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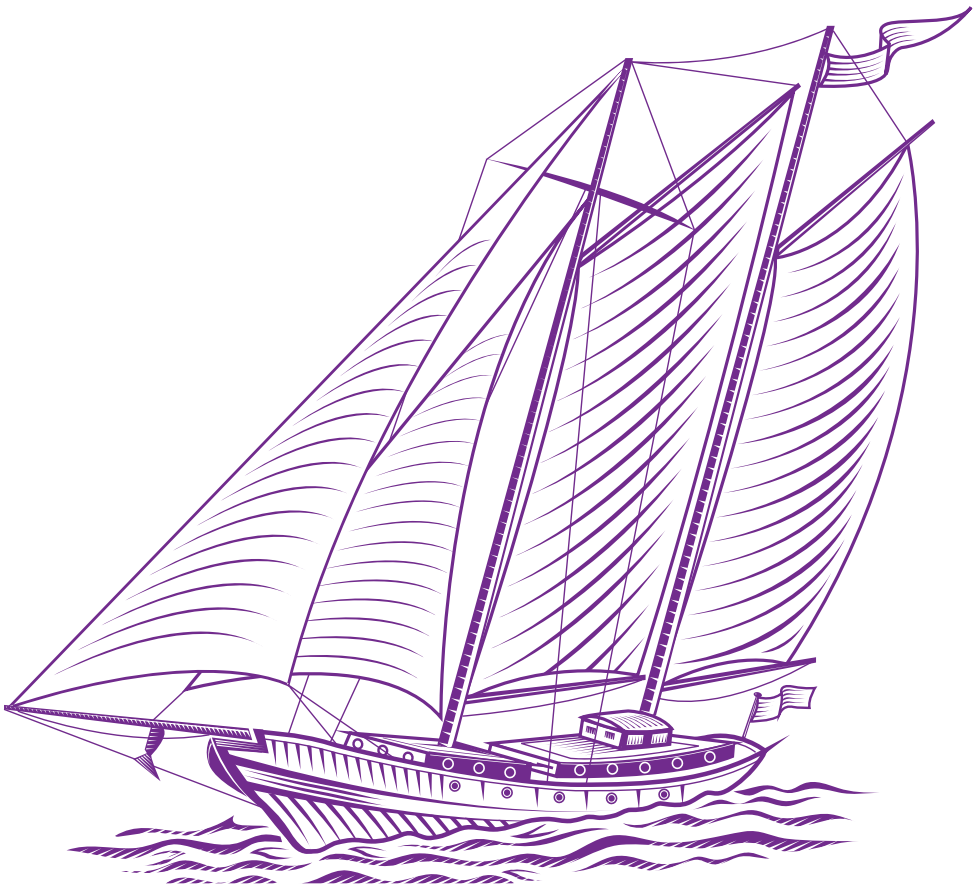

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THE WORK-LIFE BALANCE AND WELL-BEING OF ROMANIAN TELEWORKERS DURING PANDEMIC

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ABSTRACT. This period of mandated remote work has been challenging the Romanian employees to adept to the new paradigm of telework for most of them. While prior to COVID-19 pandemic employees were accustom with the work environment and its variables, they were suddenly replaced. The psychological place for restoration, called home, got invaded and occupied by working life. In this time remote workers were learning to adapt to the new way of working from home and balancing it with everyday life. While employers are searching for new and performing approach to accomplish their goals, employees are addressing new conditions affecting their working performance and personal or family life. The study presents and analyses data of two surveys conducted by the "European Foundation for the Improvement of Living and Working Conditions". The impact and consequences of telework on work-life balance and well-being of workers are discussed, seeing that the working time and work intensity dimensions have a direct influence. The search for sustainable telework requires customized working conditions, adapted skills, tackling emerging risks and involving all stakeholders in Romanian working environment.

Keywords: telework, work-life balance, well-being, work intensity, working time, flextime, autonomy, right to disconnect, COVID-19

JEL Classification: M100, M540, M150

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Introduction and literature review

Unexpectedly, the rising of COVID-19 pandemic changed the work environment of many Romanian employees in an unpredicted way, having to start working remote. Prior to the pandemic, in Romania, the percent of employees practicing telework were around 10% in 2015 and mainly happening in the information and communications technology (ICT) sector (Eurofound, 2021). For most of the teleworkers the new way of approaching work came with several challenges, first having to carry out their work through the use of ICTs, as telework is define (European Commission, 1998).

Due to the restrictions imposed during the pandemic, the companies in several industrial sectors strived to adept, digitalizing and developing their ICTs, reorganizing activities and rethinking human capital management (Grigorescu & Mocanu, 2020). A study of Romanian teleworkers reveled some advantages of remote work: improved work-life balance, achievement of new specific skills for telework, work flexibility and autonomy both sustaining further self-development, so important for remote work. Another essential effect of commuting work is the opportunity offered to careers to combine their home responsibility with work ones, and to those living in rural areas (Dima, Tuclea, Vranceanu, & Tigu, 2019). Among teleworkers, there is a positive correlation between work-life balance, well-being, job satisfaction, competences, and environment (Miron, Petcu, David-Sobolevschi, & Cojocariu, 2021).

While in the western world, the telework or remote work was heard of in 1970 (Messenger & Gschwind, 2016), in Romania telework is at the point of spreading among different economic sectors. The telework is regulated by law in Romania just since April 2018 (Dima, Tuclea, Vranceanu, & Tigu, 2019). Therefore, the research of teleworking activity is in its time of developing and uprising with important results and information for all parties.

There are several benefits and challenges of telework revealed by researchers. The ICTs empowers workers to perform their duties from almost anywhere, either is home, hotel, office, train or a caffe (Wojcak, Bajzikova, Sajgalikova, & Polakova, 2016), just using the necessary technology to perform their tasks (Belzunegui-Eraso & Erro-Garces, 2020). Remote work facilitates more flexibility that boosts work-life balance and results in increased job satisfaction, it decrease stress (Grant, Wallace, & Spurgeon, 2013), supports single parents and persons with special issues (Burrell, Barnard-Zaffino, & Ulomi, 2014), reduces commuting time and enriches personal development (Tremblay & Thomsin, 2012), offers time autonomy that enhances work-life balance and productivity (Sostero, Milasi, Hurley, Fernandez-Macias, & Bisello, 2020). Likewise, the challenges of remote work could lead to some negative consequences, like work-life blurring, social isolation and increased worry due to lack of colleagues support (Grant, Wallace, & Spurgeon, 2013), it can intensify work–family conflicts (Song & Gao, 2019), lowing trust, self-discipline issue, decreasing job performance due to lack of technological skills, procrastination (Antonacopoulou & Georgiadou, 2020), (Contreras, Baykal, & Abid, 2020), (Stankevičiūtė & Savanevičienė, 2019), (Waizenegger, McKenna, Cai, & Bendz, 2020), (Wang, Liu, Qian, & Parker, 2021), over-working influencing negatively the well-being (Grant, Wallace, & Spurgeon, 2013), if work and life in the same place is not well managed it could lead to social dilemmas, longer working hours, incapacity to switch work off (Amichai-Hamburger, 2009), psychological costs and health problems (Giménez-Nadal, Molina, & Velilla, 2020) caused by always-on status.

Accordingly, the theoretical papers identify the importance of boundary-management for teleworkers (Grant, Wallace, & Spurgeon, 2013). The strategy applied by each employee while managing time and space, and the decision-making proceeding in regards with the work and family roles are vital to balance work and life (Amichai-Hamburger, 2009). Most recent, the literature review highlights the significance of work-life balance and the wellbeing of teleworkers. The major issues of employees emphasize the need for improved technical and communication skills, flexible working arrangements, customized leadership (Wojcak, Bajzikova, Sajgalikova, & Polakova, 2016), health supporting environment,

better time management, expectation of a sustainable organizational culture enhancing individual development and diminishing inequities and discriminations (Galvez, Tirado, & Martinez, 2020).

From the employers' perspective, remote work determines some cut in costs (Galvez, Tirado, & Martinez, 2020) improved productivity and decrease absenteeism (Grant, Wallace, & Spurgeon, 2013). As workplace and worktime flexibility maintains well-being, this upholding the work-life balance, for organizations the result is lower health costs, greater productivity, and commitment (Casey & Grzywacz, 2008). Nevertheless, it is very important that organizations' activities are projects or assignments based for results evaluation. A formal clear policy guidance provided to employees is mandatory in preparation for accomplishing expectations. The employers must supply employees with adequate communication technology and tools. Studies show that teleworkers are less likely to be dissatisfied and to withdraw their job (Burrell, Barnard-Zaffino, & Ulomi, 2014). A side effect of telework is the reduction of organization structural hierarchy (Belzunegui-Eraso & Erro-Garces, 2020) that increases workers' empowerment and commitment.

Once the widespread of COVID-19 begun, there were several studies lunched to analyse the pandemic impact. These recognised that work-life balance, health and wellbeing were highly affected (Nangoy, Mursitama, Setiadi, & Pradipto, 2020), the work from home were recommended or imposed, the loss of job increased on the labor market (Cetrulo, Guarasio, & Virgillito, 2020). Work-family conflict is a result of inter-role conflict triggered by pressure between work and family roles. Work-related stress occurs when work demands exceed individual capacity to accomplish them. This influence personal performance affecting organization performance, causing absenteeism, complaints, or conflicts (Stankevičiūtė & Savanevičienė, 2019). The world seems to be at risk of a mental health pandemic due to the life and work experience in 2020 when stress, anger, sadness, and worry reached record levels among workers (Gallup, 2021).

The work-life balance is a widely used and abstract term. Different definitions and measurements have been attributed to it in the academic literature. While people struggle with balancing work and private life, the EU and national governments put together work-life balance policies to stimulate employment, productivity, healthy workplaces and to reduce

inequalities. The concept work-life balance originates in the theory of roles that differentiates the roles of individual at work and the roles in the private sectors of life. In this regard, one perspective on balance is no conflict. Even so, the allocated value or preference to each role could offer a different perspective for the individual, achievement being considered when roles involvement is in accordance with values. Individuals are searching for fulfillment of their commitments and to experience success and satisfaction in their work and life (Eurofound, 2018).

Human well-being gained attention over the years being a core global issue today. Some international agencies publish annually reports at country level measuring the well-being and related indicators (McGillivray, 2007). Casey and Grzywacz (2008) researched underline the positive influence of flexibility on well-being. The employees who can decide when and where to work expressed a higher life satisfaction with improvement on work-life balance. The employees associate greater flexibility with better mental well-being, as flexibility enables them to better coordination of work life and personal life, this also is reducing stress. Addressing this issue could result in win-win satisfaction for workers and organizations (Casey & Grzywacz, 2008).

The employees' higher control over the where, how and timing of work has valuable effect for their well-being (Amichai-Hamburger, 2009). Wheatly (2012) identified the increase of available time of home-based teleworkers for household activities, especially for women. Thus, in recent years, the number of women employed in Europe has increased and the percent of those who have started working from home is higher than among men. The results show that due to time flexibility women have managed better their work-life balance while working from home. However, during non-working hours, the results show a percent of almost 30% of teleworkers working in their free time daily or several times weekly, while the office workers doing it is less than 5%. (Eurofound, 2021).

Furthermore, some studies focused on negative effects of telework are presented by Song and Gao (2019). Their research identifies the increase in stress for those bringing work at home after working hours and when working from home on weekends. Also, they present the effects of homework activities on parents' workers and the problem of blurring work and family life. The effects of remote work vary by the type of telework, by parental status, by gender, and by the day of the week (Song & Gao, 2019).

It is critical to investigate how people feel when working from home, the relationship between remote work and affective well-being. Telework could boost well-being but it is conditioned to maintaining social connections outside of the workplace. The affective well-being is also subject to personality types as for example some are more open to new experiences, others have a higher level of rumination (that combined with low openness could decrease well-being), others seek new sensations more or social connections (Anderson, Kaplan, & Vega, 2015). Baruch and Nicholson (1997) developed a framework of homeworking identifying the organizational and individual factors that affect both sides in positive or negative ways. They classified these influences in four major factors: *individual* including personality and situation, *organization* comprising its strategy and culture, *job* involving nature and technology, and *home & family* (Baruch & Nicholson, 1997). To these four factors of teleworking was added later the *environmental* factor encompassing safety and legal elements (Belzunegui-Eraso & Erro-Garces, 2020).

The perspective for 2030 of the European Union (EU), based on the *2030 Agenda for Sustainable Development*, is aiming at smart, sustainable and inclusive development. The target addressing labor force is to protect labor rights, advance safety, secure working environments and support health and well-being for every worker (United Nations, 2015). Thus, the *European Foundation for the Improvement of Living and Working Conditions* (Eurofound) is observing the advancement of working conditions and the quality of life since 1991 applying regular surveys. The impact of telework on social, environmental, and economic levels were included in their monitoring, as the behavioral responses to remote work are exceptionally complex (Moos, Andrey, & Johnson, 2006).

The purpose of this research is to explore the impact of telework over the work-life balance and well-being of teleworkers as these two are overlap and inter-related to some degree and can be positively and negatively impacted.

Research methodology

The research focuses on the attitudes and perceptions regarding work-life balance and well-being of Romanian employees subsequently experiencing telework activities during the pandemic context 2020-2021.

Thus, a descriptive study was the appropriate method to be employed for this objective. Also, a descriptive analysis could provide the opportunity to study how the employees responded to the new working settings and pandemic context influences on work-life balance. To understand what are the employees' perceptions and behaviors, a quantitative analysis was carried out for a set of variables and items.

Since Eurofound provides through their reports knowledge to assist in the development of better social, employment and work-related policies since 1975, database was gathered from Eurofound's investigations. This European Union Agency collects comparable and reliable data on working conditions across European countries starting from 2005. Their most recent investigation related to the pandemic is the "Living, Working and COVID-19 E-survey" (LW-COVID-19). The survey was applied in several rounds in almost all EU members and for the research purpose have been selected the databases associated with June-July 2020 and Feb-March 2021. The sample size of Romanian respondents was 1,318 (out of 24,123 in total) in June-July 2020 (Sandor, Ahrendt, & Eurofound, 2020).The second database used in this research is The European Quality of Life Surveys (EQLS) from 2016. In this survey participated 1,004 Romanian respondents out of 36.908 in total from 33 countries (Eurofound, 2016).

The framework for investigating the work-life balance in the case of Romanian employees during pandemic context and analysing the influences of working conditions in new settings upon the living ones, is shaped around two dimensions of job quality: working time and work intensity (Eurofound, 2021). To respond better to the research objectives have been selected the following variables: working hours per week, remote working hours per week and well-being index. Regarding the work intensity 4 items were considered that illustrate the employees' perceptions about the influence (positive or negative) of job tasks and responsibilities on free time. Due to the fact that descriptive analysis permit to conduct comparisons at different periods of times to see whether the patterns are similar or dissimilar at different points of time, have been selected three periods: before outbreak, results obtained for 2020 and for 2021.

Results and discussions

According to the LW-COVID-19 survey results of 2020 teleworking pattern in Romania was not a common practice before the outbreak. Thus, an important feature during the pandemic crisis is that remote work became the regular way of working for many Romanian employees with no experience or very little in this system. Based on the results of the LW-COVID-19 survey applied in July 2020 in the period of lockdown, the percentage of Romanian employees working only from home was around 31% and 52% in the hybrid system. Among the industry sectors, the highest incidence of teleworking was registered in the service sectors: education, financial services and public administration; and lower level was characteristic for the frontline sectors such as health, transport and agriculture, as well as in sectors that were subject to specific lockdown restrictions, like commerce and hospitality.

The European Quality of Life Surveys (EQLS) were carried out in 2003, 2007, 2011 and 2016. The latest survey covers some topics relevant to work-life balance and well-being. The results classified Romania below the European Union average in terms of well-being and work-life balance. The Romanian employees are less satisfied with their life, less happy, they work more hours than average, they come from work too tired, found it more difficult in fulfilling family responsibilities and due to these responsibilities, it's more difficult to concentrate on work (Eurofound, 2016). A tool widely used in the psychological field is the 5-item Worlds Health Organisation Well-Being Index (WHO-5). It consists of five questions screening the mental well-being of the respondents (Topp, Østergaard, Søndergaarda, & Bech, 2015). The scale is considered from 0 to 100 and a score equal to or less than 50 shows a risk of depression. The WHO-5 was included in EQLS 2016 and LW-COVID-19 surveys in 2020 and 2021. The results show a higher depreciation of employees' well-being in Romania than at EU level at the beginning of the pandemic compared with the EQLS results in 2016 but followed by an increase above the EU level in the first semester of 2021. The results indicate a better mental well-being recovery of the Romanian employees after the lockdowns and the pandemic implied risks.

Table 1. The 5-item Worlds Health Organisation Well-Being Index

	EQLS 2016	LW-COVID-19 Survey Jun-July 2020	LW-COVID-19 Survey Feb-March 2021
RO	66	47.2	49.3
EU	66	52.2	45.3

Source: Data selected from Eurofound EQLS 2016 and LW-COVID-19 surveys

Work-life balance and well-being of teleworkers are highly corelated to working time. Therefore, since remote work primarily allows both employees and employers to adapt work time and place to their needs the first dimension analysed was the perception regarding change of working hours in the remote system. The results indicate that the working time used in the remote system has been growing in comparison with the average hours/week resulting before the outbreak. Regarding the working time have been selected two representative items: changing of the working duration per week and the working time spent in a remote system. To establish the point of comparison for changes in the working time have been selected the average before the outbreak, based on EWCS6 from 2015 (EWCS6, 2015), which resulted in 40.8 hours/week for the Romanian employees. Based on Jun-July 2020 survey responses to the question "*Last month, how many hours per week did you work on average?*" for the Romanian employees resulted in a value of 50.9 hours/week. So, the outbreak and the Covid-19 context which imposed the implementation of the teleworking or hybrid system in many fields of activity, determined a significant growth of 24.7% in the working time, with a negative impact upon the work-life balance. Even if the average decreased to 48.5 hours/week in the survey applied during February-March 2021, still the gap remains important in the case of Romanian employees, as well when it is compared with the European average of 40.1 hours/week (Eurofound, 2020).

However, it seems the Romanian employees did not perceive this growth. Figure 1 displays these perceptions on a five levels scale. Based on these data a weighted score was computed, using a rating system from -2 (decreased a lot) to 2 (increased a lot) to evaluate the overall perception. Correspondingly an overall index of (- 0.24) indicates that even if the amount of working time increased, the general employees' perception is

contrary. This result leads to the idea that remote working benefits like flexibility, greater autonomy and higher productivity were appreciated by Romanian employees strongly influence their perception. The issue emerging here is the perception of "extra" work hours gain by teleworkers not having to spend time on getting ready and commuting to the office, therefore some additional working hours was not such a burden. However, for long term this could get them unhappy as their working hours are more compared with the office workers (Amichai-Hamburger, 2009).

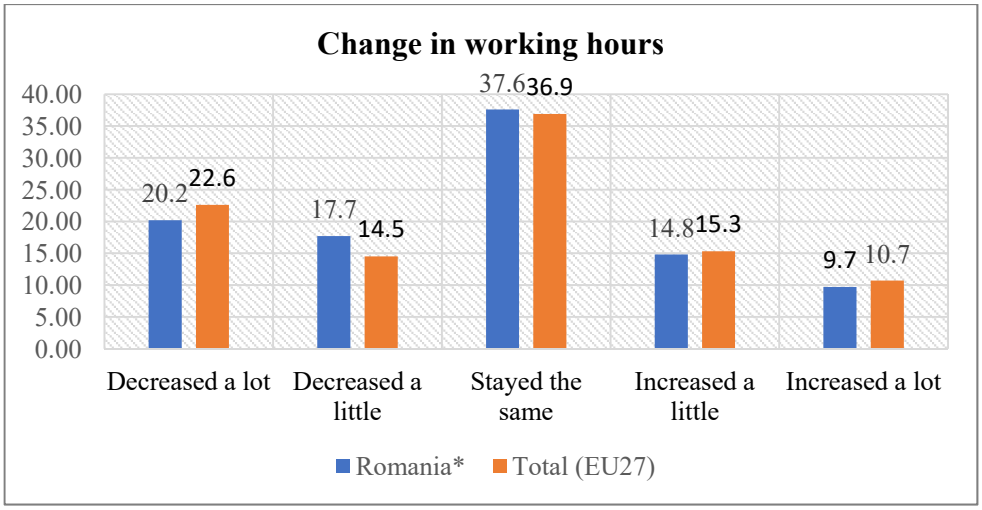

Figure 1. Perceptions about working hours in the remote system
Source: Author's processing based on data provided by the Eurofound

For the second item related to working time have been selected the responses to the question *Out of the number of working hours/week, how many did you work from home?* and outcomes are presented in Table 2.

Table 2. Average weekly working time

	Romania		Europe	
	Average working hours/week	Working hours/week from home	Average working hours/week	Working hours/week from home
Survey Jun-July 2020	50.9	10.6	41.5	14.2
Survey Feb-March 2021	48.5	11	40.1	14.5

Source: Data selected from Eurofound LW-COVID-19 surveys

In the case of Romanian employees resulted that after 2020 when the working hours from home represented 20% of the total average per week, in 2021 not only that the trend remains the same but even more, increased to 22%. In comparison to the mean at the European level, of 34-36% the working system in remote mode seems to be less utilized in the case of the Romanian economy. According to the 2021 survey, in countries like Belgium, Ireland, Finland, Netherlands the working hours from home represented more than 50% of the weakly working time (Eurofound, 2021). It is important to emphasize that the positive experience of employees and employers related to the implementation of the teleworking system during the COVID 19 context determined them to maintain it and even to embrace it more in 2021. Because of that, it is important to investigate also how the work intensity was perceived in this pandemic situation.

The second dimension investigated, work intensity has a higher potential influence upon the work-life and well-being of Romanian employees. For the analysis have been selected the following items:

- *Over the last 2 weeks, how often you have worked in your free time to meet work demands?*
- *Found that your job prevented you from giving the time you wanted to your family.*
- *Found that your family responsibilities prevented you from giving the time you should to your job.*
- *Felt too tired after work to do some of the household jobs which need to be done.*

Quantitative demands can be measured by the extent to which people have enough time to get their job done. Not always having enough time to get the job done denotes high quantitative demands and it is part of the work intensity with the potential to affect the work-life balance. Consequently, analyzing the responses obtained in both surveys, Jun-July 2020 and Feb-March 2021, resulted that the frequency to work during free time for accomplishing the job tasks increased in correlation with the intensification of working time in remote mode (Table 3). Because the incidence of these situations is not intense – higher percentages just for *Less often*, *Once or twice a week* response – this leads to the conclusion that the Romanian employees during Covid 19 context preferred to move

toward teleworking system because this doesn't diminish in an important ponder the work-life balance, but even contrary have been perceived having an insignificant effect upon the free time.

Table 3. Working during the free time

Over the last 2 weeks, how often you have worked in your free time to meet work demands?	Every day	Every other day	Once or twice a week	Less often	Never	Weighted averages
Survey Jun-July 2020	8.9	6.1	12.1	19.4	53.4	1.97
Survey Feb-March 2021	8.2 (-)	4 (-)	16.9 (+)	24.3 (+)	46.7 (-)	2.02

Source: Author's processing based on data provided by the Eurofound LW-COVID-19 surveys

Even working time increased with the experience of remote work, the most Romanian employees (75%) expressed their wish to continue working from home at least occasionally after the pandemic (Eurofound, 2020). Consequently, work-life balance is currently a tough challenge for employees and employers because telework will continue to intensify after the pandemic.

Regarding the work-life balance, the following two items are eloquent: job disallowed you from giving the time you wanted to your family and second family responsibilities prevented you from giving the time you should to your job. For 2021 in comparison with 2020 resulted, based on the Romanian employees' responses, a reduction of the situations when job tasks banned from giving enough time to spend with families. This comes in a strong connection with the minor reduction of working hours in 2021 compared to 2020 and a slight growth of the remote working time. The weighted average computed using a rating system from -2 (always) to 2 (never) increased from the overall 0.22 for the survey 2020 responses to 0.28 for 2021 survey responses. This result designates a small improvement of the work-life balance perceived by Romanian employees during the pandemic context and new working settings. On the other hand, in the case of Romanian employees, it turned out that the intensity of work is very rarely altered by family responsibilities, even if they are novices in experimenting with the remote work system.

Therefore, the percentages of responses with *Never* or *Rarely* to the question: *Found that your family responsibilities prevented you from giving the time you should to your job,* prevailed reaching a total of 80% (Figure 2). Making a comparison of the percentages obtained for both questions results that there is a lower incidence of the situations when the family responsibilities altered the working time in contrast with the situations when job tasks accomplishment waisted the free time spent with family. In the same idea, the computed Pearson coefficient between the responses of these two questions is -0.55, revealing an indirect correlation between the predominance of working time upon family time and the prevalence of family time upon working time. In conclusion, this evidence characterized an unbalanced work-life equilibrium for Romanian employees, especially for those working from home, there is often no physical separation between work and living spaces. This raises issues of unclear boundaries between work and non-work life, while the process of going out to work helps to delimit work and family.

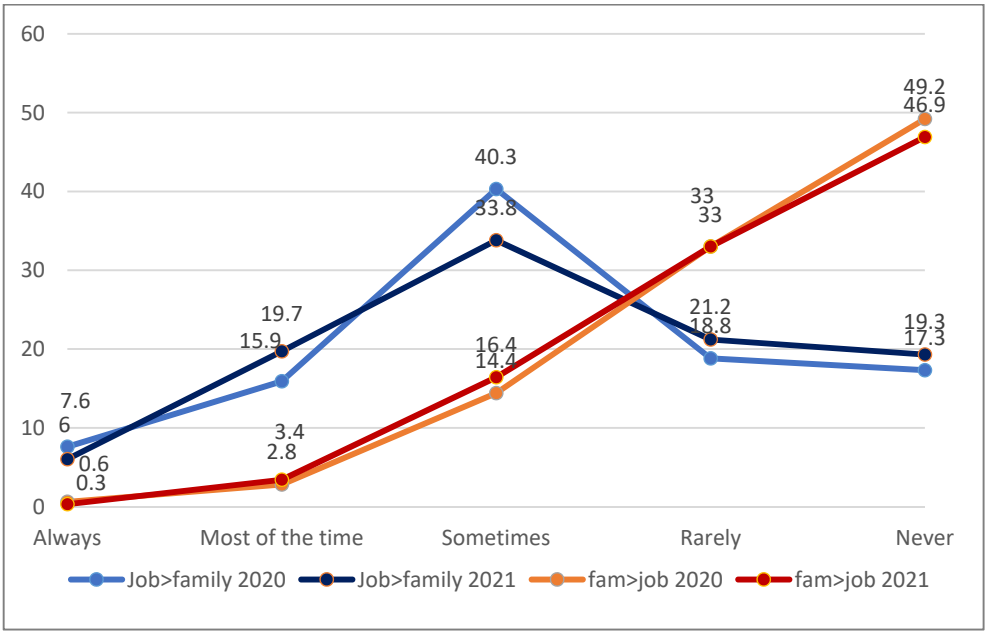

Figure 2. Job and family responsibilities comparison
Source: Author's processing based on data provided by the Eurofound LW-COVID-19 surveys

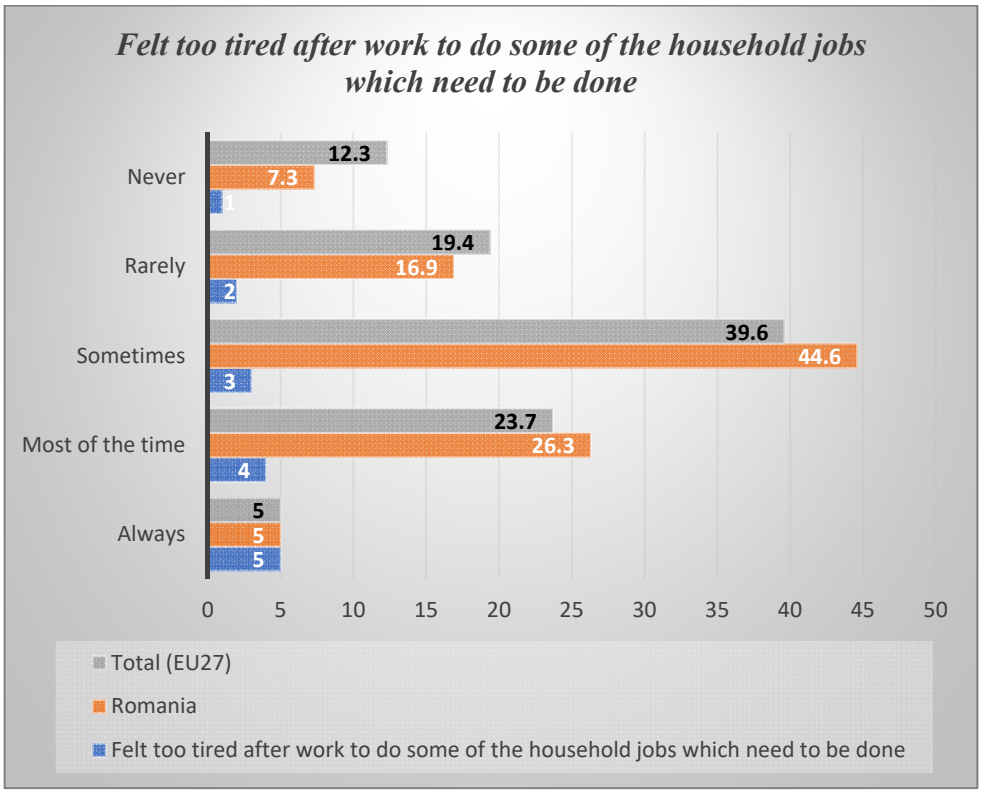

Figure 3. Work intensity and household responsibilities
Source: Author's processing based on data provided by the Eurofound LW-COVID-19 surveys

For a more comprehensive understanding of the work-life balance situation it was added the analysis of the responses to the question: *Felt too tired after work to do some of the household jobs which need to be done* (Figure 3). Respondents with children under 17 who worked only from home during the COVID-19 crisis reported a greater degree of work–life imbalance – both in comparison to those with children but working at the employer's premises or other locations and to those without children. It can be concluded that the work intensity, for Romanian employees during the pandemic context of 2020-2021, negatively influenced the non-work life, even if the spread of the remote system increased and carried the regular benefits like flexibility, job satisfaction and higher work productivity.

Conclusions

The increase of working time in remote system issue requires for different approach of Romanian teleworkers and organizational systems. There is a need for clearly defined work tasks and expectations, and family boundaries, teleworking training programs, like training to improve communication skills, self-time management or self-boundaries managing. It is very important that telework is design in a form of projects or assignments to facilitate effective results evaluation and a goal-oriented work achievement of employees. A formal clear policy guidance provided to teleworkers is mandatory in preparation for accomplishing expectations (Burrell, Barnard-Zaffino, & Ulomi, 2014). Furthermore, employers have the responsibility to facilitate a more sustainable working system offering adequate communication technology and tools with improving possibilities of digital skills and communication, establishing ways to connect and disconnect from work, also providing time management and self-boundary management trainings. These could enhance employees to reduce work-life blurring and the work intensity, being better prepared and having the necessary skills tailored to remote work.

In addition, the European Commission started earlier in 2017 to issue policies addressing employees' work-life balance. The latest rules concerning work-life balance asks for more adaptable working conditions with specific requests for parents and careers, and most important the flexible working arrangements. The rules were approved on 4 April 2019 and EU countries have three years to comply with the new rules (European Parliament, 2018). Also, the problematic subject of always-on status forced the police makers to consider and approve the law allowing employees to disconnect from work. This law was adopted by European Commission in January 2021 (European Parliament, 2021) and the right to disconnect follows to be integrated and embraced by teleworkers and their employers. The European social partners agreed, in order to overcome the challenges of telework, that it is necessary to train the employees and develop their digital skills, to provide ways to connect and disconnect form work, and to respect human dignity and surveillance (ETUC, BUSINESSEUROPE, CEEP, SMEunited, 2020). Such programs and policies will benefit employees, their families, and organizations.

This study highlights the work-life balance and well-being topics concerning Romanian teleworkers based and limited to the used data, still the respondents willing to continue working remote asks for further awareness and consideration. As home is psychologically the place for restoration the mixed of home activities and work activities impact the well-being, therefore further study on well-being of teleworkers from different remote locations needs more research. Work-life balance analysis in accordance with personality types should benefit of an in-depth relevant analysis. The work-life balance and well-being require specific attention to individuals, organizations, jobs, culture and environment in a comprehensive and sustainable way.

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INCENTIVES FOR SUSTAINABLE ENTREPRENEURIAL INTENTIONS OF YOUTH WITH HIGHER EDUCATION STUDIES IN ROMANIA

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ABSTRACT. The performed empirical study identified some factors that lead to the encouragement and stimulation of sustainable entrepreneurial intentions, by integrating the variables from the theory of planned behavior in the model of the entrepreneurial event, adapted to the context of sustainable entrepreneurship.
For a sample of 170 students of the Faculty of Economics and Business Administration within the West University of Timisoara, the empirical results showed that: perceived desire and feasibility for sustainable entrepreneurship are direct antecedents of sustainable entrepreneurial intentions; the individual attitude regarding entrepreneurship, subjective norms and behavioral control determine the perceived desire and feasibility regarding sustainable entrepreneurship, under the conditions of environmental values influence. The increase of respondents' number and the inclusion of additional variables in the research model, with moderating or mediating role, would allow the obtained results to be generalized for young people with university studies who have taken

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entrepreneurship courses through their academic curriculum and would guide to an expansion of research on stimulating factors of sustainable entrepreneurial intention.

Keywords: sustainable entrepreneurial intention, sustainable entrepreneurship, environmental values, theory of planned behavior, entrepreneurial event theory.

JEL Classification: L26, Q56.

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Introduction

Sustainable entrepreneurship postulates entrepreneurial activity as a potential solution to environmental degradation and social inequality (Muñoz and Cohen, 2018; Shepherd and Patzelt, 2011). Entrepreneurs can pursue their motivation to obtain financial benefits by creating new businesses or new activities within existing firms, and contributing in the same time to the reduction of social, environmental and environmental degradation related problems (Belz and Binder, 2017; Muñoz and Cohen, 2018; Schaltegger and Wagner, 2011). Upstream of any sustainable entrepreneurial creation specific process lays the intention of a potential entrepreneur, meaning the probability that he/she will practice a sustainable entrepreneurship (Sendawula, 2018). In order to identify the determinants of sustainable entrepreneurial intention, there are recent studies that have considered and extended the specific models of entrepreneurial event theory (Shapero and Sokol, 1985) or theory of planned behavior (Ajzen, 1990, 2002), adapting them to the context of sustainable entrepreneurship (Agu *et al.*, 2021; Peng *et al.*, 2021; Yasir *et al.*, 2021). Establishing the factors that would lead to encourage sustainable entrepreneurial intention creates the possibility for universities to understand the measures to be taken to promote environmental values and sustainability in the entrepreneurship education programs for youth, and government decision makers to ensure a stimulating business

environment for entrepreneurial business creation in order to generate at the same time profit, conserve the natural and social environment, improve the well-being of the society.

In Romania, there is a sustained academic research on the antecedents of entrepreneurial intention of youth with university degrees (Feder and Nițu-Antonie, 2017; Georgescu and Herman, 2020; Herman and Ștefănescu, 2017; Nițu-Antonie and Feder, 2013; Nițu-Antonie and Feder, 2017a; Nițu-Antonie and Feder, 2017b; Nițu-Antonie *et al.*, 2014; Nițu-Antonie and Feder, 2015; Păunescu *et al.*, 2018; Popescu *et al.*, 2016; Vodă and Florea, 2019). However, academic research is very limited when considering the determinants of entrepreneurial intentions that may influence students in their decisions to adopt and implement sustainable practices in their future business endeavors. Consequently, the present paper aims to establish the direct and indirect antecedents of sustainable entrepreneurial intentions for Romanian students who benefited from entrepreneurship university courses, in the context of integrating variables from the theory of planned behavior (Ajzen 1991, 2002) in the entrepreneurial event model (Shapero and Sokol, 1982) and their adaptation to the sustainable entrepreneurship framework. The main objective of the research was to study the indirect linkages of individual attitude towards entrepreneurship, subjective norms and perceived behavioral control regarding sustainable entrepreneurial intention, through perceived desire and feasibility on sustainable entrepreneurship, given that environmental values are precedent for individual attitude, subjective norms and perceived behavioral control.

The research was structured in four main parts: the theoretical and empirical framework regarding the antecedents of sustainable entrepreneurial intentions, respectively the conceptual research model; the presentation of the research methodology; the results obtained from the statistical analysis of the primary data, the findings and the implications regarding the research; the establishment of conclusions drawn from the conducted research, the limitations and future directions of research.

Literature, Hypotheses and Conceptual Research Model

Studies regarding the determinants of entrepreneurial intentions have been largely founded on the entrepreneurial event theory (Shapero and Sokol, 1982) and on the planned behavior theory (Ajzen, 1991, 2002)

(Ali *et al.*, 2012; Carr and Sequeira, 2007; Griffiths *et al.*, 2009; Krueger, 1993; Moriano *et al.*, 2012 in Sharahiley, 2020).

The entrepreneurial event theory (Shapero and Sokol, 1982) starts from the premise that the existence of an entrepreneurial event transforms a person's behavioral inertia into the act of creating a business. This theory considers the creation of a firm as the result of the interaction between contextual factors and a person's perceptions, highlighting the importance of these individual perceptions in the anticipation of intentions to act in a certain way (Nguyen, 2021). According to this theory, there are three factors that determine entrepreneurial intention: perceived desire, perceived feasibility and inclination to act. Perceived desire refers to the extent to which a person feels attracted to become an entrepreneur, perceived feasibility shows the extent to which they consider themselves capable of becoming an entrepreneur, and the propensity to act indicates their willingness to start a business according to their decision to become an entrepreneur.

According to the theory of planned behavior, the basis of any behavior is an intention, and the influencing factors of intentions are conceptually independent and refer to the individual attitude towards a behavior, subjective norms, and perceived behavioral control (Ajzen, 1991). According to Ajzen (1991), in general, the attitude toward the achievement of a behavior shows the perception of a person regarding the desire to achieve that behavior, based on the evaluation of that behavior and the result it would generate. Adapted to the entrepreneurship field, the favorable attitude towards entrepreneurial behavior refers to a person's desire to become an entrepreneur and is reflected by the beliefs, respectively by the individual expectations regarding the development of an independent activity (Nguyen, 2021). Subjective norms reflect a person's perception of performing a certain behavior under social pressure (Ajzen, 1991). For entrepreneurship, these are the result of individual beliefs that he/she should become an entrepreneur because the personal entrepreneurial behavior was validated as a result of the felt social pressure. In the case of entrepreneurship, perceived behavioral control reflects the capacity that a person acknowledges about the execution of a target behavior (Ajzen, 1991). This factor is favorably influenced by individual perceptions regarding the possibilities to have the necessary skills, competencies, resources and the opportunities to engage in entrepreneurial behavior.

The two theories were mainly used separately or in some cases integrated in order to establish conceptual research models for determining the background of entrepreneurial intent, being subjected to empirical testing. Krueger (1994) confirmed that perceived desire, perceived feasibility, and propensity to act, are determinants of entrepreneurial intentions, and perceived feasibility is delimited as the best predictor. Recent empirical studies confirm that individual attitudes toward entrepreneurship, subjective norms, and perceived behavioral control, are all directly and positively related to entrepreneurial intentions (Pejic Bach *et al.*, 2018; Nguyen, 2018), nevertheless there are studies that show that some of these variables do not influence entrepreneurial intentions (Phong *et al.*, 2020; Nguyen, 2017; Zang *et al.*, 2015). Consideration and inclusion of exogenous variables in the theory of planned behavior can increase its predictability in establishing the determinants of sustainable entrepreneurial intention and behavior. Peng *et al.* (2021) along with Yasir *et al.* (2021) show that variables in the theory of planned behavior are antecedents of sustainable entrepreneurial intention, and the significance attributed to environmental issues by a person (Corraliza and Berenguer, 2000) directly influences the attitude towards sustainable entrepreneurship (Yasir *et al.*, 2021), respectively the subjective norms (Pang *et al.*, 2021). Consequently, the following research hypothesis was formulated:

Hypothesis 1 (H1): Environmental values positively influence (a) personal attitude, (b) perceived behavioral control, and (c) social norms.

Some researchers believe that the variables that constitute the antecedents of entrepreneurial intentions have not been sufficiently tested and can be further integrated (Krueger *et al.*, 2000; Solesvik *et al.*, 2012). Iakovleva and Kolvereid, (2009) emphasize that the perceived desire and feasibility specific to entrepreneurship are determined by attitude, subjective norms and perceived behavioral control, respectively determine the entrepreneurial intention, without empirically testing their conceptual model. Schlaegel and Koenig (2014) integrate the variables that constitute the antecedents of entrepreneurial intention within the two theories, highlighting that the individual attitude towards entrepreneurship directly and significantly influences the perceived desire for entrepreneurship, while perceived behavioral control is a

direct and significant predictor of the perceived feasibility regarding entrepreneurship, given that entrepreneurial intention is directly and significantly influenced by the perceived desire, respectively the perceived feasibility. Alferaih (2017) indicates that the analysis of findings, based on her proposed integrative model, leads to the conclusion that the antecedents of the two theories are individual constructs that determine entrepreneurial intention, given that perceived desire for entrepreneurship does not significantly influence entrepreneurial intention. Therefore, the integrated models have not been validated or were just partially validated, requiring further identification of improved integrated models (Sharahiley, 2020). Agu *et al.* (2021) propose a research model that integrates and adapts the two theories to the context of sustainable entrepreneurship. The results of their empirical research emphasize that personal attitude towards entrepreneurship and subjective norms have a direct and significant influence on sustainable entrepreneurial intentions, while desire and feasibility do not influence directly sustainable entrepreneurial intentions. Therefore, the following research hypotheses can be stated:

Hypothesis 2a (H2a): Personal attitude positively influences perceived sustainable entrepreneurial desire in the case of youth with higher education.

Hypothesis 3a (H3a): Perceived behavioral control positively influences perceived sustainable entrepreneurial desire in the case of youth with higher education.

Hypothesis 4a (H4a): Social norms positively influence perceived sustainable entrepreneurial desire in the case of youth with higher education.

Hypothesis 2b (H2b): Personal attitude positively influences perceived sustainable entrepreneurial feasibility in the case of youth with higher education.

Hypothesis 3b (H3b): Perceived behavioral control positively influences perceived sustainable entrepreneurial feasibility in the case of youth with higher education.

Hypothesis 4b (H4b): Social norms positively influence perceived sustainable entrepreneurial feasibility in the case of youth with higher education.

Hypothesis 5 (H5): Perceived sustainable entrepreneurial desire positively influences sustainable entrepreneurial intention in the case of youth with higher education.

Hypothesis 6 (H6): Perceived sustainable entrepreneurial feasibility positively influences sustainable entrepreneurial intention in the case of youth with higher education.

The conceptual research model (Figure 1) aims to establish the antecedents of sustainable entrepreneurial intentions in the case of students who have benefited from entrepreneurial education through their academic curriculum. On one hand, it was followed the existence of causal relations between environmental values and personal attitude towards entrepreneurial behavior, subjective norms, respectively perceived behavioral control. On the other hand, it was investigated the existence of some indirect connections and effects that personal attitude on entrepreneurial behavior, social normal and perceived behavioral control may have over sustainable entrepreneurial intentions, through the perceived desire and feasibility of sustainable entrepreneurship.

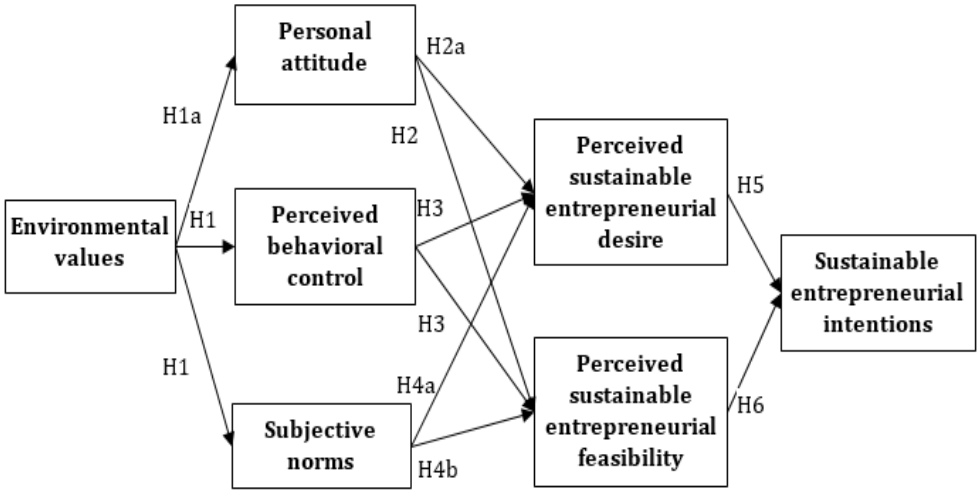

Figure 1. Conceptual research model regarding the influencing factors of sustainable entrepreneurial intentions
Source: Authors' own compilation

The originality of the research model consists in the integration of the variables specific to the theory of planned behavior in the model of the entrepreneurial event, as well as their adaptation to the context of sustainable entrepreneurship.

Research Methodology, Variables and Sample Structure

In order to empirically evaluate the proposed research model (Figure 1), from the quantitative methods, the survey was chosen, similar to several studies in this domain (Mustuc *et al.*, 2020; Nițu-Antonie and Feder, 2015; Sher *et al.,* 2020).

The technique of implementing the questionnaire was online, considering the pandemic context between the April-June 2021 time-interval. The online questionnaire in the form of access link and short presentation regarding the study was sent on the targeted student groups at the Faculty of Economics and Business Administration within the West University of Timisoara. The main motives to opt for circulating the questionnaire in the online environment considers the pandemic context, the online educational activities, the anonymity assurance for participants, the flexibility regarding the moment of completion, along with rapidity of data collection.

The data-set for present research consisted of the voluntary responses obtained from 170 students pursuing economic or business university education in Romania (Table 1). Participants were youth of different ages, ranging from 19 to 38 years, of which 60% were between 19-22 year old and 40% were over 23 years. Regarding gender, 51.77% of the participants were male and slightly less (48.23%) were female. The sample included a higher percentage of respondents from undergraduate level (61.77%), and a lower percentage from master level (38.23%). The most common majors in the sample were international business,

Table 1. Demographic profile of the surveyed participants from Romania

Criteria	Classes	Sample distribution
Age	19-22	60.00%
	23-38	40.00%
Gender	Male	51.77%
	Female	48.23%
Study level	Undergraduate	61.77%
	Master	38.23%
Role model	With entrepreneurial exposure	45.88%
	Without entrepreneurial exposure	54.12%

Source: Authors' calculations

management, marketing, and economical informatics. Slightly more respondents stated that they have no entrepreneur in their extended family or friend circle (54.12%), while the rest of the participants (45.88%) reported having an entrepreneur as role model in their entourage.

For primary data collection, a questionnaire was specially created for this research topic. In this sense, several measurement scales (Table 2) have been borrowed from the sustainable entrepreneurship or entrepreneurial intention specific literature and adapted where necessary to the current study in order to operationalize the constructs within the research model. Consequently, the studies of Mair and Noboa (2006), Liñán and Chen (2009), Koe *et al.* (2014), and of Sher *et al.* (2020) were regarded. Similar to the original studies, he current research included multiple items for each construct, items being evaluated by respondents on a five-point Likert scale, ranging from 1 (strongly disagree) to 5 (strongly agree).

Table 2. Construct operationalization, measurement scale reliability and validity

Construct	Source of measurement scale	Cronbach's alpha	Composite reliability	Factor loadings (min-max)	AVE (square root)
Environmental values	Mair and Noboa (2006)	0.841	0.932	0.560 - 0.826	0.867
Personal attitude	Liñán and Chen (2009)	0.864	0.945	0.720 - 0.939	0.899
Perceived behavioral control	Liñán and Chen (2009)	0.788	0.921	0.738 - 0.846	0.887
Subjective norms	Liñán and Chen (2009)	0.854	0.951	0.857 - 0.904	0.938
Perceived sustainable entrepreneurial desire	Koe *et al.* (2014)	0.929	0.967	0.555 - 0.958	0.923
Perceived sustainable entrepreneurial feasibility	Koe *et al*. (2014)	0.968	0.974	0.565 - 0.825	0.863
Sustainable entrepreneurial intention	Sher *et al.* (2020)	0.919	0.966	0.655 - 0.934	0.920

Source: Authors' calculations

Following the suggestions of Hair *et al.* (2019) regarding the measurement scales, first the reliability of each construct was tested using Cronbach's alpha (α) and composite reliability (CR), afterwards continuing with the evaluation of validity, in its convergent and discriminant form.

For each construct, Cronbach's alpha registered high values between 0.788 and 0.968, along with composite reliability between 0.921 and 0.974, both higher than the recommended threshold value of 0.70, therefore assuring internal consistency.

Moreover, based on factor analysis, all the seven constructs integrated within the research model, included in their structure items with loading above the 0.5 threshold value, thus assuring convergent validity. Complementary, based on data from Table 2 and 3, the square root of average variance extracted (AVE) calculated for each construct (values between 0.863 and 0.938) were higher than the correlations with all the other constructs, hence discriminant validity was assured as well.

Furthermore, collected data have been statistically analyzed, considering the methodological and empirical recommendations of Hair *et al.* (2019) regarding the descriptive analysis, association analysis and hypothesis testing via regression analysis, in a step-wise manner. For all data analysis purposes IBM SPSS 22 was used.

Research results, ascertainment and implications

Data analysis included two main parts, the first one considered an initial evaluation of the responses via descriptive and correlation statistics, while the second part focused on the evaluation of the relations within the research model.

Descriptive statistics (Table 3), in the form of mean values, in the case of all the seven variables, show high levels. The perceived behavioral control accounted for the lowest mean score of 3.595, followed by perceived sustainable entrepreneurial feasibility and sustainable entrepreneurial intentions with 3.86 and 3.88 as mean scores, and environmental values with a slightly higher mean score of 3.963. Particularly high mean scores were identified for personal attitude, subjective norms, and perceived sustainable entrepreneurial desire, all having mean values above 4 from the maximum of 5 points. Moreover, standard deviations shows limited values, between 0.612 and 0.965, therefore distribution normality is assured.

Table 3. Descriptive statistics and correlation matrix for the modeled constructs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Mean	3.963	4.076	3.595	4.093	4.050	3.860	3.880
Standard deviation	0.612	0.872	0.747	0.735	0.843	0.777	0.965
Environmental values (1)	1						
Personal attitude (2)	0.346*	1					
Perceived behavioral control (3)	0.272	0.618**	1				
Subjective norms (4)	0.288*	0.458**	0.600**	1			
Perceived sustainable entrepreneurial desire (5)	0.613**	0.759**	0.523**	0.384**	1		
Perceived sustainable entrepreneurial feasibility (6)	0.528**	0.628**	0.557**	0.331*	0.719**	1	
Sustainable entrepreneurial intentions (7)	0.372**	0.892**	0.681**	0.419**	0.777**	0.684**	1

Note: * correlations significant at 0.05 level (2-tailed);
** correlations significant at 0.01 level (2-tailed).
Source: Authors' calculations

The Pearson correlation type associations between the modeled variables are all positive and mainly statistically significant, except for the linkage between environmental values and perceived behavioral control (r=0.272 with p>0.05). Strong positive and significant relations were found between environmental values and perceived sustainable entrepreneurial desire (r=0.613), environmental values and perceived sustainable entrepreneurial feasibility (r=0.528), personal attitude and perceived behavioral control (r=0.618), personal attitude and perceived sustainable entrepreneurial desire (r=0.759), personal attitude and perceived sustainable entrepreneurial feasibility (r=0.628), personal attitude and sustainable entrepreneurial intentions (r=0.892), perceived behavioral control and subjective norms (r=0.600), perceived behavioral control and perceived sustainable entrepreneurial desire (r=0.523), perceived behavioral control and perceived sustainable entrepreneurial feasibility (r=0.557), perceived behavioral control and sustainable entrepreneurial intentions (r=0.681), perceived sustainable entrepreneurial desire and feasibility (r=0.719), perceived sustainable entrepreneurial desire and sustainable entrepreneurial intentions (r=0.777), respectively perceived sustainable entrepreneurial feasibility and sustainable entrepreneurial intentions (r=0.684).

Table 4. Results of hypotheses testing for the Romanian sample

Hypotheses	Relation	β	p	Decision
H1a	Environmental values → Personal attitude	0.346	0.014	supported
H1b	Environmental values → Perceived behavioral control	0.272	0.056	limited support
H1c	Environmental values → Subjective norms	0.288	0.043	supported
H2a	Personal attitude → Perceived sustainable entrepreneurial desire	0.759	0.000	supported
H2b	Personal attitude → Perceived sustainable entrepreneurial feasibility	0.628	0.000	supported
H3a	Perceived behavioral control → Perceived sustainable entrepreneurial desire	0.523	0.000	supported
H3b	Perceived behavioral control → Perceived sustainable entrepreneurial feasibility	0.557	0.000	supported
H4a	Subjective norms → Perceived sustainable entrepreneurial desire	0.384	0.006	supported
H4b	Subjective norms → Perceived sustainable entrepreneurial feasibility	0.331	0.019	supported
H5	Perceived sustainable entrepreneurial desire → Sustainable entrepreneurial intentions	0.777	0.000	supported
H6	Perceived sustainable entrepreneurial feasibility → Sustainable entrepreneurial intentions	0.684	0.000	supported

Source: Authors' calculations

Considering the evaluation of the 11 relations foreseen within the research model in the form of hypothesis, mainly positive and statistically significant results (Table 4) were obtained after testing them via linear regression analysis on the sample of Romanian youth with higher education studies.

In this sense, regarding the first three hypotheses, environmental values positively and significantly influence personal attitude ($\beta=0.346$ with $p<0.05$), perceived behavioral control ($\beta=0.272$ with $p<0.1$), and subjective norms ($\beta=0.288$ with $p<0.05$) of youth with academic background. Empirical results fully support hypotheses H1a and H1c, while hypothesis H1b has limited support.

Considering the next two hypotheses, personal attitude positively and significantly influences both perceived sustainable entrepreneurial desire ($\beta=0.759$ with $p<0.001$) and perceived sustainable entrepreneurial feasibility ($\beta=0.628$ with $p<0.001$) for youth with university studies, thus results validate hypotheses H2a and H2b.

Referring to the following two hypotheses, perceived behavioral control positively and significantly influences both perceived sustainable entrepreneurial desire ($\beta=0.523$ with $p<0.001$) and perceived sustainable entrepreneurial feasibility ($\beta=0.557$ with $p<0.001$) for youth with higher education background, thus results validate hypotheses H3a and H3b.

About the subsequent two hypotheses, subjective norms positively and significantly influence both perceived sustainable entrepreneurial desire ($\beta=0.384$ with $p<0.01$) and perceived sustainable entrepreneurial feasibility ($\beta=0.331$ with $p<0.05$) for youth with academic background, thus results validate hypotheses H4a and H4b.

Finally, perceived sustainable entrepreneurial desire ($\beta=0.77$ with $p<0.001$) and perceived sustainable entrepreneurial feasibility ($\beta=0.684$ with $p<0.001$) both positively and significantly influences the sustainable entrepreneurial intentions of youth with higher education studies, thus results validate hypotheses H5 and H6.

Considering the above presented results, the present research highlight at the level of the investigated student population in Romania, that sustainable entrepreneurial intentions have as direct antecedents the desire and feasibility perceived by the respondents regarding sustainable entrepreneurship, meanwhile as indirect influencing variables the individual attitude regarding entrepreneurial behavior, subjective norms and perceived behavioral control, all these three variables being directly influenced by environmental values. The integration of the theoretical model of planned behavior in the theoretical model of entrepreneurial event and the extension of the resulting research model to the context of sustainable entrepreneurship was based on previous integration attempts of Agu *et al.* (2021), Alferaih (2017), Iakovleva and Kolvereid, (2009), Peng *et al.* 2021, Schlaegel and Koenig (2014), Tehseen and Haider (2021). The existence of direct and significant relationships between the perceived desire along with the perceived feasibility regarding the sustainable entrepreneurship and the sustainable entrepreneurial intention correspond to the results obtained by Tehseen and Haider (2021), respectively by Peng *et al.* (2021). Extant research mostly validated the existence of a direct relation between individual attitude regarding entrepreneurial behavior, subjective norms, perceived behavioral control and entrepreneurial intentions (Alferaih, 2017; Nițu-Antonie and Feder, 2015), respectively sustainable entrepreneurial intention (Agu *et al.*, 2021; Peng *et al.*, 2021). The results of the present research indicate indirect causal relationships, through

the variables related to the perceived desire and feasibility of sustainable entrepreneurship, being consistent with the model proposed by Iakovleva and Kolvereid (2009) which was not empirically validated, nor adapted for sustainable entrepreneurship. Environmental values are a direct antecedent of personal attitude towards entrepreneurship, subjective norms and perceived behavioral control, according to the empirical results obtained in previous research conducted by Peng *et al.* (2021).

The empirically validated research model is suitable for stimulating sustainable entrepreneurial intentions in the case of the investigated student population in Romania. Considering that environmental values stimulate respondents to feel attracted to the entrepreneurial behavior and to perceive that they have the necessary competencies to follow it, under a social pressure that promotes this behavior, there are created the perceptions to desire and to want to pursue a sustainable entrepreneurial career, along with the awareness that it is a feasible option, all leading to the formation of the belief that a sustainable business should be started in the future.

Conclusions, limitations and future research directions

In the current research, the determinant factors of sustainable entrepreneurial intention were established for students from a Romanian university, attending entrepreneurship courses through the university curriculum.

The theory of planned behavior and the theory of entrepreneurial event were the theoretical framework of reference. The variables specific to these theories have been integrated and extended in order to adapt them to the context of sustainable entrepreneurship.

The conceptual research model was validated, as a result of the confirmation of all research hypotheses for the considered sample of students. Accordingly, perceived desire and feasibility for sustainable entrepreneurship were established as direct antecedents of sustainable entrepreneurial intentions, whilst personal attitude towards entrepreneurial behavior, subjective norms and perceived behavioral control were identified as antecedents of perceived desire and feasibility regarding sustainable entrepreneurship, under the condition of delimiting environmental values as antecedent for individual attitude, subjective norms, and perceived behavioral control.

The research can be useful on theoretically plain because it has identified an integrative and extended model to the context of sustainable entrepreneurship, improving the combined and complementary impact of planned behavior theory and entrepreneurial event theory, and thus established the variables that influence sustainable entrepreneurial intention in the case of youth.

The research model validated within the present empirical study proves its practical utility for the Romanian academic world, on one hand because it opens new research perspectives on sustainable entrepreneurial intentions, on the other hand because it highlights the need to adopt educational programs on entrepreneurship that promotes environmental values in order to stimulate the sustainable entrepreneurial intention of youth. The direct causal relationship between perceived feasibility and sustainable entrepreneurial intention reveals the importance government decision-makers should attach to ensure an opportune socioeconomic environment for sustainable entrepreneurship that gives young university graduates the necessary confidence to start new a new business to a greater extent, rather than becoming employees in the public or private sectors (Sharahiley, 2020).

The results obtained through the empirical research were validated for the sample of considered respondents, it would be useful an increase in the number of surveyed students in order to generalize the results. The research model could also be applied in comparative studies, by taking into account respondents from different countries, from different generations, or even based on a combination of quantitative and qualitative methodologies. Research could be extended, by including in the research model other individual and exogenous factors, with mediating or moderating role, as well as the effective entrepreneurial behavior, as a result of the implementation of sustainable entrepreneurial intentions.

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ANALYZING THE PERFORMANCE OF SOUTH AFRICA'S COMMODITY MARKET PRICES THROUGH BUSINESS CYCLE INDICATORS

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ABSTRACT. The soundness of the capital market is crucial in establishing resilient financial market deepening and general economic progress. Equally, the health of the financial market's commodity market is undoubtedly a key determinant of inclusion, equitability, including sustained growth and development, especially in commodity-dependent countries. However, countries worldwide are faced with the continued challenge of falling commodity prices, presenting varied negative effects. Understanding the performance of the commodity market through lenses of fundamental or real-side indicators, other than just micro-specific financial or monetary variables, could prove helpful in constructing better inferences of the commodity market from an industrial, investor and policy standpoint. This study conducted a comprehensive evaluation of South Africa's official component series of the business cycle indicators (BCI), to assess their potential and capacity to serve as explanatory signals for commodity market prices. The study utilized the cross-correlations tests, Granger causality tests, variance decomposition and charting techniques to assess the co-movement and concordance between business cycle component series (regressors) and the All-commodity index (regressand). Monthly observations from June 2003 to November 2017 were employed. Evidence of existing co-movement or concordance was established between the commodity market and most of the BCIs. Significant BCIs were identified as leading, lagging and coincident indicators for the commodity market based on the underlying properties established in the empirical estimates of the study.

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Introduction

Continued low commodity prices pose serious concerns to commodity-producing countries, especially for most developing economies that are highly dependent on the soundness of the commodity market's performance. Unfortunately, these countries have commonly exhibited pressing traits of highly fluctuating, falling and mostly low prices amid increased production and export costs, weak global growth, and volatile global capital markets, as experienced in the 2008-09 financial crisis (Ighobor, 2017). In understanding South Africa's commodity market outcomes, it is essential to consider the existing realities of the country-specific factors, such as the various and mostly overlooked economic indicators, to peruse their likely potential to influence commodity market prices. Unfortunately, much of the present day's research that examines the performance of financial markets are governed by the forecasting of the various capital market segments and money markets through lenses of market-specific or micro-finance variables (Larsen, 2010:1; Rusu & Rusu, 2003:104). This paper objectively shifts the focus towards investigating the potential relationships between South Africa's commodity market prices and the country's official leading, lagging, and coincident business cycle indicators (BCIs) to gauge the latter's usefulness in explicating the performance of the capital market's commodity prices.

Leading, lagging, and coincident indicators are the focal point of economic analysis and forecasting in business cycle analyses. Meanwhile, debates on the predictability of financial times-series largely revolve around traditional and behavioural finance models. Under the efficient

market hypothesis (EMH), traditional finance models purport that opportunities for profit-making and market predictability are eliminated due to market time-series random walk stochastic processes (Dupernex, 2007:167). Whereas, behavioural finance theories assert that negative or positive autocorrelations capacitate the predictability of time-series (Abu-Mostafa & Atiya, 1996; Glaser et al., 2004), amid market anomalies arising from cognitive behavioural biases carrying predictable trends, seasonal cycles, turbulence and bubbles (Thomaidis, 2004).

The focus on gauging financial market cycles against real market cycles is an alternative means of establishing if real sector activities can determine South Africa's financial market cycles. It is argued that capital markets, such as the equity market, tend to act as leading indicators of the real business cycle by six months (Moolman, 2003; Pearce, 1983:7-8). Likewise, South Africa's commodity market prices have been identified as one of the country's official real business cycle indicators, characterised as a component series of the composite leading indicator (Venter 2005a:5a). Moolman & Jordaan (2005) posit that despite the ability of component series such as stock market prices to lead the business cycle, other component BCIs tend to lead the business cycle by much longer periods can be used as directional signals of the equity market. Such a notion presupposes that specific component BCIs may lead the business cycle by more extended periods than commodity market prices and can therefore be used to gauge the foreseeable performance of commodity market prices.

Demand and supply forces that govern business cycle fluctuations are relatively suggested to affect the demand and supply of the financial market's credit and assets (Nason & Tallman, 2016). Business cycle and financial cycle linkages may be identified through the credit channel's credit prices, along with equity and housing asset prices (Claessens et al., 2012:178). These linking mechanisms are amplified through the financial accelerator and other channels, including processes within financial markets that involve equity indexes and the real estate, which influence the business cycle (Avouyi-Dovi & Matheron, 2005; Braun & Larrain, 2005:1097; Bosworth et al., 1975:257-258; Carlstrom et al., 2002; Claessens et al., 2012). According to Holmes & Maghrebi (2016:1), potential effects have been identified on the equity market arising from expected economic conditions, while the business cycle is reliably affected by

market returns. Moreover, economic recoveries and contractions also tend to cause variations in market volatility and returns (Kvietkauskienė & Plakys, 2017). Henceforth, synchronizations are anticipated in the cyclical movements of business cycles and commodity prices of the capital market based on the aforementioned assertions.

Review of literature

Commodity prices are known to be exogenous. They are commonly taken as crucial leading market indicators due to their inherent capacity in providing reasonable signals of economic shocks. In contrast, the international market serves as a critical instrument for setting market prices (Rangasamy, 2009). Thanks to the capital market's commodity exchanges, the commodities exchange market makes up a convenient environment for trading precious commodities such as metals, agricultural products, and so forth (Van Zyl et al., 2009:471). These markets are established as efficient and formal platforms where buyers and sellers of commodities engage and interact in executing market activities and are essential for providing improved physical goods marketing and quality management of price risks (Mezui et al., 2013). Reduced price risk, enhanced price discovery, and economic inclusiveness are some of the key benefits of these exchanges, arising from a boost in finance and agricultural linkages, leading to the overall competitiveness and efficiency of the commodity sector (Mezui et al., 2013; Rashid, 2015:2).

The empirical literature on the analysis of potential concordance between macroeconomic or business cycles and financial cycles has been minimal, particularly for the African landscape. Whereas studies on such inter-plays for developing and developed economies have presented mixed findings. In terms of the existing studies, Schaling et al., (2014) established a lack of cointegration and a negative correlation between South Africa's exchange rate and commodity prices from 1996 to 2010. In comparison, strong unidirectional causality was found stemming from commodity prices to the nominal exchange rate. However, having been comparatively weaker than that of countries from the Organization for Economic Co-operation and Development (OECD).

Moreover, using the spline-GARCH framework and the detrending procedure of the generalized least squares (GLS), Karali & Power (2013) examined components of high – and low-frequency volatility of eleven commodities relative to macroeconomic indicators. Results showed that macroeconomic variables in the United States of America had a more significant effect on commodity prices during the bull-and-bear cycle than before, as of 1990-2009. Further highlighting that from 1990 to 2005, common effects of macroeconomic variables on commodity prices were detected, while commodity-specific effects were observed from 2006 to 2009.

Also, results by Smolík et al. (2015) showed that 75.74 per cent of the volatility in monthly averages of daily values for the S & P Goldman Sachs Commodity Index (GSCI) were explained by changes in selected macroeconomic determinants for the period January 2000 to September 2013, using the Boosted Trees method. Among the most significant determinants were the nominal effective exchange rate of the United States Dollar and short-term interest rates. An increase in the S & P GSCI value was accordingly revealed due to the weakening of the US dollar. Smolík et al. (2015) explained that this was due to the short-term nature of speculations in the highly financialised and current commodity exchanges, which coincides with economic development and investors' psychological behavior. Furthermore, results by Bangara & Dunne (2018) revealed existing causality running from Malawi's tobacco prices to various macroeconomic time-series, where positive shocks in tobacco prices had a significant and positive effect on the gross domestic product (GDP), including a decline in the consumer price index and the strengthening of the real exchange rate. This involved quarterly data from 1980Q1 to 2012Q4 based on the structural vector auto-regressive (SVAR) model.

Moreover, the study by Frankel & Rose (2010) revealed the potential for impact of macro-economic variables (i.e., global output and inflation) and micro-economic components (i.e., inventories, volatility, and spot-forward spread) on commodity prices. Where macro-economic factors displayed positive effects and the most effect coming from micro-economic variables. Also, using the factor-augmented vector auto-regression (FAVAR) model, Yin & Han (2016) revealed significant effects of China's macro-economic components on commodity markets. Comparatively, results from the US were not significant. Positive effects of inflation, money

supply and output on commodity price bubbles were subsequently showcased in the study by Li *et al.* (2017), while interest rates had a negative effect. The study considered the period 2006 to 2014 and used the Zero-inflated Poisson model, where output and money supply were identified to have had the most significant impact. Lastly, using the error correction model (ECM) and the Auto-regressive Distributed Lag (ARDL) model, for the period January 2001 to June 2012, Jena (2016) found an existing long-run relationship between the agricultural price index and macro-economic series, including a negative relationship between the energy price index and macro-economic variables. However, the metal price index did not show any long-run relationship with the macro-economic variables. Nevertheless, the industrial production index (IPI) and the exchange rate had significant and positive impacts on the agricultural price index and significant impacts on the energy price index.

Methodology

As a primary objective, the study sought to examine the potential for BCI's to affect commodity prices in their capacity to provide meaningful signals for capital market analysis and interpretation. Therefore, the sub-individual components of South Africa's official coincident, leading and lagging composite indicators for the business cycle were examined relative to commodity prices. The study utilized a quantitative research method, with the time-series encompassing about 171 monthly observations spanning from June 2003 to November 2017 for the BCIs. The all-commodity index (ALCI) represented the commodity market prices. This time-frame was selected to consider South Africa's post-apartheid period and the availability of the time-series data-set. The composite BCIs' sub-series were considered as explanatory variables and were chosen due to their local and international superiority, with respect to Carriero & Marcellino's (2007) signaling market criteria. Accordingly, the ALCI was treated as the dependent variable. The ALCI and the BCI sub-series data sets were retrieved from the South African Reserve Bank (SARB).

To gauge the leading, lagging and coinciding properties of the BCI sub-series on the ALCI, this paper employed the cross-correlations test in conjunction with the cross-correlations function (CCF) to illustrate the

time-lagged interactions (gap) between the ALCI and the BCI sub-series (McCoy & Blanchard, 2008). This approach is similar to the studies on the financial market and the business cycle by Burger (2010) and Damos (2016). According to Mahan et al. (2015:100), the cross-correlations test is configured to examine potential relationships between two variables. It highlights the changes in the sequences of the gap in the input series relative to those of the reference or output time-series (Burger, 2010: 29). The study subsequently employed the Granger causality test, which estimates the sequences of changes between the input and output variables when used in line with the cross-correlations test (Burger, 2010). The employed steps of analysis are respectively shown in Figure 1.

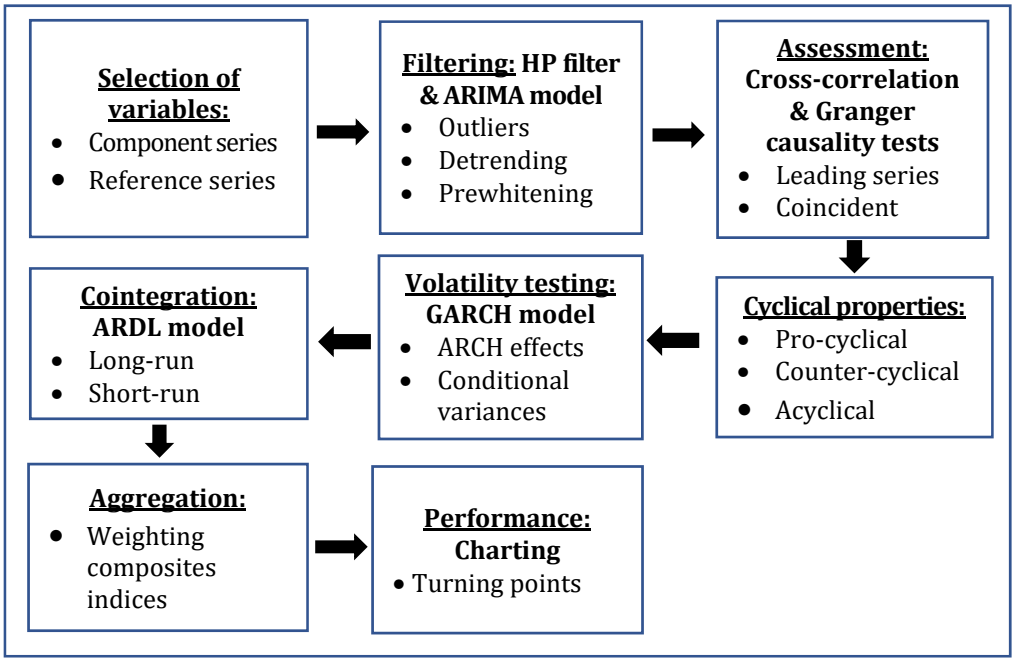

Figure 1. Model framework steps
Source: Author compilation

In order to circumvent potential biases in the cross-correlations test, Gröger & Fogarty (2011) purport that time series should be (i) stationary concerning their means and variance and are (ii) pre-whitened

or filtered. Following Gujarati & Porter (2008), the study sought to ensure the absence of unit root in all the time series to certify the stationarity of all the variables based on the Augmented Dickey-Fuller (ADF) test by Dickey & Fuller (1979). Accordingly, for each input series, time series were pre-whitened using the autoregressive integrated moving average (ARIMA) model. All time series were transformed into their natural logarithmic form while considering the cyclical component of each variable, having been detrended using Hodrick & Prescott's (1997) Hodrick-Prescott (HP) filter. The detrended smoothed and deseasonalised series assist in establishing a fairer understanding of the stability and strength of the cycle's co-movement while enhancing the forecasting of turning points and reducing likely falsehoods in signals (Mohanty et al., 2003). Following Probst et al. (2012), equation 1 was estimated to showcase the cross-correlations models, which sought to examine the sensitivity of the state of the dependent variable in the face of pressure caused by the independent variable.

$$r_t = \frac{n^* \sum y_1 y_2 - \sum y_1 \sum y_2}{\sqrt{[n^* \sum y_1^2 - (\sum y_1)]\,[n^* \sum y_2^2 - (\sum y_2)]}} \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots (eq.\,1)$$

Where:

r_t represents the cross-correlation coefficient at time lag t;

t represents the time lag between two time-series in terms of months;

n^* represents the number of overlapping observations or data points;

y_1 represents the input series (composite business cycle subcomponents); and

y_2 represents the output series (capital markets - ALCI).

The CCF is used to measure the strength of co-movement between time-series while classifying variables as leading, coinciding or lagging series at separate lag or lead times. Estimating the cross-correlations coefficient at time t establishes the model in eq. 1 (McCoy & Blanchard, 2008:5). The cross-correlation peak of the CCF suggests whether the variable is coincident, leading or lagging indicator. In contrast, the value of τ where the CCF is maximised, provides the lead and lag relationship. The gap of the cross-correlations between the reference series and the component series are configured based on the time (t), the contemporaneous (t = 0),

the leads (t – 20 to t – 1) and the lag (t + 1 to t + 20) values for the two series. Whereby the sign of the cross-correlations suggests the type of patterns. A negative (-) sign with an inverse pattern to the reference series would be considered counter-cyclical. Accordingly, positive (+) cross-correlation values with a pattern that resembles the reference series would be considered pro-cyclical, whereas acyclical patterns would be assumed when no definitive pattern is presented (Napoletano et al., 2006).

Moreover, Sugihara et al. (2012) highlight that the cross-correlations test between variables may not imply causation. Henceforth, introducing causality rules to the model would present a more accurate stance for assessing variables to establish if the present correlation is triggered by a common variable or based on mere chance (Damos, 2016). In this case, the Granger causality test was employed to confirm the lag, lead and coinciding relationships after the cross-correlations estimations, similar to Burger (2010). The Granger causality test by Granger (1969) is applied as a reasonable test of causality in order to establish whether a variable can be a significant instrument of presenting forecasts of other time-series by highlighting potential causation, then simply just lag or lead correlations. Following Lin (2008), the Granger causality model is expressed according to equation 2 as follows.

Based on the parameters, if for all $h > 0$, then X_t does not Granger cause Y_t.

$$F(Y_{t+h} \mid \Omega_t) = F(Y_{t+h} \mid \Omega_t - X_t) \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots eq.2$$

Where:

F represents the conditional distribution;

Ω_t represents all the information concerning the variables; and

X_t and Y_t denote the reference and output series.

According to Burger (2010:30-31), when an output series presents a CCF having a maximum value with the input series. At the same time, the Granger causality test provides statistically significant results. This reveals that the changes in the output variable could either lag or lead to the changes in the input series gap. On the other hand, the gaps in the changes between the input and output series may be regarded as coinciding or contemporaneous series when high cross-correlations are revealed, while none of the findings presented by the Granger causality is statistically significant.

Empirical Analysis and Results

Section 4 and its subcomponents provide established findings of this study in assessing the potential for co-movement within the series of the BCIs and the capital market's commodity prices represented by the ALCI. The likelihood of existing concordance suggested the potential for macro-economic or BCIs to explicate the cyclical performance in the movement of South Africa's commodity prices. Appendix 1 reveals all the considered BCIs, which the South African Reserve Bank has officially identified as key BCIs. The component BCIs were coded/abbreviated to establish simplicity in the paper and were henceforth represented according to the demonstration in Appendix 2.

Unit Root/Stationarity Tests and the ARIMA model estimations

Mahan et al. (2015:97) caution that time-series variables are likely to be auto-correlated, having values that their past values could influence. Non-stationarities in data series may be characterised by drifts or trends over time, resulting in exaggerated correlations which may not exist. Henceforth, Podobnik & Stanley (2008:1) expound on the necessity of utilizing stationary variables for the cross-correlations test to circumvent potential spuriousness in the findings. All time-series were also detrended based on the HP filter in their log-based time-series as necessary transformation methods following Carmona et al. (2012:3). The values of the HP filter were set at "14400" as prescribed for monthly time-series to smooth and extract the cyclical component of each variable (Pollock, 2018:20). Accordingly, results of the ADF test in Appendix 3 revealed that all variables were stationary at "level", having p-values below 0.05, and indicated a lack of unit root in all the time-series and thus, no subsequent differentiating was needed. Moreover, Appendix 4 showcases the ARIMA model's automatically selected order processes in pre-whitening the residuals, captured using Rstudio's auto Arima function (Probst et al., 2012:673).

Cross-correlations findings

The study selected cross-correlation coefficients which exhibited the highest lags found to be statistically significant at 0.05 significance level. Such that time t were lags [t+1 to t+20 (positives)], leads [t-20 to t-1 (negatives)] and contemporaneous (t=0). Table 1 demonstrates the results from the cross-correlation test pertaining to the ALCI output series and the BCI sub-component input series. The findings revealed existing cross-correlation between the gaps of the input and output series, such that the gap leads the LALCI in the following variables; LLEI3, LLEI8, LLEI9, LLEI11, LLAI1 and LLAI7. Furthermore, the gaps in the variables LLEI1, LLEI2, LLEI4, LLEI5, LCOI1, LCOI2, LCOI3, LCOI4, LCOI5, LLAI1, LLAI3 and LLAI4 were identified to lag behind the series LLC. Nevertheless, contemporaneous properties were identified between the LALCI with the series LLEI10 and LLAI6. The series LLEI6, LLAI2 and LLAI5 showed no cross-correlations with LALCI.

Table 1. Results of the Cross-correlations test for the ALCI and business cycle indicators

				ALI				
BCIs	**LLEI1**	**LLEI2**	**LLEI3**	**LLEI4**	**LLEI5**	**LLEI6**	**LLEI7**	**LLEI8**
Max lags	17	17	-9	14	1	-	-1	-17
Coeff.	0.177	-0.299	0.172	-0.200	0.268	-	0.188	0.154
BCIs	**LLEI9**	**LLEI10**	**LLEI11**	**LCOI1**	**LCOI2**	**LCOI3**	**LCOI4**	**LCOI5**
Max lags	-8	0	-12	13	10	14	2	4
Coeff.	0.219	0.955	0.189	0.239	0.194	-0.229	0.335	0.244
BCIs	**LLAI1**	**LLAI2**	**LLAI3**	**LLAI4**	**LLAI5**	**LLAI6**	**LLAI7**	-
Max lags	-1	-	3	2	-	0	-9	-
Coeff.	0.221	-	0.401	-0.217	-	-0.171	-0.209	-

Source: Author compilation

The study further employed the Granger causality test for the LALCI and the corresponding BCI sub-components, as displayed in Table 2. This was estimated in order to confirm the cross-correlations test findings previously established in Table 1.

Table 2. Results of the Granger causality test between the ALCI and business cycle indicators

ALSO								
BCIs	**LLEI1**	**LLEI2**	**LLEI3**	**LLEI4**	**LLEI5**	**LLEI6**	**LLEI7**	**LEI8**
Lags	17	17	-9	14	1	-	-1	-17
YX	0.113	0.453	0.078*	0.285	0.543	-	0.027**	0.137
XY	0.001***	0.003*	0.374	0.134	0.001***	-	0.343	0.051*
BCIs	**LLEI9**	**LLEI10**	**LLEI11**	**LCOI1**	**LCOI2**	**LCOI3**	**LCOI4**	**LCOI5**
Lags	-8	0	-12	13	10	14	2	4
YX	0.091*	0.000*	0.013**	0.055*	0.218	0.219	0.257	0.089*
XY	0.166	0.000***	0.221	0.000***	0.000***	0.016**	1.47	0.011
BCIs	**LLAI1**	**LLAI2**	**LLAI3**	**LLAI4**	**LLAI5**	**LLAI6**	**LLAI7**	-
Lags	-1	-	3	2	-	0	-9	-
YX	0.009***	-	0.482	0.552	-	0.000***	0.053*	-
XY	0.003***	-	5.843	0.011**	-	0.000***	0.771	-

Source: Author compilation

The Granger causality test findings confirmed that input series LLE3, LLEI7, LLEI11, LLAI1 and the LLAI7 exhibited characteristics of leading indicators for the ALCI and had a bidirectional causal relationship. Whereas, lagging series of the ALCI was confirmed to include the series LLEI1, LLEI2, LLEI5, LLEI8, LCOI1, LCOI2, LCOI3, LCOI5 and LLAI4. Exhibiting bidirectional properties between the ALCI and the series LCOI1 and LCOI5. Lastly, the ALCI was found to be contemporaneous to the series LLEI4, LCOI4, LLAI, LLEI10 and LLAI6.

Correspondingly, these results were reverberated by the estimations of the variance decomposition as showcased in Table 3. It was purporting that the identified leading variables tend to explain variations in the ALCI over time. The variable LEI9 was shown to have had the highest contribution of about 27.1 per cent for the 10th period in the variations in the ALCI series. Also, about 11.1 per cent, 10.7 per cent and 7.9 per cent of variations or shocks in the ALCI were explained by the series LLAI7, LLAI1 and LLEI11, respectively, in the 10th period. The series LLEI3 and LLEI7 had the lowest contributions of about 0.32 per cent and 4.7 per cent, respectively.

Table 3. Variance decomposition results

Period	LALCI					
	LLEI3	**LLEI7**	**LLEI9**	**LLEI11**	**LLAI1**	**LLAI7**
1	0.000	0.000	0.000	0.000	0.000	0.000
2	0.045	1.347	0.157	1.708	1.888	0.305
3	0.114	3.631	0.665	3.237	2.142	1.661
4	0.180	4.499	1.356	3.732	2.865	3.601
5	0.232	4.089	3.444	4.485	4.029	4.683
6	0.269	3.453	5.298	4.854	5.624	6.747
7	0.294	3.337	9.069	5.856	7.162	9.039
8	0.309	3.779	13.413	6.638	8.529	10.569
9	0.319	4.297	19.749	7.246	9.705	11.028
10	0.324	4.714	27.136	7.911	10.737	11.058

Source: Author compilation

Table 4 presents a summary of the identified leading, lagging, and coincident indicators based on the findings of the cross-correlations and the Granger causality tests.

Table 4. Summary of established leading, lagging and coincident variables of the ALCI from the Granger causality and cross-correlations tests

Leading indicators	**Lagging indicators**	**Coincident indicators**
The ratio of consumer instalment sale credit to the disposable income of households	Job advertisement space in the Sunday Times newspaper: Percentage change over twelve months	Real M1 money supply (deflated with CPI) * six-month smoothed growth rate
Gross operating surplus as a percentage of gross domestic product	Number of residential building plans passed for flats, town houses and houses larger than 80m'	The net balance of manufacturers observing an increase in the volume of domestic order received (half weight)
The new balance of manufacturers observing an increase in the average number of hours worked per factory worker (half weight)	Index of commodity prices (in US dollar) for a basket of South African-product export commodities	The ratio of gross fixed capital formation in machinery and equipment to final consumption expenditure on goods by households
Number of new passengers	RMB/BER Business Confidence Index	Industrial production index

Leading indicators	Lagging indicators	Coincident indicators
Interest rate spread: 1-year government bonds less 91-day Treasury bills	Gross value added at constant prices, excluding agriculture, forestry and fishing	Predominant prime overdraft rate of banks
Cement sales (in tons)	Total formal non-agricultural employment	
	Value of retail and new vehicle sales at constant prices	
	The utilisation of production capacity in manufacturing	
	The ratio of inventories to sales in manufacturing and trade	

Source: Author compilation

Constructing and testing the commodity market's (ALCI) leading indicator

The use of BCIs as instruments for measuring market cycles' changes was first instigated to detect the business cycle's reference turning points in terms of troughs and peaks. Several individual BCIs are consolidated to form a single series as a coincident, lagging or leading composite index. This is done in order to offset variations in the different series (Provincial treasury, 2012; Venter, 2005b:1-5b). Henceforth, the study sought to combine the formerly identified individual leading indicators by constructing a single composite indicator that weights and consolidates all the identified individual leading series of the ALCI into a single variable. Similar to the method utilised by The Conference Board (2001), yet with minor modifications, the study adopted the official approach used by the SARB to construct the composite leading index for the business cycle (Van der Walt & Pretorius, 1994). Accordingly, 2015 (2015 = 100) was considered the base year for the composite leading index. To test the significance or relevance of the composite signal, the cyclical component and turning points of the ALCI and the constructed composite signal were extracted and compared to verify the concordance of the series using the charting technique. This method illustrated and analyses historical price patterns in both series for future forecasting based on the degree of co-movement (Leigh et al., 2002).

Figure 2 exhibits the cyclical components' turning points for the ALCI and the constructed leading indicator. Turning points of the minimum and maximum, or peaks and troughs, were observed throughout the sample period. A similar movement was confirmed between the two series. Evidently, turning points of the leading series were shown to precede those of the ALCI with the corresponding direction, carrying a primarily positive correlation. This illustration suggested that some business cycle series have the properties and the capacity to lead financial cycles. Albeit, the ALCI appeared to be relatively more volatile than the leading indicator.

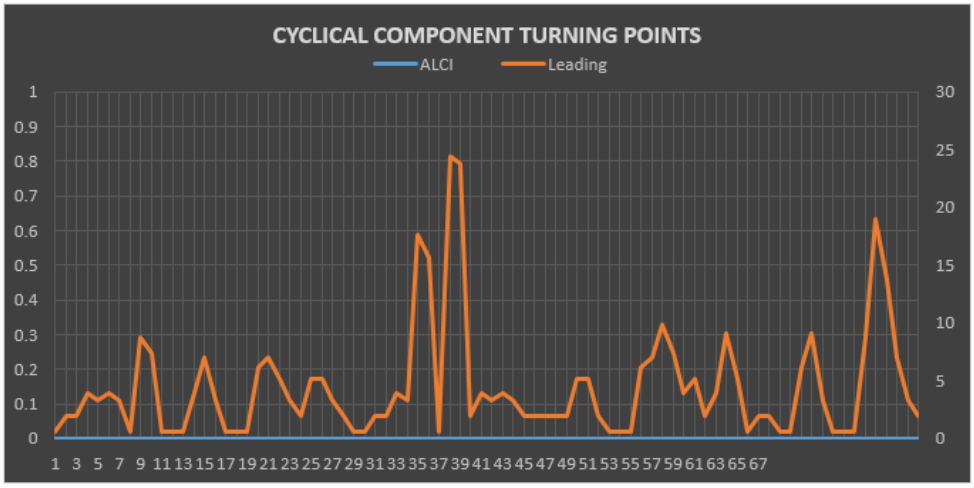

Figure 2. Cycle component turning points of the constructed composite leading indicator and the All-Commodity Index (2015 = 100)
Source: Author compilation

Discussions of results

The SARB's official BCIs were assessed as potential regressors for the capital market's All-commodity index (regressand) in gauging the prospects of establishing leading, lagging and coincident signals of the latter. The study focused on constructing and assessing the significance of the composite leading indicator to predict the All-commodity index. The methods used in achieving the study objectives comprised of the

approaches used by Bergman et al. (1998), Burger (2010), Gavin and Kydland (2000), Izani et al. (2004) and Kydland and Prescott (1990). Such methods comprised the cross-correlations test that followed estimations of the ARIMA model, the Granger causality test (a post estimation to the cross-correlations test), and the variance decomposition approach. Moreover, concordance between the study's established composite leading index and the All-commodity index were assessed using charting techniques and revealed that the signals in the composite leading indicator displayed significant leading properties of the turning points in the All-commodity index.

Having been conducted insight of the classical (or traditional) and behavioural financial theories, the study provided evidence that some features of predictability characterise the capital market performance of South Africa's All-commodity index through the lenses of some BCIs following the various empirical estimations. Accordingly, Wright et al. (2013:36) highlight that a valuable indicator is one with the capacity to provide information regarding prospective returns of market prices. The composite leading indicators were shown to have been able to predict the direction of the turning points in the All-commodity index, providing sufficient and reassuring evidence that macro-economic indicators, other than just micro-finance indicators such as credit and savings, are closely associated with financial market cycles.

Moreover, about three-component variables did not show significant leading, lagging and coinciding properties to the All-commodity index, specifically, the "value of non-residential buildings completed at constant prices", "nominal labor cost per unit of production in the manufacturing sector: percentage change over twelve months", and the "composite leading indicator of South Africa's major trading partner countries: percentage changes over twelve months". These findings are similar to the empirical study by Jena (2016) and Schaling et al. (2014). They showed in their studies that some macro-economic series have no short-or long-run cointegration with commodity prices. Nevertheless, results of existing relationships between macro-economic series and the commodity market resonate with empirical evidence of various authors, namely; Bangara & Dunne (2018), Li *et al*. (2017), Yin & Han (2016), on developing countries, including Frankel & Rose (2010), Karali & Power (2013), and Smolík et al., (2015) on developed economies.

The findings of this paper are in contrast with the assertions of non-predictability of financial cycles made by the traditional or neoclassical finance theory according to the random walk nature in market prices (Illiashenko, 2017:44). The current paper's findings are supported by Glaser et al. (2004), who administered the discussion that markets have the ability to be forecasted by input series which have short-term returns characterized by negative or positive autocorrelations. Likewise, Abu-Mostafa & Atiya (1996) motivate that these auto-correlations and price trends serve as one of the paramount pieces of evidence against the traditional or neoclassical finance theory's EMH. Thomaidis (2004:2), also mentions that the behavioral finance theory's rationally-induced biases or errors are the reasons for financial market irregularities or anomalies which result in predictable trends, seasonal cycles, turbulence and bubbles. In line with behavioural finance, market participants' behavior is systematic and thus open to modeling (Birău, 2012:48; Illiashenko, 2017:30); Jolls, et al., 1998:1475). The inefficiency of markets due to the varying conditional variances associated with the event suggests that a significant segment of the market can be forecasted (Rachev et al., 2017:20), as financial markets are not perfect and traders do not possess perfect information making them susceptible to behavioral biases or irrationality (Willmanet al., 2001:906).

Conclusion and recommendations

The majority of BCIs have been revealed to be statistically significant indicators or explanatory signals of the commodity market and are useful for analysis and interpretation, having exhibited explanatory capacity of behavioral time-series movements of the capital market. Reassurance is given that the financial sector is not isolated from the real sector, notwithstanding their operational idiosyncrasies. Most of the considered BCIs were revealed to exhibit forms of leading, lagging and coinciding properties respective to the All-commodity index. Results of the study proved to be significant and corresponded with various backgrounds of the empirical literature on predictability, co-movement or concordance.

These findings are crucial to how market analysts, investors, traders, scholars, including fiscal and monetary policymakers, view and build inferences on the markets. The SARB (2018:3) also acknowledged

existing and important linkages between financial stability and the real markets. Thus a stable financial system can be founded by sustainable growth prospects and vice versa. Such that real market developments can influence financial stability and performance. They identified signals or other variables that can display co-movement with the All-commodity index. They can be used to assess South Africa's outlook of its financial market and, therefore, assist in curbing likely market disruptions or lessening their impact by realizing suitable measures or safety-nets. This study encourages the utilization of BCIs or real side variables in conjunction with micro-finance variables to analyze, interpret and formulate economic policy for financial sustainability and stability. The use of real and finance variables improves the accuracy in estimation and macro-prudential analysis. Therefore, investors and traders seeking to make profits in South Africa's capital markets may also attain quality inferences by looking at both real and monetary side factors.

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APPENDIXES

Appendix 1:

South Africa's official composite business cycle indicators

Component time series of the composite business cycle indicators		
Leading indicator	**Coincident indicator**	**Lagging indicator**
Job advertisement space in the *Sunday Times* newspaper: percentage change over twelve months	Gross value added at constant prices, excluding agriculture, forestry and fishing	Cement sales (in tons)
Number of residential building plans passed for flats, townhouses and houses larger than 80m'	Total formal non-agricultural employment	Value of non-residential buildings completed at constant prices
Interest rate spread: 10-year government bonds less 91-dat Treasury bills	Value of retail and new vehicles sales at constant prices	Ratio of gross fixed capital formation in machinery and equipment to final consumption expenditure on goods by households
Real M1 money supply (deflated with CPI)" six-month smoothed growth rate	Industrial production index	Ratio of inventories to sales in manufacturing and trade
Index of commodity prices (in US dollar) for a basket of South African-produced export commodities	Utilisation of production capacity in manufacturing	Nominal labour cost per unit of production in the manufacturing sector: percentage change over twelve months
Composite leading business cycle indicator of South Africa's major trading partner countries: percentage changes over twelve months	n/a	Predominant prime overdraft rate of banks
Gross operating surplus as a percentage of gross domestic product	n/a	Ratio of consumer instalment sale credit to disposable income of households
RMB/BER Business Confidence Index	n/a	n/a

Component time series of the composite business cycle indicators		
Leading indicator	**Coincident indicator**	**Lagging indicator**
New balance of manufacturers observing an increase in the average number of hours worked per factory worker (half weight)	n/a	n/a
Net balance of manufacturers observing an increase in the volume of domestic order received (half weight)	n/a	n/a
Number of new passenger vehicles sold: percentage change over twelve months	n/a	n/a

Appendix 2:

Representation of variables and transformed time series to logged series

Variable	Log Series	Representation
All commodity index	LALCI	Log of the All-Share Index
Job advertisement space in the Sunday Times newspaper: Percentage change over twelve months	LLEI1	Log of Leading Indicator 1
Number of residential building plans passed for flats, townhouses & houses larger than 80m'	LLEI2	Log of Leading Indicator 2
Interest rate spread: 1-year government bonds less 91-dat Treasury bills	LLEI3	Log of Leading Indicator 3
Real M1 money supply (deflated with CPI) * six-month smoothed growth rate	LLEI4	Log of Leading Indicator 4
Index of commodity prices (in US dollar) for a basket of South African-product export commodities	LLEI5	Log of Leading Indicator 5
A composite leading indicator of South Africa's major trading partner countries: percentage changes over twelve months	LLEI6	Log of Leading Indicator 6
Gross operating surplus as a percentage of gross domestic product	LLEI7	Log of Leading Indicator 7
RMB/BER Business Confidence Index	LLEI8	Log of Leading Indicator 8
The new balance of manufacturers observing an increase in the average number of hrs. worked per factory worker (half weight)	LLEI9	Log of Leading Indicator 9
The net balance of manufacturers observing an increase in the volume of domestic order received (half weight)	LLEI10	Log of Leading Indicator 10

Variable	Log Series	Representation
Number of new passengers	LLEI11	Log of Leading Indicator 11
Gross value added at constant prices, excluding agriculture, forestry & fishing	LCOI1	Log of Coincident Indicator 1
Total formal non-agricultural employment	LCOI2	Log of Coincident Indicator 2
Value of retail & new vehicle sales at constant prices	LCOI3	Log of Coincident Indicator 3
Industrial production index	LCOI4	Log of Coincident Indicator 4
The utilisation of production capacity in manufacturing	LCOI5	Log of Coincident Indicator 5
Cement sales (in tons)	LLAI1	Log of Lagging Indicator 1
Value of non-residential buildings completed at constant prices	LLAI2	Log of Lagging Indicator 2
The ratio of gross fixed capital formation in machinery & equipment to final consumption expenditure on goods by households	LLAI3	Log of Lagging Indicator 3
The ratio of inventories to sales in manufacturing & trade	LLAI4	Log of Lagging Indicator 4
Nominal labour cost per unit of production in the manufacturing sector: percentage change over twelve months	LLAI5	Log of Lagging Indicator 5
Predominant prime overdraft rate of banks	LLAI6	Log of Lagging Indicator 6
The ratio of consumer instalment sale credit to the disposable income of households	LLAI7	Log of Lagging Indicator 7

Source: Author compilation

Appendix 3:

ADF unit root results for All-commodity index and business cycle indicators

Variables	Level				First Difference		Order of Integration
	With intercept & without trend		With intercept & trend		Without trend		
	t-stat	P-value	t-stat	P-value	t-stat	P-value	
LACI	-4.150	0.001**	-4.138	0.007	-6.963	0.000	I(0)
LLEI1	-4.291	0.001**	-4.278	0.004	-10.527	0.000	I(0)
LLEI2	-3.018	0.035*	-3.008	0.133	-14.009	0.000	I(0)
LLEI3	-4.392	0.000**	-4.378	0.003	-13.432	0.000	I(0)
LLEI4	-3.962	0.002**	-3.951	0.012	-4.870	0.000	I(0)
LLEI5	-11.607	0.000**	-11.571	0.000	-9.816	0.000	I(0)
LLEI6	-3.657	0.006**	-3.643	0.029	-6.874	0.000	I(0)
LLEI7	-3.873	0.003**	-3.837	0.017	-4.742	0.000	I(0)
LLEI8	-4.802	0.000**	-4.804	0.001	-10.655	0.000	I(0)
LLEI9	-6.873	0.000**	-6.861	0.000	-11.812	0.000	I(0)
LLEI10	-4.104	0.001**	-4.093	0.008	-7.112	0.000	I(0)
LLEI11	-6.678	0.000**	-6.658	0.000	-6.423	0.000	I(0)
LCOI1	-3.821	0.003**	-3.808	0.018	-4.502	0.000	I(0)

Variables	Level				First Difference		Order of Integration
	With intercept & without trend		With intercept & trend		Without trend		
	t-stat	P-value	t-stat	P-value	t-stat	P-value	
LCOI2	-3.985	0.002**	-3.976	0.011	-3.879	0.003	I(0)
LCOI3	-2.740	0.029*	-2.723	0.229	-17.396	0.000	I(0)
LCOI4	-5.695	0.000**	-5.678	0.000	-17.387	0.000	I(0)
LCOI5	-4.776	0.000**	-4.766	0.001	-4.668	0.000	I(0)
LLAI1	-4.690	0.000**	-4.675	0.001	-11.137	0.000	I(0)
LLAI2	-12.182	0.000**	-12.144	0.000	-11.315	0.000	I(0)
LLAI3	-5.100	0.000**	-5.083	0.000	-4.481	0.000	I(0)
LLAI4	-6.521	0.000**	-6.498	0.000	-18.179	0.000	I(0)
LLAI5	-4.514	0.000**	-4.495	0.002	-8.540	0.000	I(0)
LLAI6	-4.514	0.000**	-4.530	0.002	-7.260	0.000	I(0)
LLAI7	-3.09	0.029 *	-3.081	0.114	-11.053	0.000	I(0)

Source: Author compilation

Appendix 4:

Selection of ARIMA model for prewhitening of residuals

Time series	ARIMA Order			AIC
	p	*d*	*q*	
LLEI1	1	0	2	417.42
LLEI2	1	0	0	49.78
LLEI3	1	0	2	430.2
LLEI4	5	0	3	687.5
LLEI5	0	0	0	117.39
LLEI6	2	0	5	132.74
LLEI7	2	0	2	1617.8
LLEI8	2	0	1	486.89
LLEI9	1	0	0	38.16
LLEI10	2	0	0	698.85
LLEI11	2	0	1	638.27
LCOI1	3	0	2	1891
LCOI2	4	0	2	1950.81
LCOI3	1	0	1	981.24
LCOI4	1	0	1	925.12
LCOI5	5	0	0	1592.11
LLAI1	1	0	1	729.07
LLAI2	0	0	0	55.85
LLAI3	4	0	1	1109.71
LLAI4	3	0	1	1021.83
LLAI5	2	0	2	289.57
LLAI6	2	0	1	1014.96
LLAI7	2	0	2	1199

Source: Author compilation

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BUCHAREST STOCK EXCHANGE DEVELOPMENT BETWEEN 1995 AND 2020. FROM FRONTIER TO SECONDARY EMERGING MARKET

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ABSTRACT. The current paper presents and discuss the evolution of Bucharest Stock Exchange over the past 25 years since the re-establishment of this institution. The study also discuss the upgrade and re-classification of the Romanian capital market as a secondary emerging market by the index provider FTSE Russel. Further, it presents Bucharest Stock Exchange position among the security exchanges of the former communist countries, which became member of the European Union. Also, some influences resulting from the implementation of European Union directives in financial sector are discussed The paper concludes showing that Bucharest Stock Exchange still has a long road ahead until it will fulfill the conditions to be re-classified as a full emerging market by the other two global index providers, MSCI Barra and Standard and Poor's.

Key Words: security market, frontier market, secondary emerging market

JEL Classification: G10, G19

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Introduction

Over a decade ago, the implementation of MiFID I (Market in Financial Instruments Directive I) raised a lot of debate regarding the future of smaller and younger security exchanges within the European Union (EU). The possible dangers were perceived to be represented by the development of alternative trading venues as new competitors (Skinner, 2007) and by the potential need, for the security exchanges, to increase their critical size in order to attract and retain liquidity, combined with the need to generate the indispensable revenues for investment in new technologies (Haas, 2007). The relevance of smaller and less liquid EU security markets was questioned by Iorgova & Ong (2008).

Nonetheless, the presence of an operating security exchange in an economy proves the existence of a functioning market economy (Harrison & Paton, 2004) which is still an important validation for the former communist countries, now EU members, including Romania. Furthermore, a functional security exchange might represent an important source for raising capital for the development of local and/or regional companies and for domestic government institutions (Andritzky, 2007; Stulz, 2009; Bayraktar, 2014). In addition, the respective security exchange might offer access to capital at a potential lower costs and also a listing platforms for companies and government institutions financial instruments with lower fees than those presumed by foreign listings in combination with other administrative and cultural factors (Pop, 2011). Moreover, an active national security market offers investment alternatives (and liquidity for these investments) for domestic small investors who cannot afford and/or do not have the necessary knowledge to be present in multiple (foreign) markets. The importance of a functional domestic security market is also supported by the fact that the phenomenon of home bias[2] remains strong across countries (Kho et al., 2009; Ardalan, 2019) and is even stronger in emerging and frontier markets (Ardalan, 2019; Hu, 2020). Besides all the reasons presented above, an important

[2] Home bias is shows the preference of domestic investors to channel an important amount of their available financial resources towards the securities issued and traded in their own home country, despite the potential benefits of diversification provided by foreign markets. Among the main causes for home bias are mentioned: the risks related to foreign exchange rates, problems related to transaction costs in foreign markets, different legal frameworks and tax treatment, specific factors requiring in-depth knowledge and the familiarity with the local security market (Ardalan, 2019; Schumacher, 2018)

series of studies have shown the relationship between the existence of a national security exchange, the development of financial services (known most recently as financialization) and the economic growth of a country, mainly in the cases of emerging and frontier markets (Ang, 2008; Minier, 2009; Masoud & Hardaker, 2012; Bayraktar, 2014; Petry, 2020). Last, but not least important, the presence of a security market in an emerging and/or a frontier economy represents a source of national pride (O'Hara, 2001).

MiFID I enactment since the end of 2007 generated two important outcomes (Schwartz et al., 2015; Aghanya et al., 2020): i) an increase in the cross-border investments (a situation confirmed by Ardalan, 2019 which specify that home bias across European countries is lower than the world average); ii) increased competition among various trading venues, generating a fragmentation of the market for these trading venues.

MiFID I was revised and extended through MiFID II. MiFID II implementation started across Europe since January 3, 2018. MiFID II is based on the same three pillars as MiFID I: transparency of the trading venues, investor protection, and competition among the trading venues. Currently, it is expected that MiFID II to continue the developments triggered by MiFID I within EU countries. These developments seem to favor the presence of smaller security exchanges since they enhance the investors' rights to choose among various trading venues. Nonetheless, there are concerns that this will generate too much competition which might lead to adverse selection costs and 'cream-skimming' by informed investors (Aghanya et al., 2020).

On the other hand, MiFID I and MiFID II enhance the EU emerging and frontier markets growth potential through the development of trading sectors dedicated to SMEs (Pop et al., 2016a), also called 'junior' markets (Granier et al., 2017).

The classification of countries in developed, emerging, and frontier was triggered by the introduction, in 1992, by the International Monetary Fund, of the expression 'frontier markets' for describing a subset of smaller, illiquid, less accessible, yet investable (financial) markets (Pop et al., 2016a). First to offer this type of classification was the global index provider Standard & Poor's by the end of 2007, followed in 2008 by MSCI Barra and FTSE (Pop et al., 2016a). These classifications are used to inform the potential investors about the level of development of the respective markets and the associated investment risks. An upgrade in the market status is considered to be beneficial by attracting more

foreign investors like various (and larger) investment funds, other index tracking institutional investors and individual investors (Saidi et al., 2012). An upward re-classification for a country is perceived, by the international investor community, as a signal for a stronger policy commitment toward market reforms and liberalization; it also indicates a recognition from global index providers viewpoint that market reforms were undertaken and markets improvements were registered (Saidi et al., 2012).

The present paper looks at Bucharest Stock Exchange developments over the last 25 years, since the institution re-opening in 1995. The paper also discuss the path Bucharest Stock Exchange followed to be upgraded from frontier to secondary emerging market, the position of the institution withing the group of security exchanges of other 10 former communist countries that joined the EU, and also discuss some of the future perspectives for Bucharest Stock Exchange. To the best of author's knowledge no such analysis has been published until present.

BVB main developments

Bucharest Stock Exchange (BVB3 henceforth) was re-established4 in 1995: the official opening took place on April 21, while the first trading session was held on November 205 as specified by Pop & Dumbrava (2006). BVB was re-started as a non-for-profit public institution, based on membership and managed by Bucharest Stock Exchange Association (Pop & Dumbrava, 2006). This was the most frequent legal status for stock exchanges around the world at the mid 1990s when, traditionally, security exchanges were founded, owned and managed by brokers and dealers associations, as non-for-profit organizations (Fleckner, 2006).

BVB was among the latest exchange to re-open in the Central and Eastern European region (Pop & Dumbrava, 2006). Also, due to a delayed privatization process, the number of listed companies was small (8 in November 1995) and therefore the trading activity at BVB was shallow, as shown by Pop & Dumbrava (2006), specifying that BVB was open for business only once a week between November 1995 and March 1996, increasing to twice a week between March 1996 and March 1997, then extended to three trading sessions per week from March 1997 to May 1997. Since May 5, 1997 BVB started to trade 5 days a week, except for national holidays.

During 1997, RASDAQ market was established in order to offer a trading venue for the majority of the privatized Romanian companies not fulfilling the listing conditions imposed by BVB. Details regarding the evolution of RASDAQ market can be found in the series of 3 papers of Pop et al. (2014), Pop et al. (2015), and Pop et al. (2016b). Also in July 1997, a derivative market was opened at Sibiu, under the (Romanian) name Bursa Monetar Financiara si de Marfuri Sibiu (Sibiu Monetary Financial and Commodities Exchange), which later became SIBEX. To the best of the author's knowledge, no academic paper discussing the evolution of SIBEX was yet published.

Neither of these two exchanges launched in 1997 represented direct competitors for BVB. In the end, both RASDAQ (in 2005) and SIBEX (in 2018) were absorbed by BVB.

Table 1, below, presents the main development steps of BVB as institution. As can be observed, during the first decade, BVB registered few important developments, except the increase in number of listed companies. Pop & Dumbrava (2006) present a number of causes for the problems faced by BVB between 1995 and 2005, among which it is interesting to mention the low level of transparency for the listed companies and the two crisis (1996 and 2000) of Romanian mutual funds which, up to a point, affected BVB's activity also. Filip & Raffournier (2010) also stressed out that, during the first decade, BVB image have been negatively influenced by a low number of liquid companies which generated low trading volumes and also suffered due to few and disputable transparency requirement. Furthermore, the political decisions of that period had too often negative influences over the entire economic environment (Popescu et al.2014). more details about the financial and economic environment of BVB during the first decade can be found in Harrison & Paton (2004), Skully & Brown (2006), Stefanova (2014).

To address the problem of listed companies transparency, in 2008 BVB launched the first Code of Corporate Governance for these companies. The Code of Corporate Governance was updated and upgraded in 2015 and included new important requirement for the listed companies in terms of disclosure and transparency. The implementation of the 2015 Code (since January 2016) started to have a positive influence on BVB listed companies' transparency (Stanciu, 2019; OECD, 2021) which improved significantly between 2015 and 2021.

More details, regarding the main developments of BVB trading system, complementing the information provided in Table 1 can be find in Annex 1.

Table 1. The main developments for BVB

1995	**April 21**: BVB was re-established as a public non-profit institution based on the National Securities Commission Decision no.20/1995; in this capacity, BVB was under the administration of the trading members' association; the 24 to 28* trading members created the Bucharest Stock Exchange Association; the number of member was not limited, providing the new members fulfilled a minimum set of requirements. **June 23**: the official inauguration **November 20**: the first trading session
2003	BVB becomes an affiliated member of the Federation of European Securities Exchanges (FESE).
2005	BVB changes the legal status and becomes a for profit public joint stock company based on the decision taken by the Bucharest Stock Exchange Association. The members of the respective association became the BVB shareholders. The absorption of the RASDAQ Electronic Exchange was approved and the process was completed in December 2005. RASDAQ became an unregulated market under BVB management.
2006	The merger negotiations with the Sibiu Monetary Financial and Commodities Exchange failed. BVB became a member of the World Federation of Exchanges
2007	BVB becomes full member of FESE since Romania's accession to European Union.
2010	**June 8**: BVB start listing its own shares within the regulated market under the symbol BVB. The Alternative Trading System (ATS) is launched and Daimler AG is the first international company to be dually listed within this market segment.
2013	**August:** Ludwik Soboleski was appointed as BVB's CEO (Chief Executive Officer)
2014	The introduction of a new website for BVB in December reflecting the various changes implemented on the trading system and practices.
2015	**February:** AeRO is launched as a new ATS segment dedicated to small domestic companies. **October 27**: RASDAQ, the unregulated segment, is closed and over 200 companies were transferred on AeRO. BVB became a partner exchange and a member of the United Nations Sustainable Stock Exchanges Initiative
2016	**April:** A new series of negotiations are initiated with SIBEX (former Sibiu Monetary Financial and Commodities Exchange) having as goal the merger of the two security exchanges. **June:** An agreement with SIBEX was reached and considered as a first step for the future merger. **September:** FTSE Russel announced the inclusion of Romanian capital market in the watch-list for upgrading to secondary emerging status within a short or medium time interval. **December:** BVB shareholders formally approved the merger with SIBEX and the legal process for the merger to be acknowledged began.

2017	**August:** Ludwik Soboleski CEO's contract with BVB came to an end. Soboleski continued as CEO until October when he resigned and was replaced by his Romanian deputy. **December:** Bucharest Court of Law approved the merger (through absorption) of SIBEX by BVB and the merger became effective starting with January 1, 2018. The 12 companies listed on SIBEX will be transferred on AeRO segment at BVB.
2018	**January:** a new Romanian CEO is appointed for BVB **September:** FTSE Russel Report on Romanian capital market shows improvements on Romania's road toward a secondary emerging market.
2019	**October:** FTSE Russel announced that starting with September 2020 Romanian capital market will be promoted to the status of secondary emerging market.
2020	**April:** FTSE Russel confirms Romania will be included in the group of secondary emerging markets as of September 2020. **September 21st**: FTSE Russel includes Romania in the group of secondary emerging markets. **November:** BVB celebrates 25 years of activity since its first trading after re-opening on November 20, 1995.

Note: The number of trading members varies depending on the sources (Anghelache 2006, Skully & Brown 2006, and BVB 2001 Annual Report) due to the fact that it probably increased from 24 to 28 between April and November.
Sources: Pop(2015); http://www.bvb.ro/aboutus/mediacenter/pressitem/20-de-ani-de-la-prima-tranzactie-pe-Bursa-de-Valori-Bucuresti/4164; http://www.bvb.ro/press/2015/2015.05.05_BVB%20Rez%20fin%201Q15_EN.pdf; 2001 and 2003 Annual Reports available at: http://www.bvb.ro/AboutUs/Publications, OECD (2021)

After absorbing the RASDAQ market in 2005, BVB followed the international trend of other exchanges around the world[3] and incorporated, becoming a joint-stock public company at the end of 2005 and the beginning of 2006. BVB also made a first trial to absorb SIBEX (by then still called Sibiu Monetary Financial and Commodities Exchange) during 2006, but the negotiations failed. It is interesting to mention that after this event, SIBEX announced that it will launch a new trading platform for shares in order to diversify its trading products (futures and options on futures), while BVB announced the launch of its derivative sector, which included only futures contracts on various underlying assets (exchange rates, indices, shares, commodities). Therefore, BVB and SIBEX became direct competitors, but the more prominent and established position of BVB overshadowed SIBEX and, in the end, absorbed the smaller security exchange from Sibiu.

[3] Due to the deregulation process, advances in the field of information technology, and increasing globalization, security exchanges were under pressure to give up their former status and became for-profit, publicly traded, companies. This process is known as demutualization and, for the main security exchanges around the world, took place between 1997 and 2006 (Fleckner, 2006)

After incorporation, BVB also created the BVB Financial Group which comprises four companies in which BVB is holding a majority shareholder position (for details see Annex 2a). All these companies were either acquired or created in order to enhance and help the future development of BVB. More details regarding BVB Financial Group can be found in Stanciu (2019).

Since June 2010, BVB started listing its own shares on the trading platform under the same symbol, BVB, as the used abbreviation. The gap between BVB incorporation and the listing of its own shares can be explained by the fact that for the period 2006-2008 the shareholder structure included also preferred shareholders composed of mix of individual (natural) persons and legal entities which had an ambiguous status and needing re-authorization for functioning as financial service companies due to changes in Romanian regulatory framework. Since 2009, all the shares became ordinary shares. In order to prevent share concentration, no shareholder or declared group of shareholders is allowed to control more than 20% of BVB shares (Stanciu, 2019). Some details regarding BVB shareholder structure are presented in Annex 2b and in Stanciu (2019).

In order to support Romania's capital market upgrade from frontier to emerging market, in August 2014 Romanian Financial Supervisory Authority (FSA) launched the project STEAM (**S**et of Actions **T**owards **E**stablishing and **A**cknowledgment of the Emergent **M**arket Status). In 2015 the project was updated and it was set to review the regulatory framework for the Romanian capital market, to improve the capital market infrastructure, to support the (further) development of bond market, to increase the number of issuers, to expand the retail market and the financial literacy through financial education. By October 3, 2019, after FTSE Russell announcement that Romania will become a secondary emerging market since September 2020, the Romanian FSA considered that it reached its main objective within STEAM project. Nonetheless, the FSA announced that it will continue the actions within this project for a potential future reclassification of Romania as emerging market by MSCI Barra and Standard & Poor's (source: https://asfromania.ro/en/a/510/asf-a-atins-obiectivul-fundamental-al-proiectului-strategic-steam).

Tables 2a and 2b, below, present more details regarding the developments within the BVB main/regulated market and BVB alternative trading system (currently named multilateral trading system or MTS). One must note that after the absorption of RASDAQ market, between

2006 and 2010 this was considered the unregulated market at BVB. However, RASDAQ legal status was complicated and generated endless disputes between BVB and the supervisory body (currently FSA) and consequently the alternative (multilateral) trading system was introduced in order to replace, in time, the RASDAQ market segment.

Table 2a. The main steps in developing BVB regulated/main market

Nov.1995 to Oct.2001	Only domestic equities were listed and traded.
2001	**November**: the launch of the municipal bond market sector.
2003	**May:** the launch of the domestic corporate bond market sector
2005	The first rights are traded
2006	**September:** the introduction of international (corporate) bonds
2008	**February**: the first dual listing of Erste Group Bank AG (also listed in Vienna and in Prague) within the section International equities/shares. **April:** the launch of the derivative markets; only futures contracts on offer. **August**: the launch of the *Government bond market sector.* **September**: start trading of the first UCITS.
2010	**July:** The introduction of the first certificates within the *Structured products'* segment
2011	June: The listing of the first REIT4 (symbol NEP, registered in the Isle of Man) at BVB within the regulated equity market under the section Other international securities. the REIT was delisted at the mid of July 2017 due to changes in shareholder structure.
2012	**August:** The introduction of the first ETF under the symbol TVBETETF. To the present (December 2021) this remains the only ETF listed at BVB.
2015	**June:** The first retail Government bonds start listing within Government bond sector. These retail bonds were issued for individual investors (general population) only.
2016	**January:** The derivative market segment (futures contracts only) was closed after registering no trading activity since mid 2013. **June:** Warrants are introduced to BVB under the section *Structured products.*
2017	**May:** the second international company (symbol DIGI) is dually listed within the section International equities/shares. **July:** the instruments named "Other international bonds" were introduced. This category of securities includes bonds issued by real estate companies.
2018	**February:** a third international company (symbol WINE) is dually listed within the section International equities/shares.
2019	**June:** under the name "Other bonds" the first issue of mortgage bonds started listing.

Source: Author's compilation based on the Annual Reports available at: http://www.bvb.ro/AboutUs/Publications and on http://www.bvb.ro/aboutus/mediacenter/pressitem/20-de-ani-de-la-prima-tranzactie-pe-Bursa-de-Valori-Bucuresti/4164

Table 2b. The main steps in developing the ATS/MTS at BVB

2010	**October-November:** The Alternative Trading System (ATS) is launched and Daimler AG is the first international company to be dually listed within this market segment.
2015	**February:** The launch of the AeRO segment and the start of domestic equity trading; all the shares were included in the ***standard*** category. **July:** The introduction of the first corporate bond and the launch of ***ATS bond segment;*** the second corporate bond starts trading in December 2015. **August:** The introduction of the first UCITS, transferred from RASDAQ (XFOA symbol)
2016	**February:** The ***premium*** category is introduced for AeRO. **December:** The first rights start trading on AeRO.
2018	**November:** The ***base*** category is introduced at AeRO in order to include the companies transferred from SIBEX, as agreed when the merger of the two security exchanges was negotiated.

Source: Author's compilation based on the information available at:
http://www.bvb.ro/AboutUs/Publications,
http://www.bvb.ro/AboutUs/MediaCenter/PressReleases

The way BVB diversified its trading offer is presented in Table 3a for the regulated market and Table 3b for MTS & AeRO (for Romanian shares) segments.

As Table 3a presents, mainly after 2005, BVB showed a constant effort to diversify the type of securities offered for trading on the main/regulated market. Nonetheless, the shares (only common shares were and are traded on the regulated market) constantly represented the most important component of BVB turnover. However, the importance of share turnover decreased since 2018 due to an increased number of bond public offerings registered through BVB main market platform. The bond public offerings comprised mainly corporate bonds and retail government bonds (dedicated to retail/individual investors only). Further, one can observe that the certificates (structured products) have a relative level of popularity among investors given their hybrid characteristics, combining flexible hedging positions with speculative trading. The other products seem to be less popular either due to a relative lack of investors level of sophistication or to other causes: i.e. the marginal interest or lack of interest (in the case of investment funds and ETFs); high nominal values4, out of the range of an average retail investor (mainly in the case of corporate bonds, other international bonds, and other bonds). Each of these securities or group of securities deserve more dedicated attention and they will not be investigated in any detail within this paper.

Table 3a. BVB main/regulated market structure (%) by turnover of the listed securities

Year	Shares	Municipal bonds	Corporate bonds	International bonds	Government bonds	All bonds' public offerings	Rights	Futures	Investment funds	Funds'public offerings	Structured products	ETFs	Warrants	Other intl. bonds	Other bonds
1995	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
1996	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
1997	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
1998	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
1999	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
2000	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
2001	100.00	-	-	-	-	-	-	-	-	-	-	-	-	-	
2002	99.89	0.11	-	-	-	-	-	-	-	-	-	-	-	-	
2003	98.23	0.13	0.01	-	-	1.63	-	-	-	-	-	-	-	-	
2004	89.22	0.20	1.79	-	-	8.79	-	-	-	-	-	-	-	-	
2005	98.34	0.03	1.33	0.00	-	0.26	0.04	-	-	-	-	-	-	-	
2006	90.81	0.07	0.86	0.82	-	7.43	0.01	-	-	-	-	-	-	-	
2007	94.00	0.07	0.34	2.97	-	2.06	0.56	0.00	-	-	-	-	-	-	
2008	96.29	0.44	0.59	1.42	0.27	0.00	0.66	0.26	0.07	-	-	-	-	-	
2009	78.74	0.30	0.94	2.88	14.12	1.66	0.00	1.04	0.04	0.28	-	-	-	-	
2010	67.04	0.27	0.00	0.17	27.46	2.90	0.05	1.28	0.13	0.15	0.55	-	-	-	
2011	90.03	0.08	0.00	0.67	3.30	0.91	0.00	0.93	0.08	0.00	4.00	-	-	-	
2012	77.42	0.00	0.00	0.11	12.19	2.61	0.00	0.42	0.05	0.00	7.20	0.00	-	-	
2013	84.83	0.02	0.30	0.00	3.19	7.36	0.22	0.02	0.04	0.00	4.01	0.01	-	-	
2014	91.58	0.02	0.28	0.00	0.80	5.64	0.00	0.00	0.06	0.00	1.60	0.02	-	-	
2015	73.01	0.62	0.79	0.03	2.27	19.87	0.00	0.00	0.04	0.00	3.34	0.03	-	-	
2016	83.89	1.06	0.49	0.25	1.01	9.39	0.00	0.00	0.02	0.00	3.85	0.01	0.03	-	
2017	86.52	1.77	0.07	0.00	0.26	9.37	0.00	0.00	0.06	0.00	1.85	0.04	0.08	0.00	
2018	81.90	0.04	0.13	0.02	0.93	14.48	0.00	0.00	0.05	0.00	2.40	0.02	0.00	0.00	
2019	81.57	0.35	0.61	0.01	0.03	15.79	0.00	0.00	0.02	0.00	1.57	0.04	0.00	0.00	0.00
2020	66.94	0.02	0.31	0.05	1.66	26.42	0.00	0.00	0.02	0.00	4.54	0.06	0.00	0.00	0.00
2021	55.19	0.03	0.36	0.01	4.39	35.42	0.02	0.00	0.03	0.00	4.33	0.20	0.03	0.00	0.00
Avg.	***80.94***	***0.29***	***0.41***	***0.46***	***3.37***	***11.68***	***0.08***	***00.16***	***0.04***	***0.01***	***2.51***	***0.04***	***0.01***	***0.00***	***0.00***

Source: Based on the data available at www.bvb.ro

Table 3b presents the market structure for the MTS & AeRO market. The MTS was dominated by international companies listed in dual way until 2014. The international shares have the main (listing) market in Germany, USA, and Euronext France. A cumulative number of 31 international shares was dually listed on MTS. However, during February 2015, 4 French companies and 1 German company were withdrew from MTS mainly due to the pull back of their market makers. For the same reason, all the 11 American companies were withdrew during August 2016, decreasing the number of international shares at 15, all German companies. This number (15) remained unchanged until present (December 2021).

The segment for Romanian shares was also called MTS between 2012 and 2014. The name was changed in AeRO in 2015 when the transfer of over 260 companies from RASDAQ took place. The new listings (companies not previously listed on RASDAQ) on Romanian share segment was low: 11 companies between 2012 and 2015, with 6 of them starting listing during 2015; and 6 companies between 2016 and 2020, with 3 of them starting listing during 2020. For AeRO, the period between 2015 and 2020 was dominated by a high number of companies being delisted (51 companies). Only one company (BNET symbol) was transferred on BVB main/regulated market. During 2021, the tide was changing with only 10 delisted companies and 20 new listings, increasing the investors interest for AeRO market as the data show. One must mention that within AeRO segment only two issues of preferred shares were listed. By 2021 one of these preferred share issues was delisted and one remained, though no trade for the preferred shares was registered between 2015 and 2021.

The bond sector on MTS includes only Romanian corporate bonds and, while the turnover is not high, the trades have a daily frequency, averaging around EUR 30,000 daily (public offerings excluded) for the period 2015-2021. The number of (the retail) investors in these corporate bonds is relatively low, due to the fact that an important number of these bonds were issued through private offerings. Nonetheless, these bonds are more attractive for the retail investors due to their low nominal value (RON 100 or EUR 100, rarely RON 500 or EUR 500).

Table 3b. BVB MTS & AeRO market structure (%) by turnover of the listed securities

Year	International shares	Romanian shares	Corporate bonds	Bond offerings	Rights	Investment funds
2010	100.00	-	-	-	-	-
2011	100.00	-	-	-	-	-
2012	100.00	-	-	-	-	-
2013	92.36	7.64	-	-	-	-
2014	99.56	0.44	-	-	-	-
2015	37.80	57.60	2.53	2.02	-	0.05
2016	27.46	68.98	3.46	0.00	0.08	0.02
2017	18.82	77.20	3.93	0.00	0.03	0.03
2018	14.66	76.58	4.50	4.12	0.14	0.00
2019	17.59	62.51	4.96	12.94	0.00	0.00
2020	27.64	46.06	7.84	17.11	1.35	0.00
2021	5.12	70.09	7.41	16.12	1.27	0.00
Avg.	***53.42***	***38.93***	***2.89***	***4.36***	***0.24***	***0.01***

Source: Based on the data available at www.bvb.ro

The rights offering takes place occasionally, therefore the interest for these products is related to the investors following them. Also a low interest is attached to the only investment fund (or at least the only one listed in a separate section) offered on MTS. Unfortunately, this fund is related to the 1996 mutual fund crisis in Romania. While, as in the case of regulated market, MTS & AeRO deserve special attention, they will not be analyzed within the present paper.

In Table 4 and 5, below, the number of active intermediaries, active investors, and the general ownership of BVB securities are presented, in relation with the country's long term rating. It must be highlighted that the number of active investors and the security owners at BVB are available only after the creation BVB Financial Group, with the component institutions providing information regarding the active investors (Investors Compensation Fund) and security owners (the Central Depository).

Some comments are opportune regarding the evolution presented in Table 4 and 5.

The number of active intermediaries was at its highest in 1998, when the trading activity generated by the privatization process was intense. Nonetheless, this intense activity was accompanied with unlawful tradings (mainly on RASDAQ market, causing its poor reputation and, in

the end, this market demise; for more details see Pop & al., 2014) which decrease as a more stable ownership of privatized listed companies emerged and as a higher number of illicit tradings were reported to and/or discovered by the supervisory authority. Between 2000 and 2004 an important number of intermediaries were either fined or closed due to their wrongful activities; this is shown by the important decrease in their number compared to the pick year 1998.

While BVB registered several of its best years between 2002 (when the announcement that Romania was accepted as NATO member) and the mid of 2007 (when the first signs of the looming financial crisis started to show due to the withdrawal of foreign investors), the number of intermediaries remained relatively constant, suggesting a relative low number of domestic investors and an important dealing activity. The consequences of the financial and economic crisis of 2008 – 2012 are visible on the number of intermediaries at BVB, their count decreasing due to either closure and concentration activities (mergers & acquisitions).

It is interesting to note that the number of active investors, though very low compared with the number of security owners, increased during the volatile period of 2008 – 2009, only to decrease constantly for the next 10 years. The announcement of FTSE Russell regarding the upgrade in status to secondary emerging market for Romania seems to have triggered an increase in the number of active investors. However, since this number increased during 2020 and 2021, years affected by the world pandemic of SARS-CoV-2 virus, a certain level of influence in this increase should be allocated to the changes in work habits and time spent in front of a computer imposed by lock-downs.

On another note, the number of security owners constantly decreased since 2007. To the best of author's knowledge there are no important studies on the causes of this decrease. One cause can be represented by the delisting of companies, another can be the withdrawal/ divestment of individual investors for various reasons. Nonetheless, the evolution of foreign investors followed an opposite trend, their number increasing constantly, mainly after the upgrade to BBB- of Romania's long term sovereign rating. It seems that the FTSE Russell upgrade to secondary emerging market for Romania had no important impact on the number of foreign investors.

Table 4. Intermediaries, investors and security owners at BVB as the end of the year and Romania's long term rating (end of the year)

Year	No. of active intermediaries			Number of active investors	Total number of security owners	Of which foreign owners	S&P' rating	Moody' s rating	Fitch 's rating
	BVB main market	RASDAQ	MTS & AeRO						
1995	28	-	-	n/a	-	-	n/a	n/a	n/a
1996	62	85	-	n/a	-	-	BB-	n/a	BB-
1997	133	168	-	n/a	-	-	BB-	Ba3	BB-
1998	173	202	-	n/a	-	-	B-	B3	B
1999	150	167	-	n/a	-	-	B-	B3	B-
2000	120	101	-	n/a	-	-	B-	B3	B
2001	110	86	-	n/a	-	-	B	B2	B
2002	75	69	-	n/a	-	-	B+	B1	BB-
2003	73	63	-	n/a	-	-	BB	Ba3	BB
2004	67	65	-	n/a	-	-	BB+	Ba3	BBB-
2005	70	68	-	n/a	-	-	BBB-	Ba1	BBB-
2006	73	73	-	65,304	-	-	BBB-	Baa3	BBB
2007	73	73	-	87,664	9,526,228	4,024	BBB-	Baa3	BBB
2008	76	76	-	92,865	9,542,394	5,095	BB+	Baa3	BB+
2009	71	71	-	94,545	9,397,467	5,077	BB+	Baa3	BB+
2010	65	65	45	86,453	9,321,234	5,303	BB+	Baa3	BB+
2011	61	61	48	88,143	9,188,180	5,567	BB+	Baa3	BBB-
2012	54	54	45	81,218	9,090,167	5,586	BB+	Baa3	BBB-
2013	43	43	36	85,381	9,090,042	5,718	BB+	Baa3	BBB-
2014	40	40	34	74,571	8,922,797	5,847	BBB-	Baa3	BBB-
2015	38	38	33	71,108	8,470,471	5,839	BBB-	Baa3	BBB-
2016	38	-	32	66,493	8,522,505	5,897	BBB-	Baa3	BBB-
2017	34	-	28	59,467	8,561,928	6,114	BBB-	Baa3	BBB-
2018	27	-	22	53,981	8,502,369	6,199	BBB-	Baa3	BBB-
2019	27	-	20	53,550	8,433,856	6,259	BBB-	Baa3	BBB-
2020	27	-	20	65,637	8,411,975	6,177	BBB-	Baa3	BBB-
2021	22	-	18	81,793	n/a	n/a	BBB-	Baa3	BBB-

Source: https://www.bvb.ro/TradingAndStatistics/Publications/MonthlyReports, http://www.fond-fci.ro/, https://mfinante.gov.ro/ro/web/trezor/rating-de-tara, https://www.roclear.ro/DespreNoi/RapoarteAnuale

The detailed information in Table 5 are in line with the idea that the new status of secondary emerging market for Romania did not have an important impact on the number of foreign investors. However, when one looks at the percentage of securities owned by the foreign investors,

one can see an important decrease in value. This might be due to the increase in the number of Romanian active investors, as reflected by Table 4 and the divestment of foreign investors. This is an unexpected evolution, since the upgrade to secondary emerging market status is supposed to generate, in the mind of many Romanian analysts, an awaited increase in foreign investors and their security ownership at BVB.

It is also interesting to note that the following countries have a continuous investing activity in Romania since 2007: Austria (on the 1st place since 2007 to 2020), followed on various ranks by France, USA, UK, Netherlands, and Luxembourg.

Table 5. Details regarding security owners at BVB

Year	Romanian security owners		Foreign security owners		Percentage (%) of securities owned by foreigners *
	Individuals	Legal persons	Individuals	Legal persons	
2009	9,383,994	8,396	4,461	616	45.00%
2010	9,307,723	8,208	4,653	650	45.00%
2011	9,175,429	7,184	4,856	711	49.00%
2012	9,078,086	6,495	4,889	697	48.00%
2013	8,996,889	6,435	4,947	771	42.00%
2014	8,910,642	6,308	5,027	820	42.00%
2015	8,459,522	5,110	5,077	762	43.00%
2016	8,511,411	5,197	5,085	812	44.00%
2017	8,550,572	5,242	5,288	826	42.00%
2018	8,490,890	5,280	5,342	857	42.00%
2019	8,422,404	5,139	5,480	779	40.00%
2020	8,401,211	4,587	5,458	719	34.00%

Note *: based on the securities' value calculated using the last price at the end of each year
Source: https://www.roclear.ro/DespreNoi/RapoarteAnuale

Selected evolution at BVB

Table 6, below, presents the equity market evolution at BVB, including the regulated market, RASDAQ market and MTS/AeRO market. As it can be observed, the main market capitalization had an overall upward trend, with two disruptions: one in 1998-1999 caused by the Asian crisis and the second in 2008-2011 caused by the financial and economic crisis. The 2021 capitalization is the highest reached so far by the

regulated market. The RASDAQ market reached a pick in capitalization in 2007 (one of BVB's best years), only to enter on a downward trend until its closure in October 2015. The RASDAQ capitalization decrease was triggered by the 2008-2011 crisis and deepened further by its uncertain legal status, the relative poorer quality of listed companies, and by continuous companies delisting (for more details see Pop et al.2014, 2015, 2016b). The capitalization for AeRO segment (for Romanian shares) within MTS evolved slowly between its opening in 2015 and 2020, only to increase 2 times in 2021, reaching its highest capitalization as yet, similar to BVB main/regulated market. One cause of this 2021 increase might be represented by the 20 new listed companies.

While BVB main market capitalization grew relatively steadily, the total turnover had an oscillating evolution, with a pick reached in 2007, never to be attained again until the end of 2021, despite the fact that 2021 is considered the best year for BVB in various reports and news announcements. In the case of RASDAQ market, the turnover followed the trend of its capitalization and AeRO segment turnover also followed the respective capitalization trend.

Similar with the observation made by Pop et al.(2016a), there is a high level of trading concentration around a relative small number of listed companies. It is worth to note that between 1999 and 2010, the five investment companies (closed-end funds, called SIFs) concentrate on average about 41.00% of daily turnover; while SIFs importance decreased between 2011-2021 to an average of 11.25% of the daily turnover, the closed-end fund Fondul Proprietatea (FP symbol) end up aggregating on average 23.47% of the daily turnover over the same period (2011-2021). The calculations were made based on the daily data available on BVB website.

BVB main market liquidity followed the oscillating evolution of turnover, reaching the highest values so far between 1997 and 2000 mainly due to the low capitalization. Since 2002 until 2021, BVB main market liquidity did not pass over 17%. The relative modest liquidity can be related to the relative low number of active investors. In the case of RASDAQ market, the liquidity reached its pick in 2007 (18.43%), only to decrease as the activity on this market dwindled. On the other hand, on AeRO, as the trading activity grew gradually, the liquidity followed the same trend; though it remained low, despite the increase in 2021.

Table 6. BVB equity market structure by capitalization and turnover (EUR/ECU mil.)

Year	Capitalization				Turnover			Liquidity (%)*		
	BVB main market	RASDAQ**	MTS/ AeRO	Total % of GDP	BVB main market	RASDAQ	MTS/ AeRO	BVB main market	RASDAQ	MTS/ AeRO
1997	77.61	Not part of BVB	-	0.28	0.95	Not part of BVB	-	1.22	Not part of BVB	-
1996	48.53	Not part of BVB	-	0.16	4.13	Not part of BVB	-	8.51	Not part of BVB	-
1997	560.28	Not part of BVB	-	1.81	240.50	Not part of BVB	-	42.92	Not part of BVB	-
1998	317.82	Not part of BVB	-	0.85	184.85	Not part of BVB	-	58.16	Not part of BVB	-
1999	298.09	Not part of BVB	-	0.89	84.07	Not part of BVB	-	28.20	Not part of BVB	-
2000	450.51	Not part of BVB	-	1.11	93.24	Not part of BVB	-	20.70	Not part of BVB	-
2001	1,361.08	Not part of BVB	-	2.99	148.54	Not part of BVB	-	10.91	Not part of BVB	-
2002	2,646.45	Not part of BVB	-	5.42	222.43	Not part of BVB	-	8.40	Not part of BVB	-
2003	2,991.02	Not part of BVB	-	5.65	268.64	Not part of BVB	-	8.98	Not part of BVB	-
2004	8,818.82	Not part of BVB	-	14.37	598.07	Not part of BVB	-	6.78	Not part of BVB	-
2005	15,311.35	Not part of BVB	-	19.10	2,152.05	Not part of BVB	-	14.06	Not part of BVB	-
2006	21,414.91	3,126.44	-	24.93	2,801.71	241.11	-	13.08	7.71	-
2007	24,600.75	6,985.67	-	24.57	4,152.44	1,287.71	-	16.88	18.43	-
2008	11,629.77	3,079.08	-	10.07	1,895.44	426.49	-	16.30	13.85	-
2009	19,052.65	2,937.67	-	17.60	1,203.80	136.32	-	6.32	4.64	-
2010	23,892.21	2,526.45	n/a	21.04	1,338.29	144.56	0.14	5.60	5.72	n/a
2011	16,385.91	2,366.93	n/a	14.22	2,349.04	136.21	2.62	14.34	5.75	n/a
2012	22,063.37	2,008.28	n/a	18.13	1,674.20	48.92	3.76	7.59	2.44	n/a
2013	29,980.44	1,774.47	n/a	22.10	2,543.57	68.34	4.72	8.48	3.85	n/a
2014	28,986.52	1,668.52	n/a	20.34	2,930.76	47.73	4.56	10.11	2.86	n/a
2015	32,240.80	502.25	851.07	20.97	1,980.07	14.21	20.23	6.14	2.83	2.38
2016	32,271.86	-	934.05	19.53	2,010.27	-	46.60	6.23	-	4.99
2017	35,276.13	-	1,333.91	19.49	3,005.80	-	36.18	8.52	-	2.71
2018	30,658.06	-	1,585.02	15.77	3,004.31	-	46.24	9.80	-	2.92
2019	37,847.36	-	1,868.26	17.81	2,499.10	-	49.04	6.60	-	2.62
2020	31,668.60	-	1,998.06	15.43	3,770.36	-	70.09	11.91	-	3.96
2021	46,291.58	-	4,001.50	[e]20.99	2,242.27	-	248.45	4.84	-	6.21

[e]: estimated data based on estimated GDP as announced by NIS.
Note *: Liquidity is calculated as ratio between turnover and market capitalization
Note **: The market capitalization for RASDAQ is reported for 22nd of October 2015, the last day of trading on the respective market segment.
Source: Based on the data available at www.bvb.ro and https://www.bvb.ro/TradingAndStatistics/Statistics/GeneralStatistics

One must note that BVB does not report (in General Statistics section) neither the outstanding value for listed bonds, nor the bond capitalization. Therefore, within this paper it was chosen not to report these values based on own author's calculation since they can not be verified by BVB reports. Hence, for the bond sector at BVB no information similar with that presented in Table 6 (for equity sector) is provided.

BVB indices

Annex 3 presents the 9 indices dedicate to BVB main market equity segment as of December 2020. It must be added that two new indices[4] were introduced for BVB main market segment since October 11, 2021.

For an equity main market segment with less than 100 listed companies, the number of dedicated indices is (very) high. Though justifications exist: the first index, BET (introduced in 1997), was initially dedicated to the top 10 most liquid companies; the Romanian investment companies/closed-end funds (SIFs) were listed starting with November 2001 and a dedicated index was created (BET-FI, considered a sector index); however, there was always a feeling that a combination of these two indices should exist and in 2008, BET-XT was introduced, combining the then portfolios of BET and BET-FI. Further, in 2008, a second sector index was introduces for the energy companies and energy sector related companies, BET-NG. In 2012 a new index, BET-BK was introduced in order to represent a benchmark index for the managers of Romanian investment funds; the portfolio constituents of this index are almost similar with the constituents of BET-XT, though the constituents' weight is more balanced for BET-BK portfolio. Additional to the above mentioned indices, in 2014-2015 the total return version of BET and respectively BET-XT indices were launched (called BET-TR and BET-XT-TR), following the international trend preference for this type of index. ROTX index is seldom followed by Romanian investors, thus an investment fund based on ROTX portfolio is offered by a specialized investment management company; this index is calculated and reported by Vienna Stock Exchange, is designed as a tradable index and is used as underlying asset for structured products.

[4] The two new indices are called BET-TRN (Bucharest Exchange Trading Net Total Return) and BET-XT-TRN (Bucharest Exchange Trading Extended Net Total Return). Their introduction was considered necessary to complete the information regarding the share performances based on net return.

Another justification for such a high number of indices is given by the continuity of the older indices, allowing various analyses. Nonetheless, for individual investors, this high number of indices might be confusing without an in depth study of their profiles, portfolio constituents and structures.

In Annex 4 (Annex 4a, 4b, and 4c), three graphs describe the nine BVB indices evolution.

Table 7a. BVB equity market oldest indices annual performance compared to inflation rate, bank deposit interest rate and DIVY (%)

Year	BET return	BET-C/Plus return	BET-FI return	ROTX return	Inflation rate	Bank deposits' rate	DIVY
1998	-49.40	-	-	-	59.10	38.30	10.66
1999	15.21	-4.99	-	-	45.80	45.40	7.84
2000	18.25	7.39	-	-	45.70	32.44	7.48
2001	35.71	-6.47	109.92	-	34.50	26.16	6.70
2002	117.52	124.02	113.14	-	22.50	18.39	4.97
2003	27.13	22.62	24.72	-	15.30	10.78	2.00
2004	93.15	98.29	106.94	-	11.90	11.34	1.45
2005	42.47	31.63	151.32	-	9.00	8.34	0.94
2006	18.09	25.07	24.66	20.16	6.56	6.51	1.72
2007	16.29	26.27	14.95	15.73	4.84	6.70	2.18
2008	-69.68	-69.68	-83.62	-68.70	7.85	9.55	8.57
2009	57.21	34.62	83.33	42.22	5.59	11.89	2.81
2010	10.89	13.49	-10.09	10.85	6.09	7.29	1.87
2011	-19.18	-16.73	-13.52	-27.09	5.79	6.29	5.46
2012	18.57	6.29	29.63	28.46	3.33	5.50	6.94
2013	21.87	16.25	19.88	20.49	3.98	4.54	4.79
2014	9.21	-6.11	-3.83	10.43	1.07	3.02	6.11
2015	0.48	0.24	0.52	8.64	-0.59	1.89	5.35
2016	2.59	3.18	-0.99	2.68	-1.55	1.11	6.95
2017	8.23	9.55	31.80	10.91	1.34	0.89	7.22
2018*	-6.66	-6.63	-14.19	-5.85	4.63	1.30	10.11
2019	33.55	32.75	37.53	34.65	3.83	1.79	6.79
2020**	-1.17	-1.17	-8.90	-0.98	2.63	1.93	6.49
2021**	32.69	32.48	21.81	35.69	8.19	1.58	4.47

Note *: During December 2018 a Government Order was issued regarding the taxation of Romanian registered banks' assets; the reason given for this tax was that most banks reported losses, hence no profit to tax. The reaction of BVB investors was swift and BET lost over 900 points on December 19th 2018 (a decline of -11.21% in one single day). All the other BVB equity indices followed the same trend.
Note **: Since March 2020 and until December 2021 the BVB performances were influenced by the SARS-CoV-2 virus pandemic[5].
Source: Based on the data available at www.bvb.ro and at www.bnro.ro

[5] Some interesting results regarding SARS-CoV-2 pandemic influence on BVB can be found in Gherghina et al., 2021.

Table 7a and 7b present the annual returns of BVB indices versus the annual inflation rates, bank deposit rates (for non-banking sector), and BVB reported annual dividend yield. As both tables show, most of the time, after 2002, BVB companies offered interesting returns (especially BET constituents) while the dividend yield compensates for low or negative annual returns.

Table 7b. BVB equity new indices annual performance compared to inflation rate, bank deposit interest rate and DIVY (%)

Year	BET-XT return	BET-NG return	BET-BK return	BET-TR return	BET-XT-TR return	Inflation rate	Bank deposits rate	DIVY
2007	9.63	18.99	-	-	-	4.84	6.70	2.18
2008	-74.67	-71.71	-	-	-	7.85	9.55	8.57
2009	61.54	63.99	-	-	-	5.59	11.89	2.81
2010	0.30	27.96	7.60	-	-	6.09	7.29	1.87
2011	-15.25	-21.51	-18.21	-	-	5.79	6.29	5.46
2012	13.45	2.51	13.03	-	-	3.33	5.50	6.94
2013	19.64	2.65	15.55	26.79	28.24	3.98	4.54	4.79
2014	6.44	5.84	3.70	14.64	11.23	1.07	3.02	6.11
2015	1.16	-12.60	3.13	4.80	6.38	-0.59	1.89	5.35
2016	1.81	-2.19	1.35	11.26	9.83	-1.55	1.11	6.95
2017	13.10	8.11	21.00	17.77	22.31	1.34	0.89	7.22
2018	-9.29	-9.49	-12.86	2.23	-1.33	4.63	1.30	10.11
2019	33.21	29.29	28.47	45.01	44.08	3.83	1.79	6.79
2020	-4.20	-11.58	-0.97	3.97	0.57	2.63	1.93	6.49
2021	30.69	27.58	34.66	39.46	36.67	8.19	1.58	4.47

Source: Based on the data available at www.bvb.ro and at www.bnro.ro

One must mention that the AeRO segment was associated with a dedicated index, BETAeRO, since October 11, 2021. This index was also excluded from this paper due to its very short history.

Unfortunately, the bond segment at BVB did not received the same attention. While the MTS bond segment includes only corporate bonds, the BVB main/regulated market includes at least three broad segments: municipal bonds, corporate bonds (domestic and international), and government bonds. Therefore, a general bond index for BVB main market would have been welcomed. Though, the relative low frequency trading and relative low trading values (as shown in Table 3a) might be a reason for the absence of a bond index. It must be noted that between 2010 and 2012 the main market corporate bond segment did not registered any trading activity and for at least 2 years there were no

listed corporate bonds. Furthermore, the government bond segment went through a low trading period between 2016 and 2020 due to the government attitude toward the listing of its bonds. Only since August 2020, after a change in government composition, government bond public offerings for population were launched on a larger scale and the respective bonds were listed at BVB, boosting this bond segment trading.

In the absence of a bond index, Table 8 provides the annual average coupons of the outstanding bonds listed at BVB and compare these coupons with the inflation rates, bank deposit rates, BET annual return and annual dividend yield.

Table 8. BVB main market and MTS bond coupons compared to inflation rate, bank deposit rate, BET return, and DIVY (%)

Year	Municipal bonds	Corporate bonds	International bonds	Government bonds	MTS corporate bonds	Inflation rate	Bank deposit rate	BET return	DIVY
2001	36.50	-	-	-	-	34.50	26.16	35.71	6.70
2002	31.71	-	-	-	-	22.50	18.38	117.52	4.97
2003	19.39	-	-	-	-	15.30	10.78	27.13	2.00
2004	20.16	19.74	-	-	-	11.90	11.34	93.15	1.45
2005	12.38	12.36	-	-	-	9.00	8.34	42.47	0.94
2006	9.20	8.25	6.50	-	-	6.56	6.51	18.09	1.72
2007	8.77	9.08	6.65	-	-	4.84	6.70	16.29	2.18
2008	11.22	10.03	6.78	7.31	-	7.85	9.55	-69.68	8.57
2009	13.25	12.92	8.09	7.58	-	5.59	11.89	57.21	2.81
2010	8.31	n/a	9.13	7.55	-	6.09	7.29	10.89	1.87
2011	6.85	n/a	9.13	7.41	-	5.79	6.29	-19.18	5.46
2012	6.18	7.40	9.13	7.01	-	3.33	5.50	18.57	6.94
2013	5.57	6.95	9.13	6.59	-	3.98	4.54	21.87	4.79
2014	3.55	6.14	10.36	6.32	-	1.07	3.02	9.21	6.11
2015	2.44	5.91	10.36	5.91	11.33	-0.59	1.89	0.48	5.35
2016	1.84	5.79	6.84	5.05	9.79	-1.55	1.11	6.95	6.95
2017	1.81	5.00	6.11	4.49	9.12	1.34	0.89	7.22	7.22
2018	3.29	4.82	5.70	4.35	9.04	4.63	1.30	10.11	10.11
2019	4.00	4.86	4.41	4.59	9.00	3.83	1.79	6.79	6.79
2020	3.42	4.71	4.00	4.39	8.68	2.63	1.93	6.49	6.49
2021	2.62	4.14	3.60	4.06	8.62	8.19	1.58	32.69	4.47

Note: The bond coupons are calculated as the annual average of the listed bonds within the respective year and reported only for the bonds denominated in RON
Source: Based on the data available at www.bvb.ro and at www.bnro.ro

As it can be observed (and expected), bond coupons do not match BET annual returns, mainly when combined with DIVY. Of course, exceptions exists for negative return years for BET returns. On the other hand, the corporate bonds, mainly the MTS corporate bonds, are better (however riskier) investment alternatives versus bank deposits and providing a hedge against inflation. Also the government bonds offered a reasonable protection against inflation between 2011 and 2020 and, for the same period, a far better investment alternative than the bank deposits. While more in depth analyses of bond sector might reveal more interesting facts, the present paper is not dedicated to these analyses.

BVB position within the security exchanges of the former communist countries, members of the European Union (EU)

BVB position is discussed in two circumstances: the country position (frontier/emerging) combined with the country overall rank according to Global Competitiveness Reports, and the Romanian security exchange position in comparison with the 10 securities exchanges of the former communist countries, now members of EU.

Annex 5 presents the positions of 11 former communist countries (including Romania), currently EU members. These positions are allocated by three global index providers and the information is important for various groups of institutional and individual investors regarding the associated risks, the expected returns, and the diversification opportunities for their investments (for more details see Pop et al. 2016a).

As it can be observed, between 2007 (when this classification was introduced along with dedicated indices to each group of countries) and 2020, only FTSE Russell carried out upgrades within this group of former communist countries: Czechia progressed from secondary emerging to advanced emerging in 2012, Poland moved up from advanced emerging to developed status in 2020, and Romania which was promoted from frontier to secondary emerging, also in 2020. Nonetheless, the other two global index providers (MSCI Barra and Standard & Poor's) did not follow FTSE Russell upgrades since they do not have the emerging market category split in secondary and advanced emerging market and therefore the requirements and limits for any country to be upgraded as emerging are more demanding and higher. While for Romania the upgrade from

frontier to secondary emerging was considered by officials and analysts an important step ahead, it is important for BVB authorities and the supervisory authority to continue the improvements that can provide a further upgrade by FTSE Russell and upgrades by MSCI Barra and Standard & Poor's. Some analysts associated with EBRD and OECD suggest that an upgrade for Romania made by MSCI Barra might represent an important advance since the emerging indices provided by MSCI Barra are used as benchmark by an important number of passive investment funds.

One must note that Standard & Poor's, in August 2012, included Romania in the watch list for a potential upgrade from frontier to emerging; by 2014 Romania was removed from the list of countries under review. In August 2019 Romania was re-included in the watch list for a potential upgrade from frontier to emerging; in August 2020 was still on the watch list, while for August 2021 no watch list was provided.

Table 9, below, presenting the ranks offered by World Economic Forum, show that Romania has to improve not only its capital market but the entire financial system since the rankings show the country on low positions, next to last. This situation suggest a relative lack of Romanian investor sophistication which might be one of the causes for the (temporary, hopefully) closure of derivative segment at BVB.

The OECD (2021) report on Romanian financial sector support the low rank of Romania for 2019/2020 for financial development. Furthermore, the OECD (2021) report also mentions the low number of public offerings that were hosted through BVB platform and the fact that they raised the lowest amount of capital among the peer European countries. In addition, the same report (OECD, 2021) stresses the situation that less than 10% of corporate bonds issued by Romanian non-financial companies are listed at BVB. All this information is in line with the low number of Romanian active investors, indicating also several other factors for this situation, ranging from a relative small amounts of capital available for investments at the level of retail investors to a lack of confidence that still persist among these investors in relation with the financial sector, and from limited knowledge regarding the investment alternatives available to limited time allocated to investment activity. These factors also influence the investment through open-end (mutual) funds and influencing the amount of capital available via this pool of money for investing at BVB, though the number of investors in Romanian (mainly) mutual funds increase between 2000 and 2019.

Table 9. Countries' rank based on Global Competitiveness Reports data

Country	Country overall rank		Financial development rank*	
	2008/2009 134 countries	2019/2020 141 countries	2008/2009 134 countries	2019/2020 141 countries
Bulgaria	76	49	74	73
Croatia	61	63	63	63
Czechia	33	32	47	47
Estonia	32	31	28	52
Hungary	62	47	61	66
Latvia	54	41	39	85
Lithuania	44	39	56	75
Poland	53	37	68	57
Romania	68	51	60	86
Slovakia	46	42	31	56
Slovenia	42	35	46	61

Note*: Financial development rank is based on the data regarding the 8th pillar (Financial market sophistication) of Global Competitiveness Report 2008-2009 and the 9th pillar (Financial system) of Global Competitiveness Report 2019-2020
Source: Global Competitiveness Report 2008-2009 and 2019-2020 available at https://www.weforum.org/

Table 10 and 11, below, present BVB in the context of the other 10 former communist countries' security exchanges. The starting year 2008 was chosen since the majority of these countries were classified by the global index providers either in 2007 or 2008. From both perspectives, average turnover and average equity market capitalization, BVB ranks 5th. BVB lags well behind Poland, Czechia, and Hungary in both cases. The 4th place is occupied by Slovakia, in the case of average turnover, and by Croatia in the case of average market capitalization.

Based on average turnover, the financial product structure show that only four security exchanges offer the entire array of identified products: Zagreb Stock Exchange, Budapest Stock Exchange, Warsaw Stock Exchange, and BVB. While this diversification represents a positive aspect since it allow to attract a wider range of investors, BVB turnover remains dominated by equity trading (over 89%), compared with more balanced structures like in the cases of Polish, Hungarian, and Czech security markets. This information also points toward a relative lack of Romanian investor sophistication.

Table 10. Average turnover for 2008-2020 and structure based on turnover of offered financial products

Country & Security Exchange	Total turnover (EUR mil.)	% shares	% bonds	% ETFs & UCITSs	% structured prod., derivatives & other contracts	Max. turnover (EUR mil.) & year	Min. turnover (EUR mil.) & year
Bulgaria Bulgarian Stock Exchange	470	83.53	15.77	0.70	0.00	1,458 (2008)	169 (2019)
Croatia Zagreb Stock Exchange	959	67.35	32.04	0.02	0.59	4,302 (2008)	382 (2018)
Czechia Prague Stock Exchange	19,720	53.32	46.61	0.00	0.07	59,641 (2008)	4,711 (2019)
Estonia Tallinn Stock Exchange/ NASDAQ Tallinn	220	99.30	0.70	0.00	0.00	618 (2008)	127 (2014)
Hungary Budapest Stock Exchange	15,324	73.00	3.05	0.20	23.75	31,005 (2008)	7,990 (2014)
Latvia Riga Stock Exchange/ NASDAQ Riga	96	24.82	75.15	0.00	0.00	274 (2017)	32 (2010)
Lithuania Vilnius Stock Exchange/ NASDAQ Vilnius	217	66.36	33.64	0.00	0.00	499 (2008)	96 (2019)
Poland Warsaw Stock Exchange	118,426	47.39	0.58	0.06	51.97	163,253 (2011)	92,177 (2019)
Romania Bucharest Stock Exchange	2,036	89.32	6.69	0.10	3.89	2,764 (2020)	931 (2009)
Slovakia Bratislava Stock Exchange	8,441	0.96	99.04	0.00	0.00	24,343 (2008)	191 (2020)
Slovenia Ljubljana Stock Exchange	604	85.35	11.66	2.99	0.00	2,005 (2008)	279 (2019)

Source: author's calculations based on the data available at FESE & individual exchanges' websites

Since BVB main (equity) market is the dominant one from the capitalization viewpoint, this main market was compared with the other 10 former communist countries' main markets. Considering the average number of listed companies, BVB ranks 5th, the same rank as for turnover and capitalization. Though it should be mention that BVB authorities are constantly preoccupied to attract new companies for listing; their success was moderate so far but this is a long term project that might be successful in the years to come. Market capitalization percentage of GDP places BVB only on the 9th position; this suggest two things: the diversification of Romanian economy, but also that there is room for improvement in BVB market capitalization. Liquidity (calculated as the ratio between turnover and market capitalization) ranks BVB on the 4th place, at a wide lag behind Budapest Stock Exchange, Warsaw Stock Exchange, and Prague Stock Exchange. However, BVB's liquidity is higher than the liquidity of the other frontier exchanges. Nonetheless, for liquidity too there is room for improvement and an increased number of active investors might have a positive influence in this respect.

Table 11. Main market listed companies, capitalization, percentage of (market cap.) GDP, and liquidity (averages 2008-2020)

Country & Security Exchange	Listed companies	Market capitalization (EUR mil.)	Percentage of GDP (%)	Liquidity (%)
Bulgaria Bulgarian Stock Exchange	353	7,941	15.81	6.50
Croatia Zagreb Stock Exchange	187	18,076	38.35	3.50
Czechia Prague Stock Exchange	32	25,865	14.96	38.40
Estonia Tallinn Stock Exchange/ NASDAQ Tallinn	16	2,032	9.92	12.06
Hungary Budapest Stock Exchange	47	19,459	16.91	62.46
Latvia Riga Stock Exchange/ NASDAQ Riga	28	972	4.17	2.43
Lithuania Vilnius Stock Exchange/ NASDAQ Vilnius	32	3,423	9.40	4.37
Poland Warsaw Stock Exchange	780	129,950	30.92	44.75
Romania Bucharest Stock Exchange	79	15,352	9.28	12.12

Country & Security Exchange	Listed companies	Market capitalization (EUR mil.)	Percentage of GDP (%)	Liquidity (%)
Slovakia Bratislava Stock Exchange	110	3,935	5.13	2.11
Slovenia Ljubljana Stock Exchange	52	6,251	15.73	7.77

Source: author's calculations based on the data available at EUROSTAT, FESE & individual exchanges' websites

In Annex 6 are presented the main market indices annual returns for the 11 selected stock exchanges. The indices were chosen to include the largest number of constituents, when possible. The information is presented only to give a general idea regarding the respective security exchanges' performances over the period 2008-2020. Based on the index with the largest portfolio, BET-C/BET-Plus, BVB ranked 1st in 2019 and 2nd in 2013. BVB index registered the poorest return in 2008 under the influence of the financial crisis and the second poor performance in 2011 under the influence of European sovereign crisis, though Romania sovereign position suffered no changes.

All the information presented in this section is in line with the idea expressed by OECD (2021) considering that the level of development of the Romanian security market, despite all improvements, is still lagging behind regional countries like Czechia and Hungary.

Discussions and conclusions

Over the past 25 years, celebrated on November 20, 1995 since the re-establishment, BVB have gone through a development process which allowed the upgrade to the secondary emergent market status, an important achievement, as highlighted by OECD (2021), increasing BVB's visibility and opening the gates toward a wider range of (international) investors.

On the long road it traveled, BVB came from an inefficient market (between November 1997 and December 1999) to one that diminished the level of inefficiency by 2000 (Harrison & Paton, 2004). The level of BVB efficiency and its trends were improved as specified by Dragota & Oprea (2014).

On the other hand, BVB had to deal with low trading volumes, low liquidity (which still persists), and low capitalization for almost two decades. The study of Bayraktar (2014) included Romania in the category

called low capitalization/low effort for improving capitalization; nonetheless, the author also consider this category to have more room for the development of the respective security market. The assumption, in Romania's case, was correct. As Table 6 showed, BVB capitalization increased constantly since 2015 and reached its pick one year after Romania was upgraded to the status of secondary emerging market.

Also during these 25 years BVB had to face problems related to a high level of bureaucracy which did not encouraged the presence of (foreign) institutional investors, combined with complicated taxation procedures, as specified by Stefanova (2014). Furthermore, BVB had to struggle with a relatively indifferent, at best, to unfriendly political environment which did not understand the important role a security market plays within an economy. Among the most recent such attitudes one can mentions the constant reluctance of Romanian government of 2017-2019 to allow new Treasury bond listings at BVB. In addition, in December 2018, a Government Order regarding the taxation of Romanian banks assets generated a sharp decrease in BET (-11.21%) in a single day, on December 19, 2018. This decline was over-passed only by the drop in BET during the financial crisis (-12.29% on January 7, 2009). While much can be said regarding these problems, a direct observation shows that the relationship between the Romanian government members and BVB depends on their political orientation.

BVB provides liquidity for the domestic investors through its trading platform and allowed to numerous shareholders to liquidate their investments as the decrease in shareholders number shows (Table 5). The importance of BVB is further given by a very strong home bias as shown by Hu (2020) combined with the low number of active investors at BVB (under 100,000, see Table 4). According to Hu (2020), the home bias (HB) index for Romania is 0.998, almost close to 1 which means almost full home bias. The same study indicates strong home bias for Poland (HB index = 0.939) and for Slovenia (HB index = 0.809), while for Hungary the HB index is 0.418 showing a moderate home bias[6] (Hu, 2020). Based on the study of Hu (2020), the average HB index for 12 developed EU countries[7]

[6] No other former communist country, no member of EU, was included in the sample of the study. For more details see Hu (2020), Table A1, page 16.

[7] The countries from Hu (2020), Table A1, considered for this average were: Austria, Belgium, Denmark, Finland, Germany, Greece, Ireland, Italy, Netherlands, Portugal, Spain, and Sweden.

is 0.341. With such a strong home bias, BVB functioning is paramount in ensuring a trading platform for the domestic investors, though they low number have an impact on BVB's liquidity.

Considering BVB's role in assisting the local companies and government institutions to raise capital, there are mixed results. As OECD (2021) report shows, the number of public offerings made by corporations through BVB platform was relatively low and raised among the lowest amount of capital compared to EU peer countries. OECD (2021) reports also notes that among the 5 largest public offerings hosted by BVB between 2000 and 2019, 4 were made by state-owned companies from utility and energy sectors. Furthermore, the same report (OECD, 2021) specifies that only a small fraction of the bonds issued by non-financial Romanian companies (about 8%) are listed through BVB; the majority of these bonds are listed mainly in Luxembourg. Moreover, while between 2003 and 2011 BVB platform was used by various municipalities to raise money for their public projects (a cumulated estimated value of EUR million 115, based on the data available at www.bvb.ro), this activity abruptly stopped in 2012 for a range of reasons8: the influence of sovereign crisis in several European countries, changes in regulatory framework, the absence of credit enhancements, and the relative lack of popularity of municipal bonds instruments among individual investors. All the information above show that BVB has still room to grow via attracting new active (retail) domestic investors, an activity which might increase BVB's capacity to respond quickly and adequately to the financial requirements of issuers. In order to address this situation, BVB started, since 2015, more visible campaigns promoting various publications (various guides for investors and issuers), but also other publications discussing the experience of various investors when they start investing at BVB.

On the other hand, BVB has a positive image when considering the MiFID I and MiFID II implementation, as shown by OECD (2021) and Petry (2020).

Pop (2011) and Pop (2015) discussed the problems BVB might face by not being part of a security exchange alliance and the potential challenge represented by the CEESEG (Central and Eastern European Stock Exchange Group) which included the security exchanges from Vienna, Prague, Budapest, and Ljubljana. However, by the end of 2015 this group started to break down: Budapest Stock Exchange was took over by Hungarian National Bank and removed the exchange from CEESEG (suggesting a clear example of security exchange representing a source of

national pride). Further, during 2016, Zagreb Stock Exchange (Croatia) took over Ljubljana Stock Exchange (Slovenia) and also removed the security exchange from CEESEG. By the end of 2016 CEESEG (created in 2010) included only Vienna Stock Exchange and Prague Stock Exchange. CEESEG merged in 2020 with Vienna Stock Exchange, as the press release of Vienna institution show (https://www.wienerborse.at/en/news/ vienna-stock-exchange-news/vienna-stock-exchange-to-simplify-group-structure/).

While an important challenge (CEESEG) has been removed from BVB's path and MiFID I and II rather favor the market fragmentation, with various trading platforms in order to host competition, the road ahead BVB will continue to be difficult despite reaching the secondary emerging market status within FTSE Russell classification. As shown above, the upgrade in classification for Romania (and BVB) did not bring the expected increase in number of foreign investors, at least at 2020 level, as Tables 5 display. Though, the upgrade had the reverse effect, that of an increase in number of active domestic investors (Table 5), which might be considered a positive evolution. However, it is not clear if this increase was generated by the re-classification as a secondary emerging market or by the changes in behavior triggered by SARS-CoV-2 pandemic. It remains to be seen what the future will bring, considering the threat of the war that might be initiated by Russian president Putin against Ukraine.

BVB has to improve further in order to be upgraded as an emerging market by the other two global index providers, MSCI Barra and Standard & Poor's. The difficult path ahead is confirmed by the position held by BVB compared mainly with the security exchanges from Poland, Czech Republic (from viewpoint of capitalization and liquidity), and from Hungary (mainly liquidity), a lagging position also highlighted by OECD (2021) report. Furthermore, BVB has not a functioning derivative segment, and while the structured products segment (including certificates and warrants) might provide to some extent a hedging alternative, these products are mainly speculative. Hence, BVB has to deal with further internal diversification and constant development.

Nonetheless, the challenges BVB has to face come mainly from outside. First, FSA declared in October 2019 that the fundamental objective of the STEAM project was reached since FTSE Russell declared that BVB (Romania) will become a secondary emerging market starting with September 2020. While FSA continues to promise support for the further development toward the full status of an emerging market, the declaration

regarding the fundamental objective is a bit worrying and one can only hope that the promised support will not be relinquished. Second, the financial sector overall development is not at the level to become a strong pillar in supporting BVB further evolution, at least on short-term horizon. OECD (2021) report highlight the preference of the non-financial corporation sector from Romania toward seeking financing alternatives (mainly through bonds) on foreign markets. This situation relates to the third challenge represented by the domestic investors investment power and culture, and domestic companies' and government institutions' culture in using BVB as a source for the needed capital. Last, but not least, BVB has to struggle with the political aspects whenever changes in government take place (a little bit too often) combined with the lack of interest, and frequently with the lack of appropriate knowledge, of government members regarding the role BVB plays within Romanian economy.

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Annexes

Annex 1. BVB trading systems – main developments

1995	**November 20th**: The trading system STEA was implemented. The clearing and settlement system was integrated within STEA. The settlement period was T+5 days.
1996	**October**: The clearing and trading system Equator was launched, integrated with the trading system STEA.
1997	The cross transactions are introduced in order to speed up the tradings for the listed companies from the Mass Privatization Program.
1998	Direct custody services are introduced.
1999	The implementation of the trading system HORIZON™ The settlement period was reduced at T+3 days. Trading blocks are introduced: 100 or any multiples of 100 for regular lots and the odd lots for less than 100. Several exceptions existed of 10 or 1 for regular lots based on the individual price of the shares.
2001	ARENA trading system is used for bond transactions
2003	ARENA trading system replaces completely the HORIZON system.
2006	The possibility to use margin accounts was introduced for investors
2009	The trading blocks within the regulated markets were increased at 500 or any multiple of 500 for the majority of the traded shares for regular lots. Exceptions were allowed and lots of 100, 10 and 1 were accepted as regular lots for the shares with high individual prices.
2011	**January 25th**: short selling operations became available for Fondul Proprietatea. (As of December 2015, 20 securities can be sold short at BVB: 16 shares and 4 municipal bonds: http://www.bvb.ro/FinancialInstruments/SelectedData/AllowedShortSellSecurities)
2014	The separation between the trading platform and post trading platform is implemented. **December:** the odd lot orders are eliminated. Any volume is accepted for all the traded securities on the regulated market. The settlement period decreases at T+2 days.
2015	**April:** the launch of Arena XT Web as the web version of BVB trading platform. **July:** changes were introduced in market making program in order to enhance the trading activity; one intermediary can either be a *classic market maker* or a *super market maker* for a given share, bond or fund unit. **July:** trade settlement on a gross basis was introduced, having the following settlement periods: T+0, T+1, and T+2; this mechanism complements the existing one offering trade settlement on net basis in T+2. **October:** the launch of BVB Trading application (app); this app offers online access to BVB trading platform Arena XT. **October:** a new special section dedicated to Deal transactions was introduced within the daily trading schedule.
2016	**May:** improvement in short selling and buying on margin operations were introduced in order to increase liquidity. **August:** a new regulatory framework for short selling and buying on margin operations was implemented. **November:** a new version of Arena XT Web was launched.

2019	**December:** the mechanism for volatility interruption was introduced for the constituents of BET index and BET-FI index; this new mechanism replaces the old one (based on the extensions of price variation limits). This new mechanism for volatility interruption is in line with the introduction of MiFID II guidelines.

Source: Author's compilation based on the information available at: http://www.bvb.ro/AboutUs/Publications, http://www.bvb.ro/AboutUs/MediaCenter/PressReleases

Annex 2. Data regarding BVB Financial Group and BVB shareholder structure

Annex 2a: BVB Financial Group structure

Group's companies	**Percent of the shares owned by BVB**				
	Dec.2006	Dec.2007	June 2013	Dec.2015	Dec.2020
Central Depository	53.49%	54.51%	69.00%	69.04%	69.04%
Bucharest Clearing House currently *CCP.Ro Bucharest*	5.81%	50.90%	52.50%	52.51%	59.52%
The Institute for Corporate Governance	100.00%	100.00%	100.00%	100.00%	100.00%
Investors Compensation Fund	56.92%	56.92%	62.30%	62.45%	63.00%

Note: The former Bucharest Clearing House became CCP.Ro and in July 2020, CCP.RO signed a partnership with CC&G (Cassa de Compensazione & Garanta), one of the leading companies in post trading services within London Exchange Group.
Sources: Annual reports for 2006, 2007, 2015, and 2020; for 2013: https://www.bvb.ro/info/2013_07_24_bvb_ir_presentation_en.pdf

Annex 2b. BVB shareholder structure

Percentage of total capital	**2006**	**2010**	**2015**	**2020**
Total legal person shareholders	99.85%	87.82%	86.66%	*78.10%
of which nonresident legal persons	n/a	13.10%	14.23%	5.25%
Total individual shareholders	0.15%	12.18%	13.34%	21.90%
of which Nonresident individuals	0.00%	0.17%	0.56%	1.94%

Note *: The figure includes the percentage of 0.68% which represents the own shares held by BVB.
Sources: Annual reports for 2006, 2010, 2015, and 2020 available at www.bvb.ro

Annex 3: BVB main market equity indices

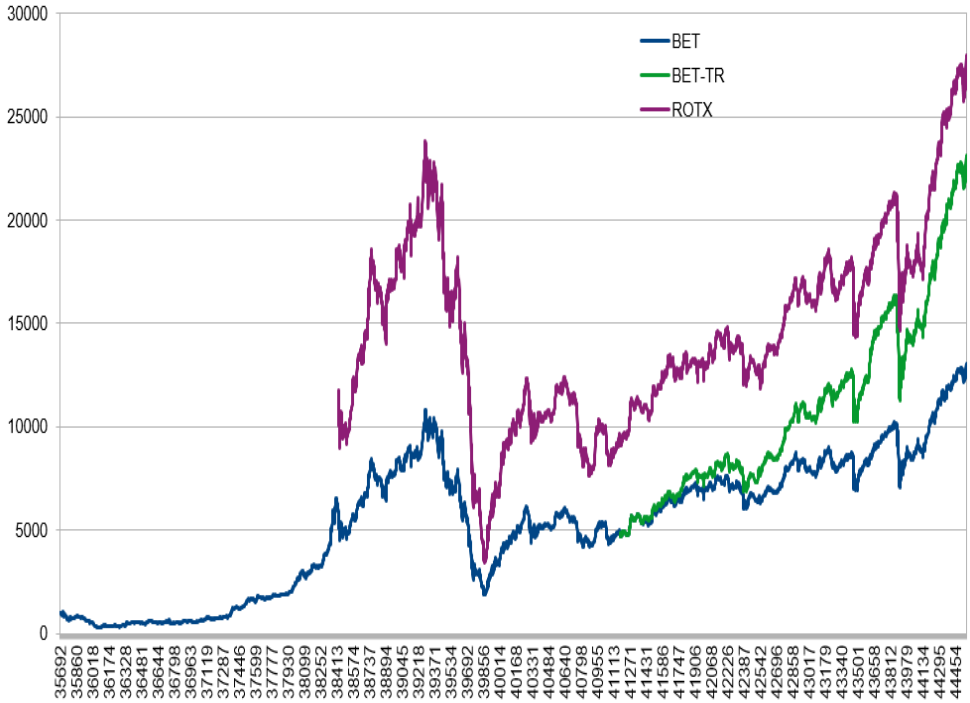
Symbol	Complete name	Launch date	Base/ Start value (points)	No. of constituents	Maximum weight/ constituent	Weighting	Type of index	Other information
BET [1)]	Bucharest Exchange Trading	September 19, 1997	1,000	Initial: 10 Since Oct. 2016: variable between 10 and 15 Since Aug 2018: variable, between 10 and 20 (as of Dec.2020: 17 constituents)	20%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	Does not include SIFs Main criterion: constituents' liquidity Extra criteria: constituents' transparency and quality of reporting
BET-C	Bucharest Exchange Trading Composite	April 16, 1998 *Discontinued June 20, 2014*	1,000	all BVB traded companies except SIFs and foreign companies	20%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	**Replaced by BET Plus**
BET Plus	Bucharest Exchange Trading Plus	June 23, 2014	1,000	variable (as of Dec.2020, 42 constituents) does not include the SIFs and foreign companies	20%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	Conditions for the constituents: : minimum liquidity coefficient 0.0002 : minimum free-float market capitalization: EUR 1 mn
BET-FI	Bucharest Exchange Trading – Investment Funds	October 31, 2000	1,000	variable (as of Dec.2020, 6 constituents)	30%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	The first sector index. Tracks the performance of the (closed-end) investment funds
BET-XT	Bucharest Exchange Trading Extended	July 1, 2008	1,000 starts January 2, 2007	Initial: 25 Since Sept 2021: 30 (includes the SIFs)	15%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	Tracks the performance of the most traded 30 domestic listed companies, including SIFs
BET-NG	Bucharest Exchange Trading Energy & Related Utilities	July1, 2008	1,000 starts January 2, 2007	variable (as of Dec.2020, 10 constituents)	30%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	The second sector index

Symbol	Complete name	Launch date	Base/ Start value (points)	No. of constituents	Maximum weight/ constituent	Weighting	Type of index	Other information
BET-BK	Bucharest Exchange Trading Benchmark	July 3, 2012	1,000 starts September 18, 2009	Initial: 25 Since Sept 2021: 30	10%	Free-float market capitalization weighting	Price index (not adjusted for dividends)	Designed to be used as benchmark by domestic asset managers and other institutional investors.[2)]
BET-TR	Bucharest Exchange Trading Total Return	September 22, 2014	4,910.39 starts September 21, 2012	the same constituents as BET	20%	Free-float market capitalization weighting	Total return (adjusted for dividends and similar cash distributions before tax)	The first total return index
BET-XT-TR	Bucharest Exchange Trading Extended Total Return	March 23, 2015	486.44 starts December 28, 2012	the same constituents as BET-XT	15%	Free-float market capitalization weighting	Total return (adjusted for dividends and similar cash distributions before tax)	The second total return index
ROTX	Romanian Traded Index	March 15, 2005	1,000 starts January 1, 2002	Initial: 15 Currently: variable (as of Dec.2020, 8 constituents)*	20%	Capitalization weighting	Price index (not adjusted for dividends)	The constituents are Romanian blue chip stocks. Calculated and disseminated by Vienna Stock Exchange.

Note 1): Considered to be the reference index for the Romanian capital market
http://www.bvb.ro/FinancialInstruments/Indices/Overview
Note 2): The calculation of BET-BK reflects the legal requirements and the investment limits applying to domestic investment funds; fully UCITS compliant index; http://www.bvb.ro/info/indices/2015/2015.06.30%20-%20BET-BK%20Factsheet.pdf
Source: Author's compilation based on http://www.bvb.ro/FinancialInstruments/Indices/Overview and the respective indices fact-sheets available within the aforementioned link.

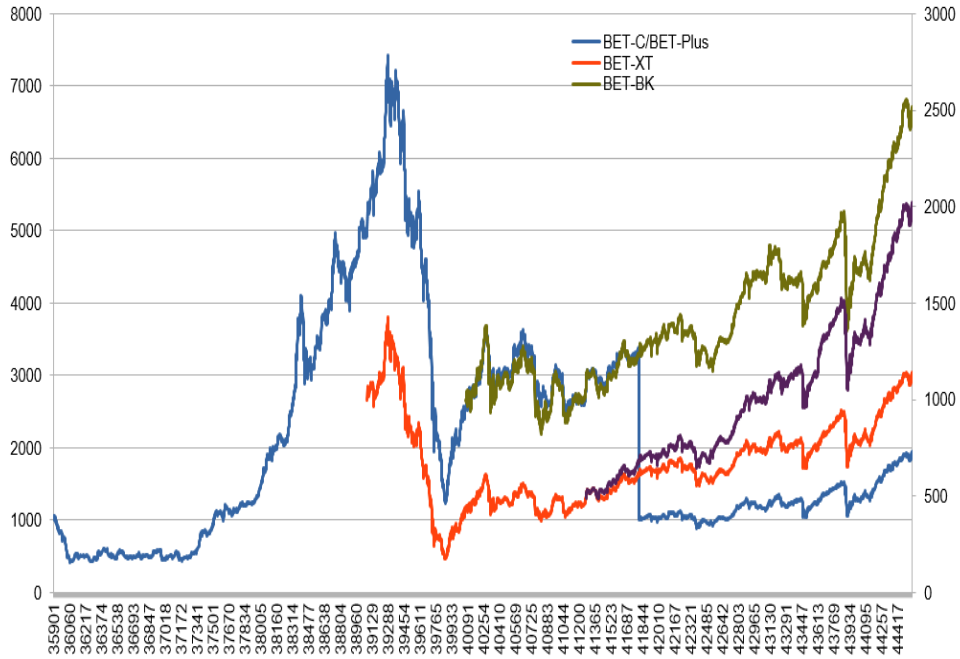
Annex 4. Graphs describing BVB indices evolution

Annex 4a. Graph for BET, BET-TR, and ROTX



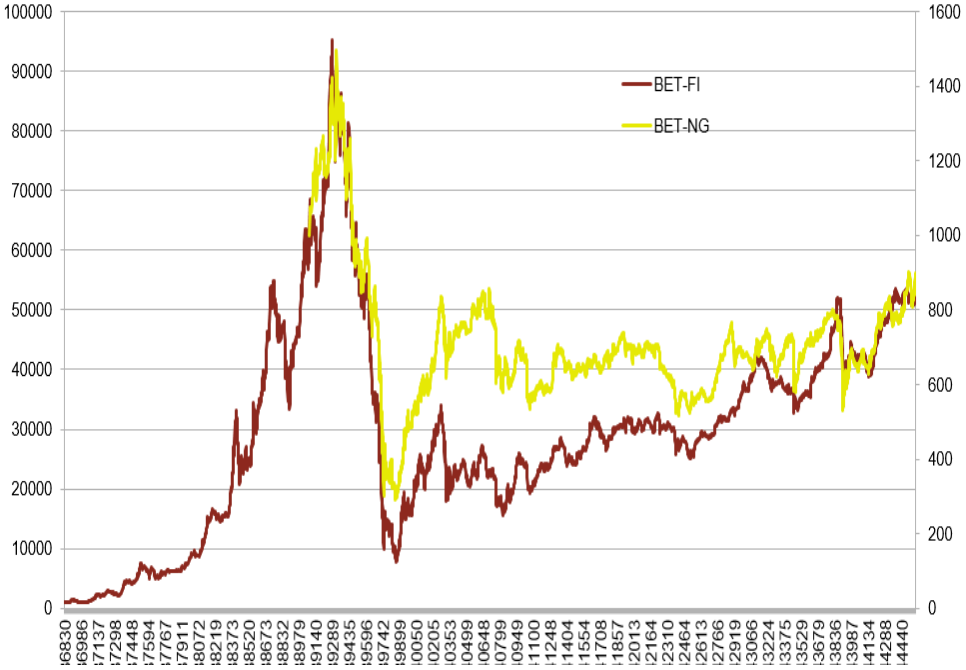
(Source: Author's compilation based on www.bvb.ro data)

Annex 4b. Graph for BET-C/BET-Plus, BET-BK, BET-XT, and BET-XT-TR
(Note: BET-C/BET-Plus is on the main Y axis; the other 3
indices are on the secondary Y axis)



(Source: Author's compilation based on www.bvb.ro data)

Annex 4b. Graph for BET-FI and BET-NG



(Note: BET-NG is on the secondary Y axis;
Source: Author's compilation based on www.bvb.ro data)

Annex 5. Country classification according to global index providers

FTSE Russell country classification						
Country	**Sept.2007**	**Sept.2008**	**Sept.2012**	**Sept.2017**	**Sept.2020**	**Sept.2021**
Bulgaria	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
Croatia	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
Czechia	Secondary Emerging	Secondary Emerging	Advanced Emerging	Advanced Emerging	Advanced Emerging	Advanced Emerging
Estonia	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
Hungary	Advanced Emerging (effective from June 2008)	Advanced Emerging	Advanced Emerging	Advanced Emerging	Advanced Emerging	Advanced Emerging
Latvia	n/a	n/a	n/a	Frontier	Frontier	Frontier
Lithuania	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
Poland	Advanced Emerging (effective from June 2008)	Advanced Emerging	Advanced Emerging	Advanced Emerging	Developed	Developed
Romania	n/a	Frontier	Frontier	Frontier	Secondary Emerging	Secondary Emerging
Slovakia	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
Slovenia	n/a	Frontier	Frontier	Frontier	Frontier	Frontier
MSCI Barra country classification						
Country	**2007**	**2009**	**2012**	**2017**	**2019**	**2021**
Bulgaria	Frontier	Frontier	Frontier	Frontier	Standalone	Standalone
Croatia	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Czechia	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Estonia	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Hungary	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Latvia	n/a	n/a	n/a	n/a	n/a	n/a
Lithuania	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Poland	Emerging	Emerging	Emerging	Emerging	Emerging	Emerging
Romania	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Slovakia	n/a	n/a	n/a	n/a	n/a	n/a
Slovenia	Frontier	Frontier	Frontier	Frontier	Frontier	Frontier
Standard & Poor's country classification						
Country	**2007**	**2009**	**2014**	**2018**	**2020**	**2021**
Bulgaria	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Croatia	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Czechia	n/a	n/a	Emerging	Emerging	Emerging	Emerging
Estonia	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Hungary	n/a	n/a	Emerging	Emerging	Emerging	Emerging
Latvia	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Lithuania	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Poland	n/a	n/a	Emerging	Emerging	Emerging	Emerging
Romania	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Slovakia	n/a	n/a	Frontier	Frontier	Frontier	Frontier
Slovenia	n/a	n/a	Frontier	Frontier	Frontier	Frontier

Sources: Author's compilation based on the information available on FTSE Russel, MSCI Barra and Standard & Poor's websites

Annex 6. Main market indices annual returns (%) for 2008-2020

Country & index	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	Average
Bulgaria SOFIX	-79.71	19.13	-15.19	-11.11	7.25	42.28	12.33	-16.52	27.24	15.52	-12.25	-4.43	-21.23	**-2.82**
Croatia CROBEX	-67.13	16.36	5.33	-17.56	0.01	3.10	-2.72	-3.18	18.04	-7.62	-5.10	15.36	-13.79	**-4.53**
Czechia PX-Glob	-51.67	27.82	8.99	-24.02	11.66	-4.34	-4.49	4.83	-3.43	20.99	-7.42	11.61	-6.05	**-1.19**
Estonia OMX Tallinn	-62.98	47.21	72.62	-23.94	38.22	11.38	-7.53	18.89	19.63	15.49	-6.38	10.05	5.00	**10.59**
Hungary BUX	-53.34	73.40	0.47	-20.41	7.06	2.15	-10.40	43.81	33.79	23.04	-0.61	17.74	-8.63	**8.31**
Latvia OMX Riga	-54.43	2.82	41.08	-5.68	6.67	16.22	-10.89	44.96	23.46	35.76	-6.74	11.53	9.67	**8.80**
Lithuania OMX Vilnius	-65.14	46.04	56.49	-27.06	18.84	18.73	7.32	7.41	14.92	16.97	-5.57	15.44	14.67	**9.16**
Poland WIG	-51.07	46.85	18.77	-20.83	26.24	8.06	0.26	-9.62	11.38	23.17	-9.50	0.25	-1.40	**3.27**
Romania BET-C/Plus	-70.34	37.31	14.60	-15.74	6.28	20.04	-6.11	-1.26	1.74	10.72	-4.77	34.26	-1.70	**-2.89**
Slovakia SAX	-19.40	-25.67	-13.71	-6.48	-10.79	2.89	12.42	31.50	8.97	2.21	2.07	5.65	-1.71	**-0.93**
Slovenia SIB TOP	-60.43	15.03	-13.47	-30.67	7.79	3.17	19.59	-11.22	3.08	12.39	-0.18	15.03	-2.78	**-3.28**

Source: Author's calculations based on the data available on FESE & individual exchanges' websites