SUSTAINABLE FINANCE AND INVESTMENTS IN WESTERN BALKANS – WHERE ARE WE?

SLAĐANA BARJAKTAROVIĆ RAKOČEVIĆ, NELA RAKIĆ & NEVENKA ŽARKIĆ JOKSIMOVIĆ

University of Belgrade, Faculty of Organizational Sciences, Belgrade, Serbia. E-mail: sladjana@fon.bg.ac.rs, nela.rakic@fon.bg.ac.rs, nevenka.zarkic.joksimovic@fon.bg.ac.rs

Abstract Nothing has united world in recent years as global climate change issues and its environmental impact. Situation is alarming and world has recognized negative consequences industrial development has on the environment. With the aim to struggle with growing needs for sustainable solutions of environment preserving, finance and investments have crucial role. Sustainable and green finance and investments have rising importance in achieving sustainable environmental projects. Also, environmental, social and governance (ESG) criteria have new vital role today in financial and investment decision making. The aim of this paper is to examine the role of sustainable finance and investments in Western Balkans countries. This study has an essentially exploratory character. The intention is to analyze current situation and to seek for potentials regarding development of green finance products like green bonds. The idea is to find incentives in sustainable finance area to further promote and develop capital market in this region.

Keywords:

sustainable finance, green finance, green bonds, environmental, social and governance (ESG) criteria.



1 Introduction

For some time now, the world is talking about global climate change issues and its environmental impact. Climate change effects are so strong on environment that number of initiatives have been in force around the globe that include most of the world countries. To name couple of important initiatives like Paris agreement, and the 2030 Agenda for Sustainable Development both adopted by United Nations in 2015. Paris agreement is international treaty on climate change (United Nations, 2021) agreed by international community. The long-term goal of Paris Agreement is to decrease greenhouse gases emission. Since number of countries are underdeveloped and cannot achieves climate goals by themselves, Paris agreement offers framework for financial, technical and capacity building assistance. Therefore, developed countries should provide financial support for less developed countries (United Nations, 2021). One of the essential steps in reaching climate goals is a strong shift to circular economy. The other important initiative of United Nations is beforementioned Agenda 2030 as a plan of action for people, planet and prosperity. "We are resolved to free the human race from the tyranny of poverty and want and to heal and secure our planet. We are determined to take the bold and transformative steps which are urgently needed to shift the world on to a sustainable and resilient path" (United Nations, 2015).

In order to preserve the nature and living being from, sometimes, severe consequences of climate change, large scale finance and investments are needed. In that context, climate finance is very important topic in providing and assuring Paris and other agreements on climate change. Climate finance refers to any spending on climate change mitigation and adaptation (Buchner et al., 2014). According to Naran et all. (2021), climate finance has been steadily growing every year by the rate of 24% since 2013/2014, but, unfortunately, this rate has fallen to 10% from 2017/2018 and 2019/2020 also (this period probably due to COVID 19 pandemic). In 2019/2020 global climate finance reached 632 billion USD, what is far from the 4,35 trillion USD needed to meet climate goals¹ by 2030 according to the same authors.

¹ Paris Agreement from 2015 set the goal to limit global warming to prefereably 1.5°C

Sustainable development today cannot be obtained without sustainable finance. Sustainable finance is a concept that takes into consideration environmental, social and governance (ESG) criteria when making investment decisions and leading to more long-term investments into sustainable economic activities and projects (European Commission, 2021a). Due to this important topic on climate changes, its concept of sustainable finance has become one of the key topics quidded by regulators, institutional investors and asset managers globally (World Bank, 2021).

ECG criteria has become very important part of the investment process, since investors are including ESG information into the investment process to gain a better perception of the companies in which they will invest (CFA Institute, 2021a). Environment refers to protection of the nature generally with the emphasis on climate change and carbon emissions, air and water pollution, waste management, water shortage, energy efficiency, biodiversity protection etc. Social criteria comprise consideration of people and relationships (human rights, labor standards, gender and diversity, data privacy and protection, customer satisfaction etc.). Governance refers to the manner companies are governed (leadership, boards composition, role and responsibilities, transparency, rule of law etc.). In this beforementioned areas like sustainable finance and ESG criteria, the term sustainable investing has also become important today in investment management industry. Unlike traditional investing, sustainable investing comprises also ESG criteria in investment management process in order to boost expected returns and long-term results (CFA Institute, 2021b).

In this paper we examine sustainable finance in the countries of Western Balkan: Serbia, Montenegro, Bosnia and Hercegovina, North Macedonia and Albania. In part two of the paper, literature review has been given. Part three include analyses of sustainable finance and investing in Wester Balkan countries and present result of explorative research followed by the concluding remarks.

2 Literature review

Sustainable development is the concept that is strongly connected to the ecological issues planet is facing (Pisani, 2006). The most cited definition of the sustainable development has been presented in Bruntland Commission Report from 1987. In this report sustainable development has been defined as

"development that meets the needs of the present without compromising the ability of future generations to meet their own needs." (WCED, 1987). "The Sustainable Development Goals (SDGs), also known as the Global Goals, were adopted by the United Nations in 2015 as a universal call to action to end poverty, protect the planet, and ensure that by 2030 all people enjoy peace and prosperity (United Nations Development Programme, 2015). Sustainable development comprises of number of processes that are connected and interwind. Those processes refer to society, environment, culture and economy used together in order to improve wellbeing (UNESCO, 2021).

According to previously said, achieving sustainable development requires large investments. In that sense sustainable finance and sustainable investments are very important area and its importance would grow further. Funds needed to achieve goals set on climate change are immense, so both public and private sector are needed to collect those funds. Sustainable finance, as explained earlier, represent evolution of green finance (gathering funds to meet climate and environmental issues) (European Parliament, 2021).

In its article from 2013, authors Fatemi and Fooladi propose that traditional approach to shareholder wealth maximization should be shifted to sustainable value creation framework where all social and environmental factors are comprised also.

In its study Ziolo et al. (2021) argue that sustainable financial systems are an important pillar for the implementation of the paradigm of sustainable development. Although those sustainable financial systems differ between institutions as well as countries, performance of those systems depends on knowledge and awareness of sustainable finance of the executives as well as their attitude to ESG risk. Due to sustainable development paradigm, sustainable finance has changed from the traditional finance as we know it. Traditional finance has one dimensional goal of the maximization of financial profits, while sustainability finance has multidimensional goals with ESG criteria (Pisano et. al, 2012).

Also, similarly, Fullwiler (2015) argues that unlike traditional financial theory whose values and outcomes are based on restrictive assumptions and limited to financial gains, loses and risk, sustainable finance recognizes more values, more types of return and loses (both financial and otherwise), financial innovations, more types of risk (ESG) etc.

Authors Amel-Zadeh and Serafeim (2018) have researched motives of investors to use ECG information when investing. They have found out that the most often motive is relevance to investment performance and the second one is client demand. As a most important obstacle to use of ESG criteria is lack of reporting standards, according to beforementioned authors.

Sustainable investing considers not only financial goals but also environmental, social, and governance criteria (Pastor et all, 2021). As with sustainable finance, the same concept applies to sustainable investing. It is further developed investment process enriched with ESG information during investment analyses in order to reach improved long-term investment decisions.

In order to ensure green economic growth, number of countries have infused resources into green projects to introduce, innovate, and use environmentally friendly technologies to protect the environment and improve environmental performance (Khan et all, 2021). Green financing, as concept that refers to financing the green economy, is very fast-growing area. Within this discipline numerous instruments have emerged with similar yet different purposes in financing green projects. Those instruments include green bonds, blue bonds, social bonds, green loans, sustainable bonds, sustainability-linked bonds, sustainability-linked loans etc. (European Parliament, 2021).

Green bonds are one of the mostly used of all green financial instruments, and those instruments have very fast-growing line recently. Green bonds are designated to finance environmental or climate projects that invest in areas like renewable energy, energy efficiency, pollution prevention and control, biodiversity, clean transportation, sustainable water management, climate change adaptation, eco-efficient products, production technologies and processes (European Parliament, 2021). Han and Li (2022) have performed research on green bonds market in the U.S. and Europe. They compered performance of green bonds portfolios with conventional bonds portfolios on those markets.

Empirical results from their study have revealed that green bonds portfolios outperform conventional bonds portfolios in terms of risk-adjusted returns in the majority of cases in both markets. The advantage of green bonds comes from both the raise in the return and the decline in the volatility for most of the cases.

3 Sustainable finance and investments instruments

As mentioned earlier, green projects and generally green finance requires large amount of investments. There are numerous initiatives and funds worldwide created to promote and financially support climate change and generally sustainable economy and development. Authors Sachs et all (2019) have been analyzing this issue and consider that in order to reach sustainable and development goals is important to expand financing of investment that deliver environmental benefits. Those authors suggest this to be achieved thought green finance umbrella - new financial instruments like green bonds, carbon market instruments, fintech, green funds etc.

Green financing instruments have steady development and usage since its inceptions. Green and other bonds (sustainable, social, etc.) are considered to be one of the most noticeable innovations in the area of sustainable finance (Maltais and Nykvist, 2020). Same authors, in their research, have found out that motivation for green bond market participation does not come from financial aspects of the instruments, but rather could be found in business motives. This means that green bonds issuers and investors are more attracted to »mainstreaming sustainability into internal operations and broader signaling effects« (Maltais and Nykvist, 2020). Although, green bonds are more financially convenient then regular ones, especially for corporate issuers (Gianfrate and Peri, 2019). In their extensive research, authors Tang and Zhang (2020), have found out that green bond issuance can be viewed as a substitution for firms to make environmentally friendly investments and change their ESG profiles.

First green bond, a "climate awareness bond", has been issued by European Investment Bank (EIB) and World bank in 2007. For example, since then, the World Bank itself has raised more than US\$13 billion through almost 150 green bonds in 20 currencies for institutional and retail investors all over the world (World Bank, 2019). Generally, from its kick off back in 2007, green bond market

has raised around 1 trillion US\$ till December 2020 (Climate Bonds Initiative, 2020a). But, nevertheless still huge amount of investments is needed in order to provide for clean and sustainable investments.

Green bond market today is spread out on all continents, with Europe being leading continent overall in terms of green bond volume. The trend now is an increase of bonds issued by developing countries and by the private sector. But green bonds market today represents below 1% of the total world bond market (Green Economy Coalition, 2020). Considering types of issuers mainly there are non-financial corporate, financial corporate, government and development bank issuers (Climate Bonds Initiative, 2020b). The same platform gives information about use of proceeds from green bonds for 2020. The main share of proceeds goes to energy 36%, buildings 28% and transport 18%.

3.1. Sustainable finance and investments in Western Balkan

In this part of the paper, we examine development of sustainable finance and investments in the Western Balkan countries. After defining framework of the research, we examine climate risk those countries are facing as well as level of development for sustainable finance topics. Financial sector of these countries with their instruments should be the supporter for creation of sustainable economies in this region. Our research focusses on Western Balkan countries: Serbia, Montenegro, Bosnia and Hercegovina, North Macedonia and Albania. Those countries are candidates to join European Union. "In 2021, The European Union developed with the Western Balkans the Agenda on Innovation, Research, Education, Culture, Youth and Sport. This agenda outlines a comprehensive, long-term strategy for cooperation with the Western Balkans. The EU supports stronger cooperation between the Western Balkans' stakeholders and EU countries to successfully implement the deliverables of the agenda. The agenda and its action plan are built on 3 main pillars: Political, Thematic, and Regional." (European Commission, 2021b). It is Thematic agenda that gives closer approach to EU strategic priorities "towards transforming national research and innovation eco-systems, counteracting climate change and promoting implementation of the EU Green Deal in the Western Balkans" (European Commission, 2021b). Therefore, important goal under this area is promoting the implementation of the Green Agenda for the Western Balkans. In the last quarter of 2021, EU has assigned 9 billion euros in grants and 20 billion in investments

for the Western Balkan countries under the Green Agenda Action Plan for climate action reforms, pollution control, nature and biodiversity protection and regional integration (Balkan Green Energy News, 2021). EU Green Deal basically means that the goal of EU created 2019 for Europe is to be the first climate-neutral continent, resource-efficient economy.

Consequences of global heating and climate change generally are present globally and Western Balkan countries are not exceptions, on contrary. BDP per capita in Western Balkans countries are lower than those in EU countries² (EUROSTAT, 2020), what makes even harder battle for sustainable development for those countries. With the intention to preserve the people and nature, with limited resources, those countries facing very challenging issues. In that context very important is that global initiatives have been recognized this problem not just in Western Balkan countries, but globally. That is why all sustainable initiatives have implemented framework where better-standing partners in those initiatives should help to those countries that struggle.

Climate changes are very strongly evidenced in Western Balkans countries as well as in the other parts of the world. Direct negative impact is seen with the rise of average temperature. Average temperatures during summer 2021. in Europe were the highest ever. Data for the Western Balkan region show alarming increase in temperature of 1,2°C in the near future to 1,7°C-4°C by the end of the century (Vuković and Vujadinović Mandić, 2018). That effects people's health, agriculture, water resources, energy production, that leads to wildfires, changing patterns in rain and snow etc. Next very evident problem in Western Balkan countries is air pollution. Pollution is leading cause of premature death in lowand middle-income countries. According to Global Alliance on Health and Pollution, Serbia is 9th country globally by the number of pollution-related death per 100,0000 population and first in Europe, while Bosnia and Hercegovina is fifth in Europe (GAHP, 2019).

Western Balkan countries are very energy inefficient. There are still a number of coal-fired power plant and not enough renewable energy. Although initiatives and support on growth on renewables are numerous, still immense work is to be done for creating energy-efficient environments. All these issues Western Balkan

² According to EUROSTAT EU BDP per capita in 2020 was 29.290 EUR while Serbia and Montenegro had 5.440 and 5.490 EUR respectively (data for other Western Balkans countries are not available on this portal).

_

countries are facing demand huge investments. Sustainable finance and investments are important framework for achieving sustainable goals. Financial sector itself is main arena for sustainable economy. However, where are the Western Balkans in this process? Sustainable finance and investments are very modest in scope in those countries. Considering financial instruments that are available we can see only commercial bank loans for financing green projects as the main instrument. Also, not all banks on those countries offer green loans, but the biggest ones. Besides banks, there are a dozen funds financed by international financial organizations and international financial institutions like European Bank for Reconstruction and Development (EBRD), European Investment bank, International Finance Corporation (IFC) etc. that also offers different loans for energy efficiency, renewables, agriculture, air pollution, waste management etc. On government level, central banks of Serbia, North Macedonia and Albania are members of The Network of Central Banks and Supervisors for Greening the Financial System (NGFS). The aim of this Network, among other, is to "enhance the role of the financial system to manage risks and to mobilize capital for green and low-carbon investments in the broader context of environmentally sustainable development" (NGFS, 2017).

Regarding other instruments, especially bond market, being the most prominent market for sustainable financing, just Serbia has issued green bonds from all Western Balkan countries. Republic of Serbia has issued its first green bond on September 16, 2021. Serbia is first from the Western Balkan countries that has issued any green instrument on capital market. With this instrument Serbia pulled 1 billion euros aimed for green projects and attracted more than 200 international investors. It would be interesting to see the structure of those international investors, but it is not available publicly. This 7-year maturity securities brought Serbia the lowest coupon rate Serbia has ever had before of 1% and carries 1,26% yield rate. During the international auction of these bonds, the demand has exceeded 3 billion euros. This information is very encouraging twofold. First, this is enormous success being first in the region with green instrument and with immense demand from international investors. That points out huge confidence international capital market has on Serbian sustainable development. Second, it encourages new bond issuance on the international capital market, what is promising for sustainable finance of green and climate projects in Serbia. On the other hand, what is very important in order to maintain those positive signals is to use the proceed of those bonds for the projects that are issued for: pollution prevention and control, water and wastewater processing, waste management, flood protection, biodiversity protection, support for energy efficiency, solar energy, sewerage, circular economy etc. Financing of those green projects and reporting should be transparent in order to maintain investors' confidence and provide for new green bonds issuance in the future.

It would be significant for the other Western Balkan countries to issue green instruments and to provide sustainable finance for the green projects, besides bank loans and international green funds. Those green and climate bonds are in ascending path globally, since investors are looking for ESG criteria in their investments. Because of this, more investors will seek for green instruments in the future, rather then an ordinary one. Western Balkan countries, that desperately need more sustainable finance, should grasp this situation in the capital market. Moreover, in its Green Agenda, EU is asking for decarbonization of Western Balkan countries. In that sense, there is huge incentive for those countries to finance those processes, like shutting down coal power plants and shifting to clean energy, with green bonds. And this is just an example.

Conclusion

Sustainable finance and investments have become integral part on today's agenda for supranational organizations, governments, financial and non-financial companies, institutional and individual investors etc. Sustainable and green finance and investments, with ESG criteria, have rising importance in financial and investment decision making and achieving sustainable environmental projects. The importance of sustainable finance and investments is even more relevant for the Western Balkan countries. Those countries facing incredibly challenging issues and struggle with necessary resources to finance sustainable and green projects. Currently, sustainable finance is very modest in scope in those countries. Available financial instruments in those countries are banks' and national and international funds' loans for energy efficiency, renewables, agriculture, air pollution, waste and water management etc.

The most prominent market globally for sustainable financing is bond market. In Western Balkan countries just Serbia, very successfully, has issued green bonds so far. In the future, more investors will look for green instruments. Western Balkan countries, that desperately need more sustainable finance, should grasp

this situation and finance its sustainable projects with more government, municipal and company green bonds. This will lead not just to important sustainable projects, but also will create new instruments for capital markets and attract more institutional and individual investors.

References

- Amel-Zadeh, A., Serafeim, G. (2018) Why and How Investors Use ESG Information: Evidence from a Global Survey, Financial Analysts Journal, 74:3, 87-103, DOI: 10.2469/faj.v74.n3.2
- Balkan Green Energy News (2021). https://balkangreenenergynews.com/adopted-green-agenda-action-plan-for-western-balkans-brings-eur-9-billion-in-grants-2024-deadline-to-align-with-eu-ets/ Retrieved 6.01.2022.
- Buchner, B., Stadelmann, M., Wilkinson, J., Mazza, F., Rosenberg, A., Abramskiehn, D. (2014). The Global Landscape of Climate Finance. Climate Policy Initiative. https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2014/ Retrieved from 29.12.2021.
- CFA Institute (2021a). https://www.cfainstitute.org/en/research/esg-investing Retrieved 30.12.2021.
- CFA Institute (2021b). https://www.cfainstitute.org/en/research/esg investing/sustainable-investing Retrieved 30.12.2021.
- Climate Bond Initiative (2020a). https://www.climatebonds.net/market/explaining-green-bonds Retrieved 4.01.2022.
- Climate Bond Initiative (2020b). https://www.climatebonds.net/market/data/#issuer-type-charts Retrieved 6.01.2022.
- European Commission (2021a). https://ec.europa.eu/info/business-economy euro/banking-and-finance/sustainable-finance/overview-sustainable-finance_en Retrieved 29.12.2021.
- European Commission (2021b).
 - https://ec.europa.eu/info/research-and-innovation/strategy/strategy-2020-2024/europe-world/international-cooperation/western-balkans_en Retrieved 3.01.2022.
- European Parliament, (2021). Green and Sustainable Finance. https://www.europarl.europa.eu/RegData/etudes/BRIE/2021/679081/EPRS_BRI(2021)679081_EN.pdf Retrieved 2.01.2022.
- EuroStat (2020).
 - https://ec.europa.eu/eurostat/databrowser/view/sdg_08_10/default/table?lang=en Retrieved 4.01.2022.
- Fatemi, A. M., Fooladi, I. J. (2013). Sustainable finance: A new paradigm. Global Finance Journal. Vol 21, Issue 2. pp 101-113. ISSN 1044-0283. https://doi.org/10.1016/j.gfj.2013.07.006.
- Fullwiler, S. T. (2015) "Sustainable finance: Building a more general theory of finance". Global Institute for Sustainable Prosperity, Working Paper No. 106. ISSN 2374-6475.
- GAHP-Global Alliance on Health and Pollution (2019). Poluution and Health Metrics. Global, regional and country analysis. https://gahp.net/wpcontent/uploads/2019/12/PollutionandHealthMetrics-final-12_18_2019.pdf Retrieved 7.01.2022.
- Gianfrate, G., Peri, M. (2019). The green advantage: Exploring the convenience of issuing green bonds. Journal of Cleaner Production. Vol 219. pp. 127-135. ISSN 0959-6526. https://doi.org/10.1016/j.jclepro.2019.02.022. Retrieved 6.01.2022.
- Green Economy Coalition (2020). Green Economy Global Barometer 2020 https://www.greeneconomycoalition.org/assets/reports/GEC-Reports/1037-GEC-Barometer-Phase2-A4-V8j-WEB.pdf Retrieved 12.01.2022.

- Han Y., Li, J. (2022). Should investors include green bonds in their portfolios? Evidence for the USA and Europe. International Review of Financial Analysis. Vol. 80. 101998. ISSN 1057-5219. https://doi.org/10.1016/j.irfa.2021.101998.
- Khan, M. A., Riaz, H., Ahmed, M., Saeed, A. (2021). Does green finance really deliver what is expected? An empirical perspective. Borsa Istanbul Review. ISSN 2214-8450. https://doi.org/10.1016/j.bir.2021.07.006.
- Maltais, A., Nykvist, B. (2020) Understanding the role of green bonds in advancing sustainability, Journal of Sustainable Finance & Investment, doi: 10.1080/20430795.2020.1724864 Retrieved 5.01.2022.
- Naran, B., Fernandes, P., Padmanabhi, R., Rosane, P., Solomon, M., Stout, S., Strinati, C., Tolentino, R., Wakaba, E., Zhu, Y., Buchner, B. (2021). Global Lendscape of Climate Finace 2021. Climate Policy Initiative. https://www.climatepolicyinitiative.org/wp-content/uploads/2021/10/Global-Landscape-of-Climate-Finance-2021.pdf Retrieved 29.12.2021
- NGFS (2017). https://www.ngfs.net/en/about-us/governance/origin-and-purpose Retrieved 10.01.2022.
- Pástor, E., Stambaugh, R. F., Taylor, L. A. (2021). Sustainable investing in equilibrium. Journal of Financial Economics. Vol. 142, Issue 2. pp. 550-571. ISSN 0304-405X. https://doi.org/10.1016/j.jfineco.2020.12.011.
- Pisani, J. A. Du, Professor of History. (2006). Sustainable development historical roots of the concept, Environmental Sciences, 3:2, 83-96, DOI: 10.1080/15693430600688831
- Pisano, U., Martinuzzi A., Bruckner, B. (2012). "The Financial Sector and Sustainable Development: Logics, principles and actors." European Sustainable Development Network ESDN Quarterly Report 27.
- Retrieved from 28.12.2021.
- Sachs, J. D., W. T. Woo, N. Yoshino, F. Taghizadeh-Hesary. (2019). Why Is Green Finance Important? ADBI Working Paper 917. Tokyo: Asian Development Bank Institute. Available: https://www.adb.org/publications/why-green-finance-important Retrieved 5.01.2022.
- Tang, D. Y., Zhang, Y. (2020). Do shareholders benefit from green bonds? Journal of Corporate Finance. Vol. 61. 101427. ISSN 0929-1199. https://doi.org/10.1016/j.jcorpfin.2018.12.001. Retrieved 06.01.2020.
- United Nation Development Programme. https://www.undp.org/sustainable-development-goals Retrieved 2.01.2022.
- United Nations (2021). https://unfccc.int/process-and-meetings/the-paris agreement/the-paris-agreement Retrieved from 28.12.2021.
- United Nations (2015).
 - https://www.un.org/ga/search/view_doc.asp?symbol=A/RES/70/1&Lang=E Retrieved 28.12.2021.
- UNSECO, (2021). https://en.unesco.org/themes/education-sustainable development/what-is-esd/sd Retrieved 2.01.2022.
- Vuković, A., Vujadinović Mandić, M. (2018). Study on climate change in the Western Balkans region. Regional Cooperation Council. SEE2020 Series.
- WCED World Commission on Environment and Development, (1987). Our Common Future. https://sustainabledevelopment.un.org/content/documents/5987our-common-future.pdf, Retrieved 2.02.2021.
- World bank (2019). https://www.worldbank.org/en/news/immersive story/2019/03/18/10-years-of-green-bonds-creating-the-blueprint-for-sustainability-across-capital-markets Retrieved 4.01.2022.
- World Bank (2021).
 - https://www.worldbank.org/en/topic/financialsector/brief/sustainable-finance Retrieved 30.12.2021.

Ziolo, M., Bak, I., Cheba, K., Spoz, A., Niedzielski, P. (2021). Sustainable financial systems toward sustainability in finance. Institutional and managerial approach. Procedia Computer Science. Vol 192. pp. 4237-4248. ISSN 1877-0509. https://doi.org/10.1016/j.procs.2021.09.200.