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Research Funding Policies and Opportunities in EU Countries in the Context of New Development Opportunities

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ABSTRACT
In the context of the development of research infrastructures, necessary for the solution of economic and social challenges in the countries of the European Union, and at the global level. The branch of research is an important part of the economic cycle, and they are valued as strategic, innovation investments that contribute to national and global competitiveness. An important problem of cricketing is the transfer of knowledge/technologies in the innovation ecosystem, the adoption of innovative ideas coming from research, by SME. It is important to be able to develop and implement new research infrastructure financing principles for EU countries. In this article, we propose to carry out a comparative analysis of research funding mechanisms in the EU countries and other experiences from the USA, Japan, China, in order to be able to identify new solutions and mechanisms for funding and making research strategies, policies and management more efficient in Romania. By correlating research - development, innovation policies with funding and investment policies in the short, medium and long term, we will succeed in building a viable and functional model of scientific research in different fields of development in Romania and for EU partner countries and other partner countries.

Key words Research funding policies, research infrastructures, innovation policies, research strategies

1. Introduction

The funding for research and development activities, which are available for the 2021-2027 programming period, in the form of non-reimbursable funds, or through other financial instruments made available to beneficiaries, show us a significant openness of European and local authorities to the research sector-development-innovation in Romania, given that the level is much higher than the previous financial allocations. Respectively, a different approach compared to the one until now, with the emphasis on stimulating the private environment, of small and medium enterprises, for involvement in such activities (Burlacu, Lădaru et al., 2022). The most important source of funding in this field is represented by the Intelligent Growth, Digitization and Financial Instruments Operational Program, which targets aspects of research-development-innovation-digitalization in different forms. In addition, comes the Regional Operational Program (POR), valid for the programming period. Considering the decentralization process, this process allows the elaboration of operational programs, for each development region, with

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funding components, from research-development-innovation-digitalization, for boosting local, regional ecosystems of profile, and public-private partnerships in different fields of activity (Burlacu, Ciobanu et al., 2021). To these funding sources, priority aspects from the National Recovery and Resilience Program are added, which includes a wide spectrum of funding directions, with the objective of boosting the research-development-innovation sector, to encourage the development of profile projects, and to facilitate participation to European partnerships in the respective directions. We would like to mention that SMEs are the main beneficiaries of these sources of financing from the directions drawn up to now within the mentioned operational programs, in the form sent by the Romanian authorities for approval to the European Commission, a paradigm shift can be observed - if in in the past the emphasis was on encouraging the professional academic environment and fundamental research, now the focus is on applied research and on driving and encouraging the private environment, especially small and medium-sized enterprises (SMEs), for an active participation in research endeavors -development-innovation-digitalization and to incorporate innovation in developing new products or processes and bringing them to market (Radulescu et al., 2021).

2. Analysis of the bibliographic sources of the studied topic

Bao et al. (2020) believes that blockchain technology has the technical characteristics of data traceability and unfalsifiable information and would have a pioneering importance in increasing the convenience of financing activities and reducing financing costs. Research on related blockchain technology and online finance provides a new benchmark (Burlacu, Profiroiu et al., 2019). Research funding inequality is an important issue, in which measuring inequality is the basis (Dengsheng, et al., 2018). According to the specialized literature, in which we find research that finances inequality with the help of providing general values of inequality, very rarely explored the respective subject through the internal structure of general inequality (Jianu et al., 2019). In the present paper, a three-stage nested index is used to decompose overall research funding inequality within and across components.

According to the information of the National Natural Science Foundation in China, between the years 2013-2017, at the researcher level, some empirical data is collected individually, which indicates that the global funding index in China is 1.97 (equal to 0.87 in Gini index), value higher than that of the USA, but lower than that of Japan. The results of the research funding inequality decomposition indicate that inequality within institutions dominates and contributes 80.0% to overall inequality. In addition "Universities" contribute more than. In that paper, we have the construction of the institutional framework, of the hierarchical structure based on the university-institute subgroup, in China. The authors used the Theil decomposition method, which appears in three stages, to investigate research funding in China. In that paper, we have the construction of the institutional framework, of the fundamental hierarchical structure in the university-institute subgroup, in China. The authors used the Theil decomposition method which appears in three stages to investigate research funding in China.

The availability of information from the NSFC is very useful and exploited for research funding in China. Information from the NSFC is useful and used to describe China's research sector.

Therefore, results are presented through three aspects.

The first aspect shows us that the general inequalities in the financing of the research sector in China is at a high level. Compared to the US and Japan, China's R&D inequality is higher than the US, but still lower than Japan.

Although the policies promoted and the mechanisms implemented during several years regarding the limitation of applications, the results are still modest (Bodislav, Radulescu et al., 2020). Those results are due to the relatively late start of R&D funding, the existing imbalance in the performance-based R&D funding system, and the uneven distribution among researchers, eminent scientists in different Chinese institutions. The over-concentration of R&D sector funding has also generated many negative effects. Current application capping policies implemented to restrict applicants should be strengthened. Second, the decomposition of the overall inequality structure showed that 80.0% of the overall inequality is due to inequality in research institutions, and the remaining 20.0% of inequality is related to disparities in the allocation of research funding between research institutions. This situation indicates that research funding inequalities between individual researchers play the dominant role, and the contribution of inequalities between different types of R&D institutions is small (Florescu & Burlacu, 2021). These situations suggest that when severe restrictions are applied, applicants should pay more attention to the characters of individuals, for example, such as gender difference, age, academic title, number of publications, etc., rather than the types of host institutions. Third, the evaluation of structural disparities in the allocation of research funding between subgroups of the same level of the structure is welcome from a hierarchical point of view. "Institutes" contribute to inequality, and "world-class universities" contribute the most, among the six groups of the In-B component.

The existence of inequalities in the funding of the research and development sector has attracted a lot of attention from researchers and policy makers. Measuring inequality, knowing its inherent features, are of great importance for the creation of effective policies regarding. The existence of certain structural disparities is partly based on historical reasons, and in the short term it could be more difficult to avoid them in China. A good part of the bibliography of the field offers general inequality, the authors investigate inequality through internal structure, by introducing the Theil decomposition method, being in three stages, from the measurement of income inequality in the economy. We set out to show, as a large-scale, implementation of the additive decomposition character. Based on this merit, the general inequality can be decomposed between and within the components. In this way, the internal structure of inequality is explored, combined with the hierarchical framework, and the structural disparities of subgroups are compared. To reduce measurement biases, the individual researcher is selected as the unit of analysis, thus redefining the concept. Unlike studies that treat beneficiaries or the entire faculty as researchers in an institution, in that paper researchers are defined as those with specific academic titles who are involved in the application of projects, either as participants. The statistics reflect that neglecting non-beneficiaries causes bias in overall inequality. When all defined researchers are counted in the population, overall inequality is 1.97, while inequality is 0.64 if unspecified researchers are neglected. Therefore, more accurate picture of national inequality at a more granular level in China is emerging. This article discusses and analyzes the financing process of the innovative scientific processes that take place in parallel with the innovation processes. Increasing collaborations and joint research between university and industry, author (Intarakumnerd & Charumilin, 2013) argue: "Similar to criticisms of the Bayh-Dole Act in the US, regarding the rate of innovation and the quality of university research (e.g. Mowery et al., 2004; Mowery and Ziedonis, 2002; Walsh et al., 2003), scholars such as Odagiri and Kato (1997) argue that Japanese university professors already had extensive collaboration with industry, albeit personal and informal. Even before the act, Japanese university research had contributed to commercial innovation, especially in the life sciences (Sakakibara, 2007)". Certain political decision-making factors, Kitami approves this argument, he considers that the new laws have made it easier for teachers without industry contacts to begin their engagement with assistance from personal communication. Through TLO work, research results can reach many more firms than previous one-on-one personal collaboration, but the scale of research projects can be larger. Since universities became legal entities and owners of intellectual property, they have become much more active in "formal" research, in collaboration with industry. The amount of funds received from the industry has increased in the last five years from ¥50,123 million in 2005 to ¥57,988 million in 2010 (Satomi, 2012). The number of joint and commissioned research projects has steadily increased. Evidence on the 'funding gap' for research and development is reviewed (Working Paper No. E01-311, 2002). It is necessary to mention the emphasis on financial market reasons, considering the underinvestment in the field of research and development, considering the non-existent vision and knowledge in the field of the performance of the research and development sector, its role and the general vision of managers, experts in the sector financial markets (Orzan et al., 2020). The authors' conclusions are important: 1) small firms and innovative new firms, have a wealth of experience, capital costs are partially due to the presence of risk capital; 2) the evidence of the high costs of research and development capital for large firms is mixed, the respective firms prefer internal funds to be able to finance these investments; 3) the existing limits of venture capital as solutions for financing the gap, especially in countries where they are public stock markets are not very developed; and 4) the study of initial government capital, subsidy programs, using quasi-experimental methods is warranted. Japan, submitted (Intarakumnerd & Charumilin, 2013), considerable efforts to Stimulating innovation, after economic power declined in the 1990s. Many laws, policy initiatives were introduced during that period, especially to encourage interaction between universities/research institutes and industry. As a result of joint efforts, although the number of researchers between universities and industry has increased, the licensing revenues, owned by universities, the patents that fluctuate from year to year, the number of spin-offs, startups from universities have been growing, and reached 1000 in 2004, as planned. Japan's experience of the last twenty years demonstrates our strengths and weaknesses, and we can learn important lessons for us. Performance-Based Research Funding (PBRF), (Zacharewicz, et al., 2019). The allocation of institutional funding based on ex post evaluations of university research performance has been implemented in a large number of EU member states. However, the characteristics of this funding scheme differ greatly. In addition to differences in funding volume, there are major variations in the assessments that feed into the funding allocation formula. Even within the two main groups of metrics-based and peer-reviewed assessments, the approaches taken vary. Some of the main strengths and weaknesses of the various options are discussed in this article. Méndez-Morales and Yanes-Guerra (2021), analyzed the importance of financial markets, and the impact on the share of private R&D expenditures in OECD countries between 2000 and 2016. The authors used the effects model approach random for understanding the types of financial sources (banks, bonds and precious metals markets) that are related to private R&D activity in these countries. The authors investigated the relationship between the specialization of the financial market and the research and development activity, in order to understand what type of financial system is suitable in supporting the expenses in the field of research and development, i.e. the typical approach in the specialized literature, but to understand whether a mixed arrangement of these.

The systems can support the financing of innovation in a more effective and efficient way. We found that macroeconomic stability is fundamental for private R&D activity within countries; increases in variables such as the exchange rate index and inflation. It negatively affects the proportion of private spending on research and development. We find evidence that bond markets negatively affect the share of spending invested by private companies in the OECD, perhaps because of their short-term nature. At the same time, we find no evidence linking the bank's activity to investments in research and development; however, we find that bank concentration is related to a higher proportion of private R&D spending, we can attribute that result to the fact that we have a diversity of countries at different stages of development in the research sample. More research is needed to fully understand this result. Stock market volume appears to be closely related to aggregate R&D spending. The respective result is logical, considering the fact that the markets have a long-term nature and with multiple risks, we can say that this type of funding source seems to be suitable for supporting research activity, compared to banks or other financial instruments such as the obligations.

The development of the path of national innovation systems refers to private research and development expenditures; countries continue their long-term investment traditions, respectively as shown by the results of the full-time researcher employment variable. Therefore, a critical message for underdeveloped countries is that the investment path must start at some point; this path could be supported by public policies that privilege researchers. Respective, a critical message for countries with a more correct level of development, It is that they must start on the path of attracting investments in all investment times, who recruit to private industry, which in the long run will generate its own acceleration of private R&D spending. We include a new approach to research where a mixed or specialized arrangement of financial systems is better to support private R&D investment, for this purpose.

3. Evolution of the situation regarding the financing of research and development in EU

3.1. Evolution of the situation in EU countries

R&D spending at 2.3% of GDP in 2020. In 2020, EU Member States spent around €311 billion on research and development (R&D). This is a decrease of EUR 1 billion compared to 2019 (EUR 312 billion). R&D intensity, meaning R&D spending as a percentage of GDP, was 2.3% in 2020, up from 2.2% in 2019. However, this small increase is due to a decline in GDP- as a result of the COVID-19 pandemic. Ten years earlier (2010), R&D intensity was 2.0%. Research and development is a major driver of innovation, and R&D spending and intensity are two of the key indicators used to monitor the resources devoted to science and technology worldwide. The business enterprise sector continues to be the main sector where R&D expenditure was spent, accounting for 66% of total R&D paid in 2020, being followed by the university education sector with (22%), the Government sector with (12%) and followed by the private non-profit sector (1%; data may not add up to 100% due to rounding). This information comes from data on research and development expenditure published today by Eurostat.

The highest research and development intensity, at 3.5%, was recorded in Belgium and Sweden. In 2020, the highest R&D intensity was recorded in Belgium and Sweden (3.5% of GDP), followed by Austria (3.2%) and Germany (3.1%). At the opposite end of the scale, six Member States registered an R&D intensity below 1% of GDP: Romania (0.5%), Malta and Latvia (both 0.7%), Cyprus, Bulgaria and Slovakia (all 0 .9%). The government allocates 2.81 billion lei to the field of Fundamental Research and Development Research, according to the draft budget for 2023 published this week by the Ministry of Finance and announced as approved a short time ago by the Executive. The amount that he proposes to be allocated to the research field, through the Ministry of Research, Innovation and Digitization, is a considerable increase compared to the execution for the current year, preliminarily estimated at 1.7 billion lei, but it represents only 0.18% of the GDP, compared to an allocation of 0.17% for the year 2022, given that for the year 2023 the research budget is double. In the budget allocated in 2023 for MCID - the field of Fundamental Research Development Research in 2023 is 2,811,488,000 lei, almost double the achievements reported for 2021 (1.59 billion lei) and well above the execution for 2022 (1.73 billion lei), reported in the same document. The reported for 2022-2023 is therefore 62.35%. But this year's allocation is similar, as a percentage of GDP, to last year's, remaining below the threshold of 0.2% (0.18%).

Table 1. Gross domestic expenditure on research and development, by performance sector and source of funds 2012 – 2020

		2012	**2014**	**2016**	**2018**	**2020**
Austria	Euro, Millions	9287.84	10275.18	11145.02	11912	12199.02
Belgium	Euro, Millions	8809.188	9551.244	10852.674	13158.259	15425.429
Estonia	Euro, Millions	380.695	286.736	270.34	365.64	480.89

Finland	Euro, Millions	6831.888	6512.1	5926.1	6437.7	6932.7
France	Euro, Millions	46519.04	48926.86	49650.923	51913.8	54230.72
Germany	Euro, Millions	79110.378	84246.766	92173.556	104669.05	106582.97
Greece	Euro, Millions	1337.6	1488.74	1754.18	2179.31	2494.2
Hungary	Forint, Millions	363683.4	441092.1	427191.8	654163.1	771489.6
Italy	Euro, Millions	20502.5	21781.275	23171.612	25232.243	25028.257
Latvia	Euro, Millions	145.374	162.8	110.4	186.2	208.23
Lithuania	Euro, Millions	298.367	376.827	327.612	426.306	578.262
Luxembourg	Euro, Millions	561.403	630.3	712.1	704.5	688
Netherlands	Euro, Millions	12512.616	14595	15235	16554	18494
Portugal	Euro, Millions	2320.133	2232.249	2388.467	2769.072	3236.212
Slovak Republic	Euro, Millions	585.225	669.632	640.835	750.947	838.927
Slovenia	Euro, Millions	928.306	890.232	811.953	892.724	1007.493
Spain	Euro, Millions	13391.607	12820.756	13260	14946	15768
Poland	Zloty, Millions	14352.9	16168.2	17943	25647.792	32402.089
Czech Republic	Czech Koruna, Millions	72360.307	85104.467	80109.157	102753.73	113382.51
Denmark	Danish Krone, Millions	56494.7	57733	65191	66834	68991
Sweden	Swedish Krona, Millions	120911	123848	143372	160351	175825

Source: OECD OECD, Gross domestic expenditure on R&D by sector of performance and source of funds

3.2. Evolution the expenses from research and development in Romania

In 2020, research and development expenses represented 0.47% of GDP, in 2021 a share of 0.48% of GDP. The expenses in 2020 recorded the figure of 4.964 billion lei. In 2021, the expenses registered the figure of 5.616 billion lei for research and development, for four performance sectors of the research and development activity, of which 5.135 billion lei are current expenses (91.4%) and 481.2 million lei capital

expenditures (respectively 8.6%). At the end of 2021, 47,011 employees were active in research and development, 3.8% more than in 2020.
After the financing sources of the total research and development expenses, in 2021, the financing sources provided by enterprises had the highest share, of 51.8%. In second place are public funds (including general public university funds) with 31.6%. In the research and development activity in Romania in 2021, 18,982 people with doctoral and postdoctoral studies were involved, of which 9,425 were women.

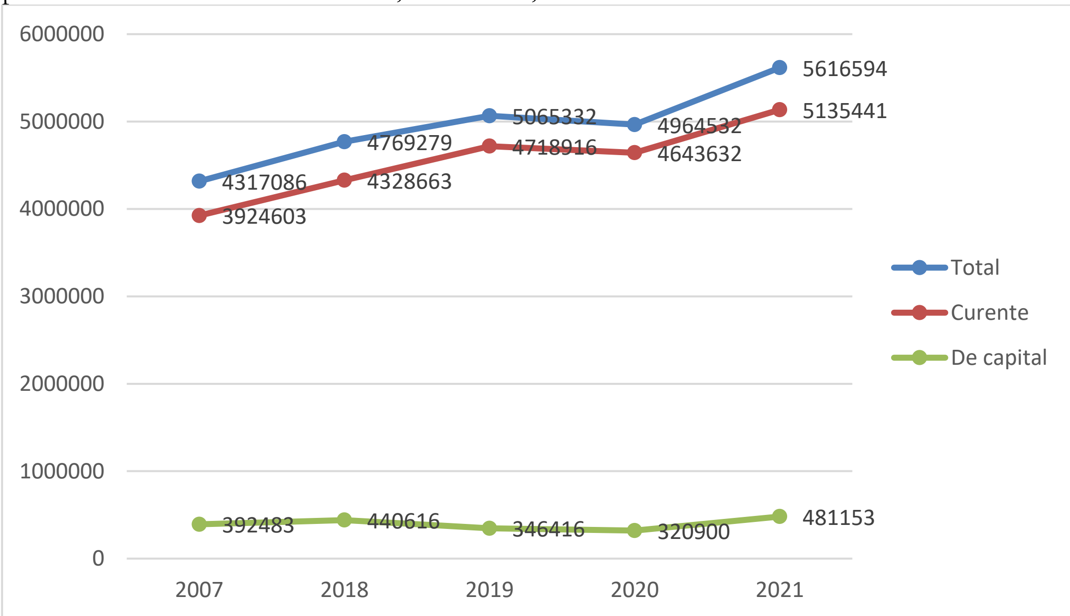

Figure 1. Total expenses from research and development activity, by macro-regions, development regions and counties - current prices, million lei
Source: INSSE www.insse.ro/

Table 2. Employees from the research-development activity by occupation and sex, at the end of the year

	1993	2000	2007	2017	2018	2019	2020	2021
Total emloyees	75648	37241	42484	44801	44733	43973	45304	47011
Male	37770	20127	22940	24266	24561	23721	24088	25394
Female	37878	17114	19544	20535	20172	20252	21216	21617
Total researcher	39582	23179	30740	27367	27471	27168	28090	29347
Male	22102	13338	16995	14577	14767	14423	14815	15666
Female	17480	9841	13745	12790	12704	12745	13275	13681

Source: INSSE, www.insse.ro/

Under the Paris Agreement, the European Union (EU) committed to reducing emissions by at least 55% by 2030 compared to 1990. The EU is committed to achieving climate neutrality by 2050. In this way, the energy transition gained more urgency, acceleration and necessity especially in the last year due to the conflict in the region. Achieving those goals requires large investments, ranging between 133 billion dollars and 266 billion dollars annually until 2050) just for the energy sector. Total investment in energy must increase; energy investments must move from high-carbon technologies to low-carbon technologies. Because of the long lifespan of energy assets, it is important that the change happens now. Funding is particularly important for this transition, as we need to move from technologies with high operating expenses to technologies with high capital expenditures (CAPEX). Therefore, financing conditions, the associated costs of capital, affect relatively high CAPEX renewable energy technologies more than they affect relatively high OPEX fossil fuel technologies. The EU Horizon 2020 INNOPATHS program provides a rich picture of the state of energy finance and the role that finance plays in accelerating or hindering the energy transition 8. While most of the research presented in this perspective focuses on Europe, the insights will also be valuable for other OECD countries. Future research avenues. We would like to mention three avenues for future research from the four perspectives. It is important to consider the types of financing for the energy transition. Equally important is the approach to financial research that deals with secondary markets because of the large-scale availability of data. To provide the important insights for the energy transition, information, data, research on securities and equity-type assets - risky, nontraded, can complement the understanding of financing, can create bottlenecks in the transition. Financial markets, are interconnected, exploring how the availability of funds in different types of assets, to match the dynamics of demand, is important to build better financing modules in energy system models, integrated assessment models, which inform the factors of decision. First, researchers must gather information, provide data on funding conditions. This is also true for conventional power, where more data is available due to balance sheet financing, but different financing costs are rarely considered. Second, researchers need to build conceptual links between financial markets and real asset CoC. Technological maturity, financial market structure and the types of financing available will determine the cost of capital for different assets. Third, modelers need guidance on how to operationalize empirical dynamics. Such guidance must be developed in interdisciplinary teams to ensure the empirical accuracy of the models and their usefulness to decision makers.

4. Methodological approaches

Important variables are included, by applying the principal component method, if several financial development variables are taken, with the use of variables, using the variable we classify the OECD countries in specialized financial system (market or bank), we mix the countries with banking markets and the countries with developed financial markets that could generate efficient financing portfolios expenditures are provided, for a sample of mostly emerging nations, using firm-level data. Evidence of the "funding gap" given to research and development is explored by (Hall, 2002). That way, the accent will be up. The emphasis is placed on the financial market reasons for the underinvestment of research and development, which persist even in the absence of the low level of investments. In conclusion, the conclusions are that (i) SMEs and innovative companies face high capital costs, partially mitigated by the presence of risk capital; (ii) the evidence with reference to the high accounts of research and development capital for large firms is mixed, although the respective firms have funds, using internal funds, to finance the respective investments; (iii) there are companies with limits on risk capital, as solutions to the financing gap, in countries where public capital markets are not very developed;

It is quite difficult to obtain financing in a free competitive market. Support for this perspective in the form of theoretical economic modeling is easy to find and starts with Nelson's (1959) classic articles and Arrow (1962), although, the idea was suggested by Schumpeter (1942)." The argument is as follows: the main result of investment in research and development is knowing how to produce new goods and services.

In situations where confidentiality cannot be maintained, the investing company cannot appropriate the return on investment. In this case, companies are not interested in investing, the corresponding situation will lead to an insufficient supply of investment in research and economic development.

Because the argument was fully formulated by the author of Arrow, developed, tested, modified and expanded in various ways. Arrow's work contains arguments predicted at the time by Schumpeter, which have been used by subsequent studies in the economic and financial sphere: the argument that there is an additional gap between the private rate of return, the cost of capital - when the investor in the innovation sphere and the financier are sub-subjects different This article examines the aspect of market failure in R&D investment: although the problems associated with under-appropriation of R&D recur. Intellectual property protection must be used, subsidies and tax incentives can be expensive to fund research using capital from external corporate or entrepreneurial sources.

It is very important to approach research and development as an investment. We would like to note that from the point of view of investment theory, the field of research and development has a number of different characteristics from ordinary investments. First of all, in practice fifty percent, or most of the expenditure on research and development, is the salaries, the salaries of the scientists, of the engineers with higher education. The efforts of these people create an intangible asset based on the firm's knowledge that will generate profit for years to come. To that extent, in which knowledge is most often understood as rather "tacit", being incorporated into the human capital of the company's employees, lost if they leave or are fired. The authors reviewed the reasons, on which the impact of financial considerations, the investment decision varies according to the type of investment and about the sources of funds in detail. To do this, we distinguish between those factors that arise from different types of market failures in this framework, and financial considerations that affect the value of different sources of funds in a diversified portfolio of funds. Among the implications of the famous Modigliani-Miller (1958, 1961) the theorem is that a firm that chooses optimal levels of investment should, and can, be indifferent to its capital structure. It also deals with the pricing for these investments and especially for R&D investments at the margin. An extensive bibliography in the field, theoretically and empirically, the questions based on this theorem are highlighted, however, it remains a useful starting point. The authors explained the reasons why the theorem may not work in practical work, and there are several of them: 1) that uncertainty combined with incomplete markets may make the real options approach suitable for R&D

investment decisions; 2) the cost of capital may be different depending on the sources of funds for various non-tax reasons; 3) the cost of capital may be different depending on the sources of funds for various fiscal reasons; 4) the cost of capital may be different depending on these types of investments, for fiscal or other reasons. Regarding the issue of investment in research and development, economic theory presents a diversity of reasons why it exists, it could be a gap between external and internal cost capital; they can be divided into three groups: (1) inventor and investor; (2) on the part of the investor, the moral risk, resulting from the separation of management and property. (3)Fiscal considerations, which create a barrier between external financing and retained earnings financing. Asymmetric information problems: In research and development, the problem of asymmetric information. It refers to the fact that an inventor often has in mind much more eloquent and correct information about some probabilities of success, the nature of the innovative project, than potential investors. The moral hazard of investments allocated in research and development can occur: as a rule, modern industrial companies have a separation between owners and management functions. This situation leads to a principal-agent problem, when the objectives of the two are in conflict, which can lead to investment strategies that do not maximize the value of the stock.

4.1. The fiscal regime.

That usual way of examining the empirical relevance of the arguments, in which investments in companies established in the field of research and development, can somehow be at a disadvantage, in various situations where internal funds are not available, and resort to the capital markets of other countries.

It is necessary to estimate the R&D investment equations, to test the presence of those constraints, of excess sensitivity, in the case of cash flow shocks. Therefore, the respective approach is based on the extensive literature developed for testing common investment equations and liquidity constraints, investment equations common to liquidity constraints (Fazzari, Hubbard and Petersen, 1988; Arellano and Bond, 1991).

Méndez-Morales, and Yanes-Guerra (2021) analyzes the role that various sources of finance and financial expertise have private activities, in the field of research and development in OECD countries. The authors developed several panel regressions, selected as a model a regression with two-way random effects, in order to understand which various sources of financing are related to research and development expenses, to the ways in which financial specialization is related to the aspects private sector of aggregate research and development expenditure.

The results reinforce the critical role that stock markets play in enhancing private research, as bond markets have an inverse relationship with national private R&D spending. The authors find no evidence of a link between banking sources and private research and development.

Specialized financial systems (whether banking, insurance or capital market, or private pension funds) support innovation much more effectively than a mixed arrangement of these two systems. In the long term, this could be a signal that national and regional innovation systems need a broad perspective of the factors that hinder scientific activity. There are ways to affect the outcomes of complex innovation activity by developing stronger financial systems that support national innovation systems. The authors argue that the financial system that a country must choose to increase growth through research-development-innovation could have misled public policies. Design/methodology/approach. A comprehensive analysis was carried out in several stages. Multiple linear regressions were performed on the cross-sectional R&D time series, capitalized expenditures, incurred costs, and other key financial factors to test the effects of R&D on stock prices, contemporaneous stock returns, and subsequent stock returns for the entire sample. , capitalizer sample and spender sample, respectively. First, most Chinese firms (about 80% of those reported) choose to adopt an R&D expenditure approach, while about 20% apply the capitalization treatment. Second, key attributes such as size, profitability, leverage, and R&D intensity are strongly associated with the propensity to capitalize. Third, current capitalization affects stock prices and contemporary stock returns (price-in) with annual volatility.

5. Conclusions

The change is welcome in the context in which Romania is in a bad position at the European level from this perspective. As such, many of the funding directions that will be available in the next period emphasize either partnerships between profile entities (public or private) and SMEs, to supplement or develop the internal capacities of the latter, or on the creation and development of own capacities within SMEs, in order to facilitate the adoption of technologies or the improvement of the innovation mentality at their level. On the other hand, funding specific to the research-development-innovation sector should be correlated with the national profile strategy and the smart specialization directions identified at the level of each development region. From this point of view, digitization, with the support of the IT sector in Romania, which registers positive developments, is well placed at the borders between research development-innovation and digitalization, and will take advantage of the funding available during the programming periods, addressing the issues necessary for the two levels, with thematic offers that bring together advanced technologies, especially in the context of digital transformations in current Romania. Moves from the funding directions related to the programming period, focus on knowledge transfer or technology transfer. In this way, there will be a transfer of intellectual property rights between research-development-innovation entities and large enterprises, which are only participating as partners in projects proposed by small and medium-sized companies, to the respective SMEs. It is important to monitor the extent to which entities and large enterprises will be willing to engage in these kinds of partnerships. Large companies will be able to apply for the mentioned financing, as partners for SMEs, for institutes and research centers in certain types of projects. The approach within programming periods tends to be flexible, depending on the evolution of various aspects over time.

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