

## **EXTERNAL RESILIENCE OF THE ARMENIAN ECONOMY: DEVELOPMENT AND ANALYSIS OF A COMPOSITE INDEX**

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Key words: external resilience, current account balance, financial account balance, external debt, reserves adequacy

### ***Introduction***

At the current stage of the world economic development, with the economic interconnectedness and shocks contagion effects it is crucial to maintain the resilient and stable development of the economy. Ensuring macroeconomic resilience is particularly important for countries with small and open economies, as they are more vulnerable to external and internal shocks. The two major shocks of the last twenty years– the global financial crisis and COVID-19 - served as a breakpoints to review the state of the economy and the policies designed to ensure its smooth development, as these shocks revealed the vulnerable fundamentals of the economies. As the external sector of the economy is the connecting link between the world and other sectors of the national economy, studying its resistance and degree of "preparedness" for crises is important. Therefore, it is necessary and urgent to study the vulnerabilities of this sector and its weak resistance to them. To address these issues, an index of external resistance has been developed, which will indicate the degree of resistance of the external sector and the existing pressures.

### ***Methodology***

The methodology applied in this research is the principal component analysis. The main idea of principal component analysis is to reduce the dimensionality of a data set in which there are a large number of interrelated variables, while retaining as much as possible of the variation present in the data set. This reduction is achieved by transforming to a new set of variables, the principal components, which are uncorrelated, and which are ordered so that the first few retain most of the variation present in all of the original variables [Jolliffe, 2002, 1-2]. The advantage of obtained methodology is that PCA assigns weights to the indicators included in the index based on their contribution to the overall variance, leading to a more robust and meaningful representation of the underlying factors. Data for the external resilience index covers the period from 2001 to 2023 on an annual basis.

### ***Literature review***

There is no still consensus regarding the concept, comprehensiveness and measurement of economic resilience. Various definitions of resilience describe it as an ability of an economy to absorb and to recover from shock. Some researchers also include com-

ponents such a shock avoidance [Briguglio, 2006, 6-8], re-orientation [Martin, 2010, 12-17] and bouncing forward [Alessi et. al, 2018,12]. There are also different approaches for choosing indicators: some researches combine both the resilience and vulnerability indicators, while others believe that resilience is mainly about the stock variables and not about the prediction of crisis [Lau et.al, 2003, 28-30]. Resilience is seen as a state of the health of the economy. There are various methodological approaches to measure the resilience of the economy: peak to trough methods, structural models, time series models and the design of indexes for comprehensive and multidimensional assessment. These indexes consistently consider the crucial role of indicators that describe the resilience of the external sector. While the included indicators are generally similar, the difference lies in the methodological approach used to construct the index. The main point is the weighting of indicators: some indexes use equal weights [Briguglio, 2009, 7-12] [Hafele et. al, 2023, 13], the coefficients estimated with regression analysis [Swiss Re, 2024] and probability-weight with “strong” and “weak” signs [Lau et.al, 2003, 30-33]. To calculate the External Resilience Index for the RA economy, the following indicators were selected based on the study of literature:

- *degree of export concentration*. The more diversified export contributes to resilience positively;
- *current account/GDP*. A large current account deficit carries risks, indicating potential vulnerabilities in domestic demand and external competitiveness;
- *financial account/GDP*. The ability to finance the current account through the financial account supports external stability;
- *IIP/GDP*. shows the stock of wealth in the economy;
- *external short-term debt coverage (the ratio of reserves to external short-term debt)*. Measures the country's capacity to repay short-term foreign debt.

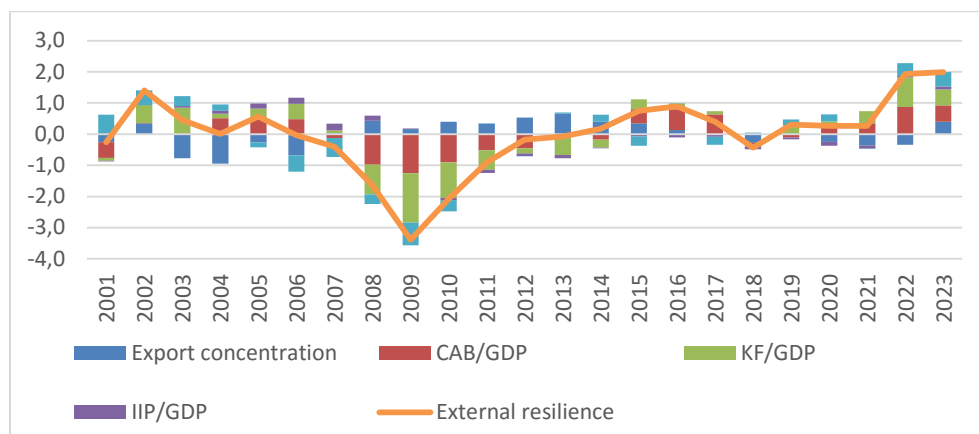
#### ***Scientific novelty***

This study introduces a novel approach by employing the PCA method to measure the composite External Resilience Index for the Armenian economy which reflects the periods of resilience accumulation, the driving forces and the state of resilience during shocks and crisis.

#### ***Analysis***

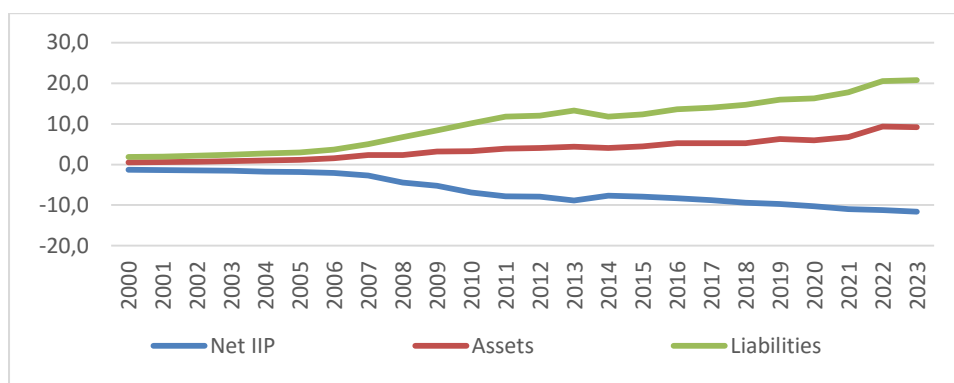
The External Resilience Index calculated for the RA economy, in fact, accurately indicates the periods when the economy had a loss and gain of resilience. The decomposition of the Index indicates that all the considered indicators have significant contribution during different periods of resilience accumulation or loss. As a result, we can state that in 2008-2009 financial crisis the contribution of current and financial accounts to the recession was greater than in 2020. At the same time, we can notice that short-term foreign debt coverage, which is the ratio of international reserves to short-term foreign debt, is

considered an important component and driving force of resilience. Recent developments, including positive spillover effects from the Russian-Ukrainian conflict, have contributed to debt reduction and accumulation of international reserves. Notably, the external sector showed relatively high resilience levels in 2002, with subsequent recovery trends observed in 2012-2016 and 2022-2023, largely driven by improvements in current and financial accounts.



**Figure 1.** The dynamics of external resilience index and components

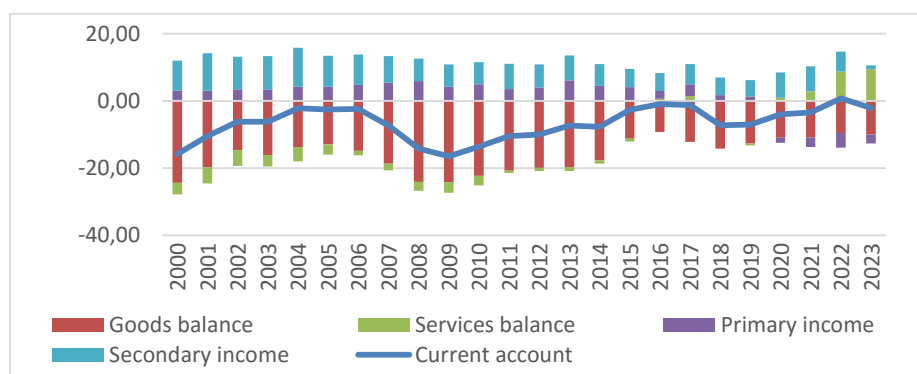
With the examination of dynamics of net international investment position we can see that the IIP continuously deepens due to the increase of both assets and liabilities. Moreover, in the last two years, the growth of assets took place mainly due to the portfolio and other investments and reserve assets. Meanwhile, the increase from liabilities side is due to the increase of direct and other investments.



**Figure 2.** The dynamics of the net IIP, bln dollars

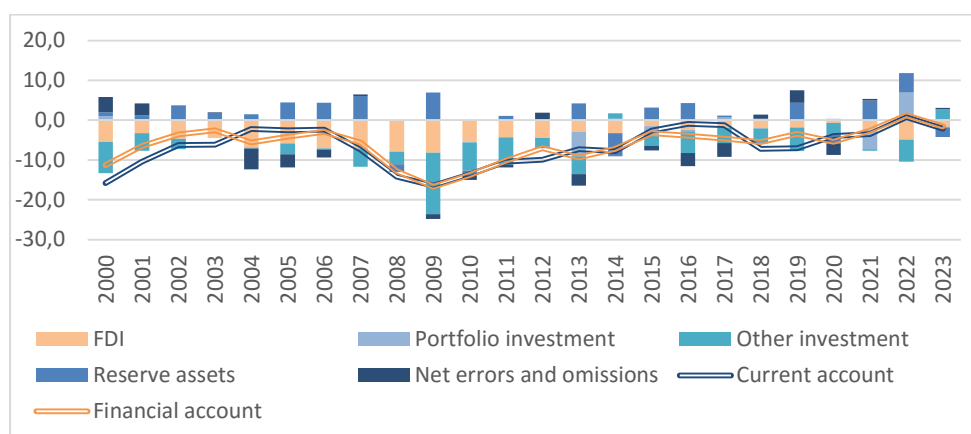
As a result of the global financial crisis, the current account deficit of RA deepened: 14.2% in 2008 and 16.5% in 2009. Later, the indicator showed a gradual decreasing trend and we notice that after the next shock period for the RA economy, after 2014, the

current account/GDP indicator decreased significantly. Here it is necessary to highlight that in 2020, during the pandemic, no significant losses of the external position were recorded on the current account. And in 2022, the positive changes registered as a result of the Russian-Ukrainian conflict led to a sharp reduction of the current account deficit.



**Figure 2.** The structure of current account, % of GDP

We can see from the figure 2 that the balance of goods always closed with deficit due to the higher level of imports exceeding the exports. At the same time, the dynamics of goods and services balances in recent years is interesting. 2020-2023 in the conditions formed after the shock of the pandemic and the positive shock of the Russian-Ukrainian conflict, the rate of deepening of the goods balance has weakened, which can be mainly determined by the high rate of re-exports in the last year. On the other hand, the improvement of the balance of services is due to the increased export of information and tourist services. As for the primary income, it essentially reflects the income received by RA residents for working abroad, which has worsened since 2020. And the next component, non – commercial transfers, also experienced a sharp decline.



**Figure 3.** The structure of current account financing, % of GDP

The current account deficit financing structure has historically been dominated by debt-generating financial instruments, and the role of net capital inflows is quite small. Financing of the deficit with the foreign direct investments has significantly decreased over the years, resulting in the deterioration of RA's position. On the other hand the other investments that are debt creating flows are more stable. Thus, the financing of RA current account is accompanied by capital inflow, the structure of which is dominated by debt creating instruments. As a result, the financing of the current account deficit leads to an increase in the external debt of the public and private sectors.

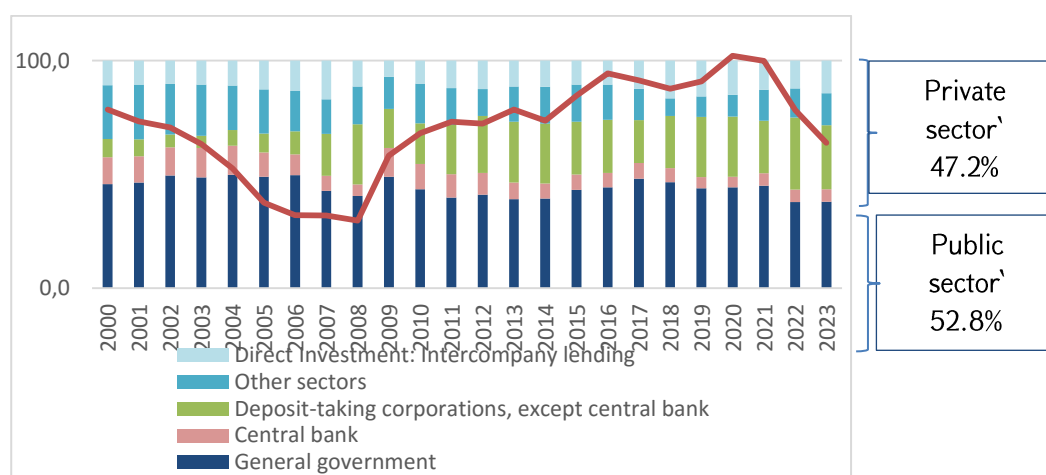
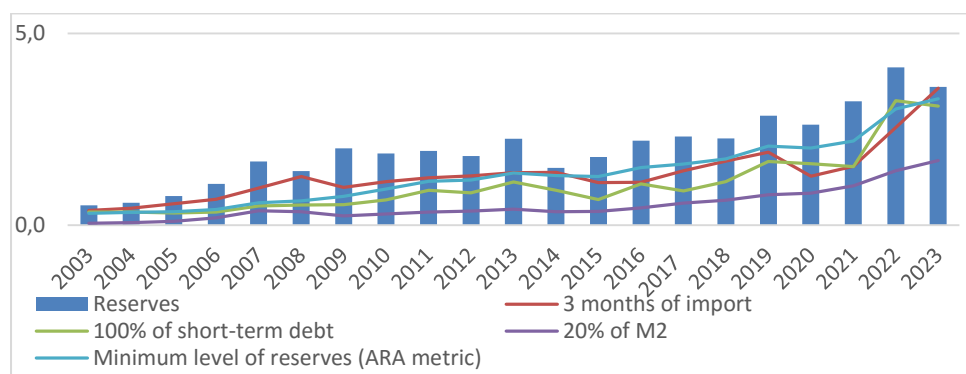


Figure 4. The structure of gross external debt, %

One of the factors contributing to the weakening of the resilience of the external position is the continuous growth of the debt burden of the private sector. If before 2008 the share of private sector debt in the structure of gross debt was on average 42.8%, after the GFS it was on average 50.2%. The reduction of the debt level in recent years is mainly due to the growth of the GDP and not the reduction of the debt. Moreover, the debt of the private sector is growing at the fastest pace.

As a buffer of the external sector of the economy, it is also necessary to take into account the level of reserves. 2022 can be considered the year of the peak of reserves accumulation. The foreign reserves of the Central Bank of Armenia amounted to about 4.1 billion dollars, which was enough to cover about 5 months of imports, 100% of the short-term foreign debt, 20% of the money supply, as well as the minimum level of reserves calculated in the case of a floating exchange rate regime using the IMF methodology. Compared to the previous year, in 2023 the level of international reserves decreased by 12.6%, meeting the coverage of imports for about 3 months, 100% of short-term foreign debt, 20% of the money supply, as well as the minimum level of reserves.



**Figure 5.** The assessment of international reserves adequacy

It should also be noted that, according to the IMF methodology, the reserve adequacy level is calculated as the sum of the weighted values of export earnings, money base, short-term debt and other liabilities. However, the IMF sets different coefficients for countries with fixed and floating exchange rate regimes [IMF, 2016, 12-25].

**Table 1.** The weights for ARA metric components

(%)	Short-term debt	Other liabilities	Broad money	Exports
<b>Fixed</b>	30	20	10	10
<b>Floating</b>	30	15	5	5

As a result, we can say that it is true that the international reserves have increased due to the inflow that took place as a result of the positive developments of the previous year, but they are still not considered a reliable indicator of resilience.

**Conclusions**

As a result of the conducted studies and analyses, we can state that from the perspective of the economy's resilience, it is important to consider the external and domestic resilience in parallel, because the factors in the real sector often underlie the indicators of the external sector resilience. The calculated resilience index reflects the periods of resilience build-up and loss. The obtained results prove that the current and financial accounts balances have the greatest influence on the formation or loss of resilience. This is due to the financing of the current account with debt, the inefficient structure of FDI distribution and the undiversified structure of exports. However, a decrease in the external debt burden was recorded, partly due to the exchange rate factor, combined with the improvement in the foreign currency reserves of the Central Bank of the Republic of Armenia and their adequacy level. On the other hand, it is necessary to note that the developed index is applicable for previous years and correctly reflected the state of the external sector of the economy. To address the mentioned issues, special attention should be paid to measures aimed at increasing economic resilience. These measures will create opportunities to respond to shocks adequately and overcome them more efficiently with fewer

losses. The measures mainly involve FDIs and the sectoral and geographical diversification of exports.

### **References**

1. Alessi, L., Benczur, P., Campolongo, F., Cariboni, J., Manca, A., Menyhert, B. and Pagano, A. (2018), The resilience of EU Member States to the financial and economic crisis What are the characteristics of resilient behaviour , EUR 29221 EN, Publications Office of the EU, Luxembourg, DOI:10.2760/840532, JRC111606., 63 p., <https://publications.jrc.ec.europa.eu>
2. Briguglio I., Cordina G., Farrugia N., (2006), Vella S., Conceptualizing and measuring economic resilience, [www.researchgate.net/publication/229039198](http://www.researchgate.net/publication/229039198)
3. Briguglio L., Cordina G., Farrugia N., Vella S. (2008), Economic vulnerability and resilience: Concepts and measurements, UNU-WIDER, Research Paper No. 2008/55, p. 229-232, <https://www.econstor.eu/bitstream/10419/45146/1/571437761.pdf>
4. Guidance Note on The Assessment of Reserve Adequacy and Related Considerations, The IMF, 2016, p.13, 25, [www.researchgate.net/publication/229039198](http://www.researchgate.net/publication/229039198)
5. Hafele, J., Bertram, L., Demitry, N., Le Lannou, L-A., Korinek, L., Barth, J. (2023): The Economic Resilience Index: assessing the ability of EU economies to thrive in times of change. ZOE Institute for Future-fit Economies: Cologne, <https://zoe-institut.de/wp-content/uploads>.
6. Jolliffe, I.T., Principal component analysis, 2002, 1986 Springer –Verlag New York, Inc., [http://cda.psych.uiuc.edu/statistical\\_learning\\_course/Jolliffe%20I.%20Principal%20Component%20Analysis%20\(2ed.,%20Springer,%202002\)\(518s\)\\_MVsa\\_.pdf](http://cda.psych.uiuc.edu/statistical_learning_course/Jolliffe%20I.%20Principal%20Component%20Analysis%20(2ed.,%20Springer,%202002)(518s)_MVsa_.pdf)
7. Lau F., Yung S., Yong I. (2003), Introducing a Framework to Measure Resilience of an Economy, Hong Kong monetary authority quarterly bulletin, [www.hkma.gov](http://www.hkma.gov)
8. Martin R. (2010) "Regional economic resilience, hysteresis and recessionary shocks", Papers in Evolutionary Economic Geography (PEEG) 1018, Utrecht University, Department of Human Geography and Spatial Planning, <https://ideas.repec.org/p/egu/wpaper/1018.html>
9. Swiss Re Institute, (2024), Macroeconomic Resilience Index, [https://www.sigma-explorer.com/documentation/Methodology\\_sigma-explorer.com\\_2024.pdf](https://www.sigma-explorer.com/documentation/Methodology_sigma-explorer.com_2024.pdf)

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This study develops and applies a novel composite External Resilience Index for the Armenian economy, employing Principal Component Analysis (PCA). The index provides a comprehensive assessment of five dimensions of the external sector and identifies periods of resilience gain and loss from 2001 to 2023. The findings reveal that current and financial account balances are the most significant factors influencing economic resilience, with notable impacts during the 2008-2009 financial crisis and the 2020 COVID-19 pandemic. Additionally, the ratio of international reserves to short-term foreign debt is highlighted as a critical component of resilience. The study highlights the role of international reserves as a buffer for the economy, and the analysis revealed that the reserves are at an adequate level. The study underscores the importance of both external and domestic resilience and suggests that enhancing FDI and diversifying exports can improve economic stability and resilience to future shocks.