive" nature with imports included together with domestic output throughout the numbers. The sum of intermediate consumption and final demand (total by rows) represents total output by commodity or service. All figures are in terms of purchaser prices which includes basic prices plus net product taxes.

The red area features final demand by sector which can be viewed from two standpoints. In terms of production it represents the output generated for final demand purposes, whereas in terms of revenue, it includes the total returns for the utilization of production factors. Unfortunately, value added is not reported as disaggregated and therefore it is not possible to identify the components (labor, capital and profit).

2.2 SUPPLY TABLE

The supply table format is also featured in Annex 1. In contrast to the use table, it includes the output generated by the various sectors, by type (the green area). Considering that the various sectors are mainly focused on their core-business products or services, the figures are mostly shown on the diagonal line. If there are numbers outside this line, they represent by-products or by-services that are associated with the core. Figures include all output generated domestically without emphasis on the destination (intermediate consumption or final demand).

If imports are added to the domestic output, we obtain total supply at basic prices (before net taxes and trade and transport margins). With the inclusion of net taxes and product margins we move from basic prices (seller) to market prices (purchaser).

2.3 INPUT-OUTPUT TABLE

This matrix is only available for 2011. It incorporates users and suppliers in a unique structure featuring differentiated basic prices and net taxes. The transactions flow from supplier sector (first column) to buyer sector and final demand purchasers. In this circumstance, final demand is reported as total and not disaggregated by component. On the other hand, imports are reported by sector. However they are not split into intermediate consumption and final demand destination. The format is shown in Annex 1.

3. MULTIPLIERS

The multipliers represent the standard indicators sourcing from the accounting matrixes. They deduct shifts in total components of the economy (output, value added, import or domestic product) resulting from changes in final demand. (Miller & Blair, 2009). Shifts in final demand are the source of the transmission mechanism and are exogenous. In the following sections, we are going to report output, value, import and domestic product multipliers by sector and final demand component.

3.1 SECTOR MULTIPLIERS

One of the main benefits associated with these statistics is the ability to model and measure induced effects that are borne out of exogenous shocks. The shocks are themselves associated with final demand by product. These shifts represent the first step of the process and the direct impact.

If the final demand for the output of a certain sector changes, the activity in the sector changes as well. In this case, production has to respond to the increased (or decreased) demand. Increased activity in the producing sector (for purpose of production) will trigger intermediate consumption demand producing activity in other sectors of the economy as well.

The general activity produces shifts in terms of value added with supplemental incomes (return for labor, capital utilization and profits). On the other hand, should the domestic production fail to satisfy the new increased final demand, based on the principles of open economy, imports move in to fill the void.

From the following section, we will describe the procedure of calculation of multipliers beginning with output and continuing with value added and imports. Calculations will include each of the 25 sectors separately (the procedure is just the same in each case) and each of the years 2009-2011. In the end, we will also show net impact in terms of domestic product by sector.

3.1.1 Output multipliers

Output multipliers imply the general increment of total output in the economy as a result of 1 unit increase in the final demand of a particular sector (1 unit equals 1 ALL). The induced effect is associated with changes in intermediate consumption transactions (through backward linkages) which are added to the original shift in final demand to produce the overall change in total output. The first step in the calculation includes the generation of sector base technical coefficients which measure the intensity of input utilization in function of output from the particular sector (the output could be for final demand or intermediate consumption purposes). The formula for the calculation of technical coefficients is the following:

$a_i = z_{ij} / X_j$

Where X_j represents total output in sector *j* and z_{ij} features the intermediate consumption purchases of sector *j* from sector *i*. Intermediate purchases could be realized within the same sector (between firms operating in the same sector). At this stage, we possess a 25x25 matrix for technical coefficients known as matrix A. If we assume a unit matrix I with values 1 on the diagonal line and 0 elsewhere, we can generate the I-A which is also known as the Leontief matrix. Total output is calculated by multiplying the Leontief inverse (I-A)-1 with the final demand vector (25 elements in one column). In such ways we would be able to obtain sector base output multipliers.

Sectorial multipliers for the years 2009-2011 are calculated from the use tables. Input-output tables could be employed as well but since the matrix is only available for year 2011, the use table represents a far more preferable option if we are to analysis the development of such multipliers. The figures are shown in Annex 2 with the sectors ranked in decreasing order based on the respective multipliers.

Based on the tables throughout the years, Construction, Minning and Quarrying except for energy producing materials and Manufacturing of other non-metalic mineral products develop the strongest backward linkages. On the other hand, smaller multipliers are recorded for Manufacturing of Machinery and Equipment, other Manufacture of Food Products and Chemicals and Rubber.

3.1.2 Value added multipliers

Since the general shift in output activity, the economy is able to generate additional value added seen in terms of product of income. Similarly, we refer to increases in value added as a result of shifts in sector final demand by 1 unit (1 ALL).

As in the case of output, the process begins with the calculation of sectorial value added coefficients which are determined as a ratio of sector value added to sector output. In this way, we obtain a vector of value added coefficients. If we multiply it to the matrix of output shifts calculated in the previous section, we obtain the elements of sectoral value added multipliers.

The figures are reported in Annex 2 again ranked in descending order. Education, Agriculture and Public Administration and Defence top the list whilst Manufacturing of Machinery and Equipment, other Manufacture of Food Products and Chemicals and Rubber are ranked at the bottom.

3.1.3. Import multipliers

We have to be reminded that the matrixes include both domestic output and imports. In this way, should the domestic side fail to satisfy the increased final demand, imports will do just that. Import multipliers imply the general growth of imports as a result of sector final demand changes.

In this case as well, the tables are able to produce import technical coefficients as ratio of sector import over sector output. As in the case of value added, the vector of import technical coefficients is multiplied to the matrix of generated output shifts from the output multiplier section to obtain the respective import multipliers.

These multipliers are reported in Annex 2. The sector ranking is the upside-down version of the value added multiplier list. The sectors boasting bigger multipliers would be Machinery and Equipment, other Manufacture of Food Products and Chemicals and Rubber. On the other hand, smaller import impact would be associated with Education, Agriculture and Public Administration and Defence.

3.1.4 Impact on Gross Domestic Product

The net effect in terms of gross domestic product is calculated by adding value added and deducting imports from the original shift by 1 unit in final demand. GDP multipliers are shown in Annex 2. The sectors boasting higher multipliers are deductively those featuring larger value added and lower import impacts. Education, Agriculture and Public Administration and Defence are ranked top whilst be Machinery and Equipment, other Manufacture of Food Products and Chemicals and Rubber sink to the bottom.

3.2 Final demand multipliers

Resembling sector based multipliers, final demand components'multipliers imply respective shifts in output, value added, imports and GDP as a result 1 unit margin change in the component itself. However, in this circumstance the components comprise purchases from various sectors of the economy. Therefore, the 1 unit (1 ALL) change is distributed throughtout the sub-categoris of each component respecting the shares they reflect in each period.

Final demand multipliers are reflected in Annex 3. Although in terms of output, capital formation and household consumption feature higher impact, in terms of gross domestic product, public consumption ranks first. This comes as a consequence of larger impacts stemming from value added, whilts in terms of household consumption and capital formation, value added impact is somewhat balanced out by incrementing import contributions. On the other hand, exports reflect lower impact as a result of concentrated import presence. It is important to emphasize that the multipliers only capture induced impacts from individual final demand (component) shifts in terms of backward linkages. They do not include second or third round impacts associated with the generation of additional final demand (forward linkages).

3.3 FINAL DEMAND: STRUCTURE AND CONTRIBUTIONS

At this point, it is important to explain the situation associated with the final

demand multipliers. In order to achieve this, we have to merge sectoral demand with sectoral output in order to produce a connection between sectoral multipliers with the shares each sector boost in terms of final demand (and final demand component).

In Annex 4 are shown several graphs related to the individual components of final demand. They include sectors in terms of their respective GDP multipliers and the respective share in terms of total demand associated with the particular component. In this way, it is possible to explain the obtained final demand multipliers through the individual multipliers and shares of the sectors composing it. Each graph is equipped with a linear trend line. If the line features a Northeast-Southwest orientation it reflects a situation where sectors displaying relatively higher GDP multipliers have larger shares in the demand of the component. Steeper lines imply that the phenomenon is further emphasized resulting in larger component multiplier. Otherwise, Northwest-Southeast orientation reflects stronger presence of sectors boosting relatively lower GDP multipliers.

For example, in the case of public consumption we can observe a visible domination of sectors featuring higher multipliers and all of them are higher than 1. In the case of household consumption and capital formation (public and private), the lines still have the right orientation but are flatter. Sectors with higher multipliers still prevail but their presence is challenged. The same applies for overall domestic final demand.

In the case of exports of goods and services, the line has the opposite orientation. In this case, export demand is concentrated in sectors boosting higher import multipliers and therefore comparately smaller value added and GDP multipliers. In particular, this is the case of Textiles and Leather, Manufacture of basic Metals, Transport and Hotels-Restaurants.

Finally, overall final demand (aggregate of domestic demand and exports) resembles the shape of domestic demand. Therefore, the presence of exports is not able to turn the condition around.

4. INTERMEDIATE CONSUMPTION AND TOTAL OUTPUT

Social accounting matrixes reflect a very colorful picture of intermediate consumption and are able to emphasize the various interconnection of the economic structure, which is source of positive points and risks. In the matrix, purchasing sectors equal supplying sectors.

In Annex 5 are shown two graphs related to the composition of overall intermediate consumption, that are similar to the ones from Annex 4. The graph labeld "Purchasers" shows the shares of purchasing sectors and their respective GDP multipliers. The line orientation reveals that the purchasers are the sectors featuring comparately higher GDP multipliers. On the other hand, the same structure seen from the suppliers' perspective reveals that the sellers

are those sectors with comparately lower GDP multipliers and therefore higher import presence. This situation is mostly associated with Manufacture of Coke and Petroleum, Manufacture of non-methalic products, Manufacture of Basic Metals, Manufacture of Wood and Paper.

Regarding overall output which aggregates intermediate consumption and final demand, the graph is shown in Annex 5 as well. The line orientation reflects stronger presence of sectors featuring smaller GDP multiplier. The main contributors are Machinery and Equipment, Manufacture of Coke and Petroleum, Cereals, Textile and Leather, Wood and Paper, Chemicals and Rubber, and Tranport. Certain other sectors reflecting higher multipliers, i.e. Construction, Agriculture and Real Estare manage to restore some balance. However, relying for intermediate consumption mostly on sector featuring higher import presence certainly represents a risk for the economy overall.

5. CONCLUSIONS AND DISCUSSIONS

In this material we presented the latest national account statistics associated with Supply-Use and Input-Output Tables. These tables report overall transactions taking place in a year within our economy in the period 2009-2011 in nominal terms. The general description is followed by the calculation of the respective multipliers.

As for the multipliers, based on the priciples of the modeling, we have calculated sector wise multipliers for output, value added and imports. They were further applied to obtain effects in terms of domestic product as a result of exogenous sectoral demand shifts. In terms of overall output generated, the most connected sectors are Construction, Manufacture of other non-methalic products and Minning and Quarrying of non-energy minerals. The lesser connected are Machinery-Equipment, Chemicals and Rubber and other Food Industries.

By adding value added and import effects and calculating domestic production effects, we conclude that the higher ranking sectors are Education, Public Administration and Defence and Agriculture, whilst the lesser impacts are reflected in Machinery-Equipment, Chemicals and Rubber and other Food Industries.

Apart from sectoral multipliers we have also calculated the multipliers associated with final demand components and final demand overall. These calculations were joined by several descriptions of final demand component related sectorial structure. According to the multipliers, the components with higher impact on domestic product are Public Consumption and Non-profit organization consumption. Intermediate impact is found in the cases of Household Consumption and Capital Formation whilst the lower impact is associated with exports.

The composition analysis of the demand components reveals the reason behind

the present multipliers. Public consumption of made up of sectors booasting larger GDP impact. On the other hand, Household Consumption and Capital Formation display similar contributions between the two types of sectors. In the case of exports, sectors with relatively higher import impact and lower GDP impact dominate.

In the cases of final demand and intermediate consumption, the structural analysis reveals two opposite stories. Relating to final demand, sectors boosting relatively larger GDP impacts dominate. On the other hand, decomposition of intermediate consumption according to suppliers features stronger emphasis on sectors directly or indirectly dominated by imports. Total output shows a similar pattern (smoother) to intermediate consumption revealing a structural risk to the economy.

In regard to possible applications of these statistics, apart from multiplier analysis static (linear) computable general equilibrium models represents the most famous field. Furthermore, impact analysis and industrial structuring policies require a well-based knowledge of the general economic structure which is perfectly described in these tables.

Nevertheless, the present statistics of Albania are still in the early stages and the unavailability of real elements (constant term statistics) in the reports disallows broader analysis. It is believed that these statistics are going to be enriched in the future expanding the scope of analysis and applications.

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ANNEX 1

Use table

	Intermediate consumption		Final Demand						Total Uses
	Purchasing industry 1	Purchasing Industry 2	Household Consumption	Public and NGO consumption	Capital Formation	Inventories	Exports	Total Final Demand	Total Output
Purchasing industry 1	X11	X12							
Purchasing industry 2	X21	X22							
Value added	V1	V2							

Supply Table

		Sector 1	Sector 2	Total	Imports (CIF)	Total supply in basic prices	Net product taxes	Trade and transport margins	Total supply at purchasers prices
Products	Product 1	Product 11	By-product 21						
	Product 2	By-product 12	Product 22						

Input-output table

	Sector 1	Sector 2	Total intermediate consumption by product	Final Demand	Total uses
Sector 1	X_{11}	X_{12}	$X_{11}+X_{12}$	FD_1	Total uses 1
Sector 2	X_{21}	X_{22}	$X_{21}+X_{22}$	FD_2	Total uses 2
Total consumption (basic prices)	$X_{11}+X_{21}$	$X_{12}+X_{22}$	Total intermediate consumption (basic prices)	Total final demand (basic prices)	Total uses (Basic prices)
Net product taxes	Net taxes on intermediate consumption 1	Net taxes on intermediate consumption 2	Total taxes on intermediate consumption	Final demand taxes	Total taxes
Total intermediate consumption by users (purchasers' prices)	IC_1	IC_2	Total intermediate consumption (purchasers' prices)	Final Demand (Purchasers' prices)	Total uses (purchasers' prices)
Value added	V_1	V_2	Total value added		
Total domestic output	P_1	P_2	Total domestic output		
Imports (CIF)	I_1	I_2	Total imports		
Total supply	Supply 1	Supply 2	Total supply		

ANNEX 2

Output multipliers by sector (year 2009)

Sector	Multiplier
Construction	2.23
Mining and quarrying of except energy producing materials	1.84
Manufacture of other non-metallic mineral products	1.77
Fishing	1.83
Manufacture of wood, paper, furniture; publishing and printing	1.54
Post and communication	1.54
Manufacture of products based on cereals	1.46
Other community, social and personal service activities	1.55
Transport	1.45
Hotel and restaurants	1.52
Public administration and defence	1.42
Trade	1.45
Manufacture of basic metals and fabricated metal products	1.60
Mining and quarrying of energy producing materials	1.32
Real estate and business activities	1.40
Agriculture, hunting and forestry	1.30
Financial activities	1.31
Health	1.35
Manufacture of coke, refined petroleum products and nuclear fuel	1.43
Electricity and water supply	1.25
Manufacture of textile and leather products	1.38
Education	1.30
Manufacture of chemicals, chemical products, rubber and plastic products	1.22
Other manufacture of food products	1.04
Manufacture of machinery and equipment	1.03

Output multipliers by sector (year 2010)

Sector	Multiplier
Construction	2.06
Manufacture of other non-metallic mineral products	1.85
Mining and quarrying of except energy producing materials	1.74
Fishing	1.86
Post and communication	1.68
Manufacture of wood, paper, furniture; publishing and printing	1.51
Manufacture of products based on cereals	1.53
Other community, social and personal service activities	1.46
Transport	1.46
Manufacture of basic metals and fabricated metal products	1.68
Public administration and defence	1.49
Trade	1.46
Hotel and restaurants	1.40
Real estate and business activities	1.40
Health	1.42
Mining and quarrying of energy producing materials	1.40
Financial activities	1.47
Agriculture, hunting and forestry	1.29
Electricity and water supply	1.25
Manufacture of textile and leather products	1.18
Education	1.36
Manufacture of chemicals, chemical products, rubber and plastic products	1.27
Manufacture of coke, refined petroleum products and nuclear fuel	1.21
Other manufacture of food products	1.08
Manufacture of machinery and equipment	1.03

Output multipliers by sector (year 2011)

Sector	Multiplier
Construction	2.12
Manufacture of other non-metallic mineral products	1.94
Mining and quarrying except energy producing materials	1.9
Fishing	1.85
Post and communication	1.76
Manufacture of wood, paper, furniture; publishing and printing	1.71
Transport	1.55
Manufacture of products based on cereals	1.52
Other community, social and personal service activities	1.49
Trade	1.48
Manufacture of basic metals and fabricated metal products	1.47
Public administration and defence	1.44
Real estate and business activities	1.42
Financial activities	1.38
Hotel and restaurants	1.38
Electricity and water supply	1.38
Mining and quarrying of energy producing materials	1.37
Health	1.36
Agriculture, hunting and forestry	1.36
Manufacture of textile and leather products	1.3
Manufacture of coke, refined petroleum products and nuclear fuel	1.26
Education	1.26
Manufacture of chemicals, chemical products, rubber and plastic products	1.23
Other manufacture of food products	1.11
Manufacture of machinery and equipment	1.03

Value added multipliers by sector (year 2009)

Sector	Multiplier
Education	0.88
Agriculture, hunting and forestry	0.86
Public administration and defence	0.82
Real estate and business activities	0.81
Trade	0.75
Post and communication	0.66
Financial activities	0.66
Electricity and water supply	0.65
Mining and quarrying of energy producing materials	0.63
Health	0.6
Construction	0.59
Fishing	0.58
Mining and quarrying of except energy producing materials	0.56
Other community, social and personal service activities	0.51
Hotel and restaurants	0.43
Manufacture of wood, paper, furniture; publishing and printing	0.37
Manufacture of other non-methalic mineral products	0.37
Manufacture of products based on cereals	0.36
Transport	0.34
Manufacture of textile and leather products	0.28
Manufacture of basic metals and fabricated metal products	0.19
Manufacture of coke, refined petroleum products and nuclear fuel	0.17
Manufacture of chemicals, chemical products, rubber and plastic products	0.09
Other manufacture of food products	0.03
Manufacture of machinery and equipment	0.03

Value added multipliers by sector (year 2010)

Sector	Multiplier
Education	0.86
Agriculture, hunting and forestry	0.86
Public administration and defence	0.81
Real estate and business activities	0.79
Electricity and water supply	0.76
Trade	0.73
Mining and quarrying of energy producing materials	0.71
Financial activities	0.69
Post and communication	0.63
Health	0.62
Construction	0.6
Mining and quarrying except energy producing materials	0.57
Other community, social and personal service activities	0.54
Fishing	0.54
Hotel and restaurants	0.44
Manufacture of other non-metallic mineral products	0.39
Manufacture of wood, paper, furniture; publishing and printing	0.36
Transport	0.36
Manufacture of products based on cereals	0.36
Manufacture of textile and leather products	0.28
Manufacture of basic metals and fabricated metal products	0.19
Manufacture of coke, refined petroleum products and nuclear fuel	0.1
Manufacture of chemicals, chemical products, rubber and plastic products	0.08
Other manufacture of food products	0.06
Manufacture of machinery and equipment	0.03

Value added multipliers by sector (year 2011)

Sector	Multiplier
Agriculture, hunting and forestry	0.86
Public administration and defence	0.83
Education	0.83
Real estate and business activities	0.79
Trade	0.73
Mining and quarrying of energy producing materials	0.72
Financial activities	0.69
Health	0.62
Post and communication	0.61
Construction	0.6
Electricity and water supply	0.57
Mining and quarrying except energy producing materials	0.55
Other community, social and personal service activities	0.53
Fishing	0.52
Manufacture of other non-metallic mineral products	0.41
Hotel and restaurants	0.41
Manufacture of wood, paper, furniture; publishing and printing	0.37
Transport	0.36
Manufacture of products based on cereals	0.34
Manufacture of textile and leather products	0.29
Manufacture of basic metals and fabricated metal products	0.2
Manufacture of coke, refined petroleum products and nuclear fuel	0.14
Manufacture of chemicals, chemical products, rubber and plastic products	0.09
Other manufacture of food products	0.08
Manufacture of machinery and equipment	0.02

Import multipliers by sector (year 2009)

Sector	Multiplier
Manufacture of machinery and equipment	0.97
Other manufacture of food products	0.97
Manufacture of chemicals, chemical products, rubber and plastic products	0.91
Manufacture of coke, refined petroleum products and nuclear fuel	0.83
Manufacture of basic metals and fabricated metal products	0.81
Manufacture of textile and leather products	0.72
Transport	0.66
Manufacture of products based on cereals	0.64
Manufacture of other non-metallic mineral products	0.63
Manufacture of wood, paper, furniture; publishing and printing	0.63
Hotel and restaurants	0.57
Other community, social and personal service activities	0.49
Mining and quarrying except energy producing materials	0.44
Fishing	0.42
Construction	0.41
Health	0.4
Mining and quarrying of energy producing materials	0.37
Electricity and water supply	0.35
Financial activities	0.34
Post and communication	0.34
Trade	0.25
Real estate and business activities	0.19
Public administration and defence	0.18
Agriculture, hunting and forestry	0.14
Education	0.12

Import multipliers by sector (year 2010)

Sector	Multiplier
Manufacture of machinery and equipment	0.97
Other manufacture of food products	0.94
Manufacture of chemicals, chemical products, rubber and plastic products	0.92
Manufacture of coke, refined petroleum products and nuclear fuel	0.9
Manufacture of basic metals and fabricated metal products	0.81
Manufacture of textile and leather products	0.72
Manufacture of products based on cereals	0.64
Transport	0.64
Manufacture of wood, paper, furniture; publishing and printing	0.64
Manufacture of other non-metallic mineral products	0.61
Hotel and restaurants	0.56
Fishing	0.46
Other community, social and personal service activities	0.46
Mining and quarrying except energy producing materials	0.43
Construction	0.4
Health	0.38
Post and communication	0.37
Financial activities	0.31
Mining and quarrying of energy producing materials	0.29
Trade	0.27
Electricity and water supply	0.24
Real estate and business activities	0.21
Public administration and defence	0.19
Agriculture, hunting and forestry	0.14
Education	0.14

Import multipliers by sector (year 2011)

Sector	Multiplier
Manufacture of machinery and equipment	0.98
Other manufacture of food products	0.92
Manufacture of chemicals, chemical products, rubber and plastic products	0.91
Manufacture of coke, refined petroleum products and nuclear fuel	0.86
Manufacture of basic metals and fabricated metal products	0.8
Manufacture of textile and leather products	0.71
Manufacture of products based on cereals	0.66
Transport	0.64
Manufacture of wood, paper, furniture; publishing and printing	0.63
Hotel and restaurants	0.59
Manufacture of other non-metallic mineral products	0.59
Fishing	0.48
Other community, social and personal service activities	0.47
Mining and quarrying except energy producing materials	0.45
Electricity and water supply	0.43
Construction	0.4
Post and communication	0.39
Health	0.38
Financial activities	0.31
Mining and quarrying of energy producing materials	0.28
Trade	0.27
Real estate and business activities	0.21
Education	0.17
Public administration and defence	0.17
Agriculture, hunting and forestry	0.14

GDP multipliers by sector

2009		2010		2011	
Education	1.76	Education	1.73	Agriculture, hunting and forestry	1.72
Agriculture, hunting and forestry	1.71	Agriculture, hunting and forestry	1.73	Public administration and defence	1.66
Public administration and defence	1.63	Public administration and defence	1.63	Education	1.65
Real estate and business activities	1.61	Real estate and business activities	1.57	Real estate and business activities	1.58
Trade	1.5	Electricity and water supply	1.52	Trade	1.47
Post and communication	1.33	Trade	1.46	Mining and quarrying of energy	1.44
Financial activities	1.32	Mining and quarrying of energy	1.43	Financial activities	1.38
Electricity and water supply	1.3	Financial activities	1.39	Health	1.23
Mining and quarrying of energy	1.27	Post and communication	1.25	Post and communication	1.23
Health	1.19	Health	1.24	Construction	1.19
Construction	1.19	Construction	1.2	Electricity and water supply	1.14
Fishing	1.16	Mining and quarrying of except energy producing materials	1.13	Mining and quarrying except energy producing materials	1.09
Mining and quarrying except energy producing materials	1.11	Community, social and personal service	1.09	Community, social and personal service	1.06
Community, social and personal service	1.02	Fishing	1.08	Fishing	1.03
Hotel and restaurants	0.85	Hotel and restaurants	0.89	Non-metallic mineral products	0.82
Wood, paper, furniture; publishing	0.74	Non-metallic mineral products	0.79	Hotele dhe restorante	0.81
Non-methalic mineral products	0.74	Wood, paper, furniture; publishing	0.73	Wood, paper, furniture; publishing	0.74
Cereals	0.73	Transport	0.72	Transport	0.71
Transport	0.67	Cereals	0.71	Cereals	0.68
Textile and leather products	0.56	Textile and leather products	0.56	Textile and leather products	0.58
Basic metals	0.37	Basic metals	0.39	Basic metals	0.4
Coke, refined petroleum products	0.34	Coke, refined petroleum products	0.2	Coke, refined petroleum products	0.28
Chemicals, chemical products, rubber	0.18	Chemicals, chemical products, rubber	0.16	Chemicals, chemical products, rubber	0.18
Other manufacture of food products	0.06	Other manufacture of food products	0.13	Other manufacture of food products	0.16
Machinery and equipment	0.05	Machinery and equipment	0.06	Machinery and equipment	0.04

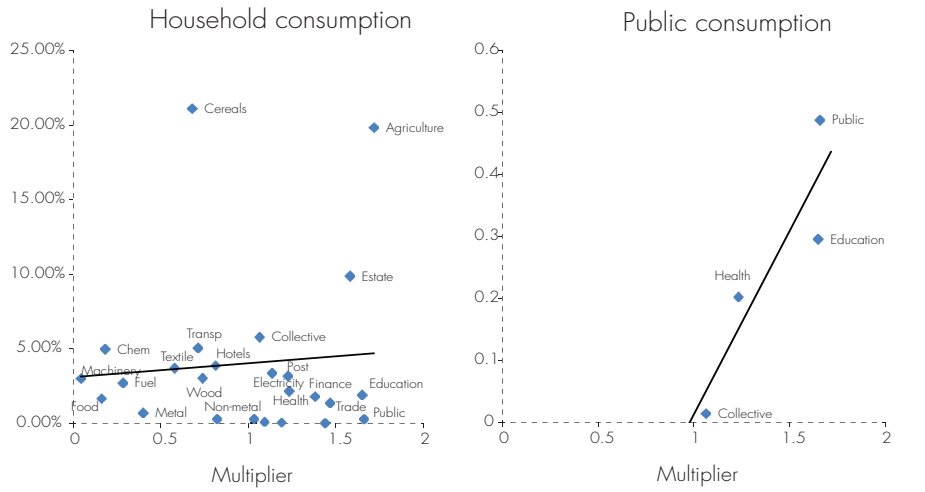
ANNEX 3

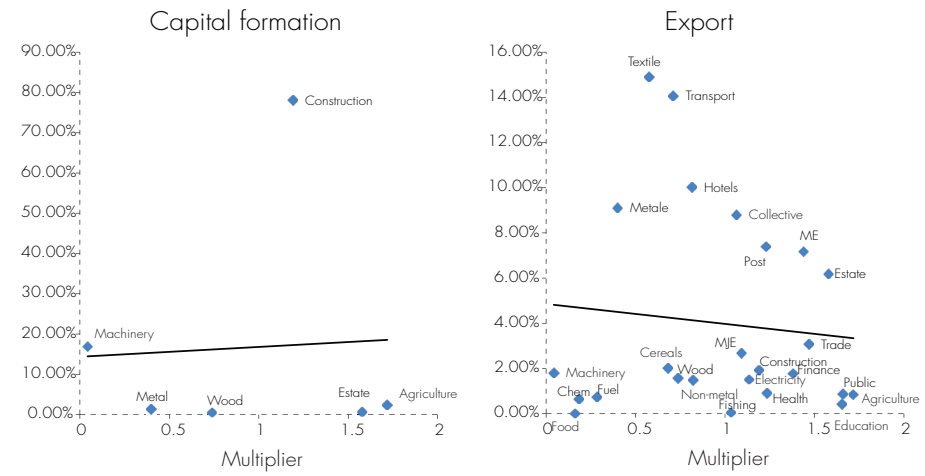
Multipliers of final demand components

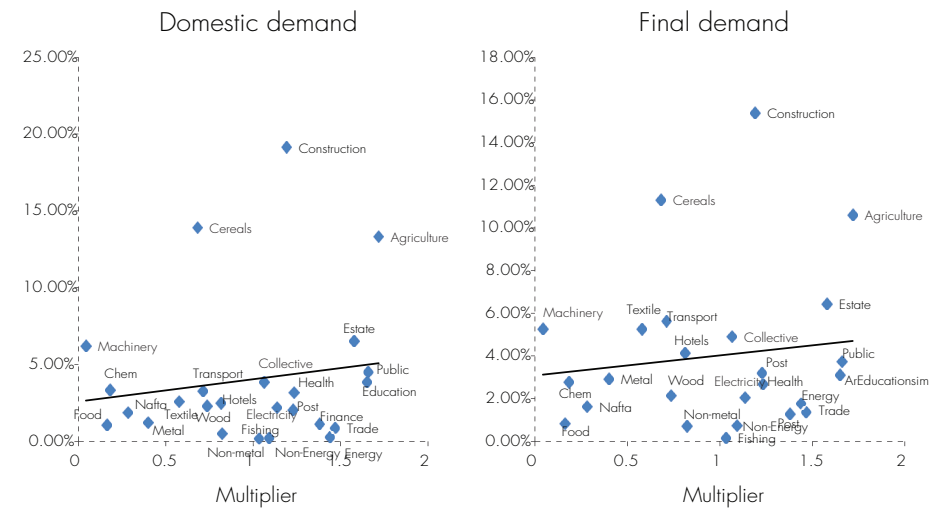
	2009				
Demand component	% on total	Output	Value added	Import	GDP
Public consumption	7.21%	1.37	0.8	0.2	1.6
NPISH consumption	0.01%	1.45	0.58	0.42	1.17
Household consumption	50.13%	1.42	0.53	0.47	1.05
Capital formation	22.09%	2.02	0.5	0.5	1.01
Exports	18.95%	1.47	0.47	0.53	0.94
Inventories	1.49%	1.5	0.3	0.7	0.6
Domestic demand	81.05%	1.56	0.5	0.5	1.01
Finald demand	100%	1.58	0.54	0.46	1.08
					2010
Public consumption	7.29%	1.39	0.78	0.22	1.57
NPISH consumption	0.12%	1.44	0.61	0.39	1.21
Household consumption	50.63%	1.42	0.53	0.47	1.06
Capital formation	19.00%	1.87	0.51	0.49	1.02
Exports	21.2%	1.46	0.47	0.53	0.95
Inventories	1.76%	1.51	0.33	0.67	0.65
Domestic demand	78.8%	1.53	0.54	0.46	1.09
Finald demand	100%	1.5	0.5	0.5	1.01
					2011
Public consumption	6.97%	1.37	0.78	0.22	1.56
NPISH consumption	0.13%	1.47	0.58	0.42	1.16
Household consumption	50.13%	1.42	0.51	0.49	1.03
Capital formation	19.16%	1.9	0.5	0.5	1
Exports	21.7%	1.48	0.46	0.54	0.92
Inventories	1.91%	1.5	0.32	0.68	0.65
Domestic demand	78.3%	1.54	0.53	0.47	1.06
Finald demand	100%	1.52	0.51	0.49	1.03

ANNEX 4

Sectoral structure of final demand components

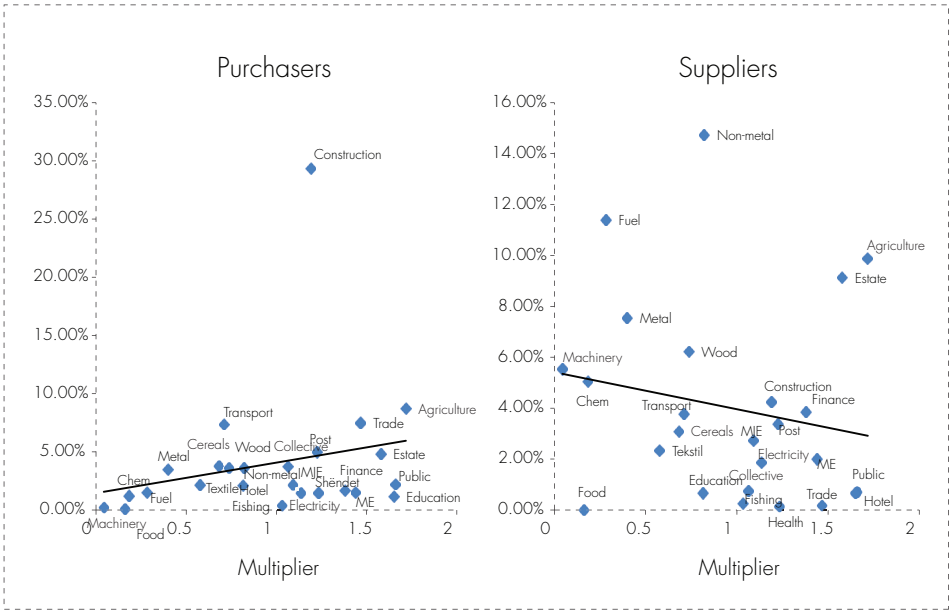






ANNEX 5

Intermediate consumption structure



Structure of total output