

UNIVERSITY OF PÉCS

Doctoral School of Earth Sciences

The Examination of Additionality in Relation to Green Bonds

Summary of PhD Dissertation

Gábor Gyura

Thesis Supervisors:

Dr. Zsuzsa M. Császár

Associate professor

Dr. Dániel Homolya

Senior lecturer

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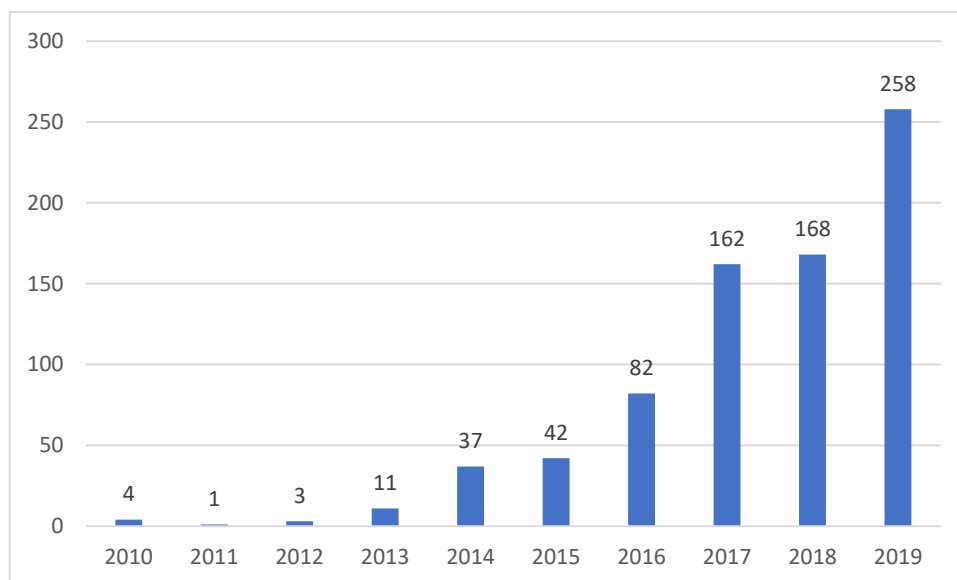
1. The objective, significance and antecedents of the research

Environmental sustainability challenges, such as climate change, the inadequacy of drinking water resources or the rapid loss of biodiversity, call for an economic restructuring as soon as possible, which will require a technological revolution and huge amounts of investments in infrastructure and other fields. However, these necessary investments are not being delivered in sufficient quantities today, and globally, the funding gap that economies should fill can be measured in hundreds of billions of dollars annually. Environmental and financial policies are therefore urgently looking for effective concepts to steer capital in the "green" direction.

At the same time, this policy challenge requires applied research from different disciplines (finance, environmental economics, geoeconomics and geopolitics), preferably as practice-oriented as possible. The transformation of the economy, and in particular the transformation of financial markets to better “serve” environmental sustainability, can only be designed on the basis of a prudent knowledge base that recognizes seemingly distant connections. For this reason, in recent years, scientific research has also increasingly turned to the intersection of the environment and finance, a trend that is also followed by my own dissertation.

The focus of the dissertation has been placed on one of the most promising and dynamically developing instruments of the above-mentioned financing challenge, green bonds, whose portfolio expanded from a “zero” market to several hundred billion dollars in just a few years (Chart 1).

Chart 1: Annual global green bond issuance (billion USD)



Forrás: World Economic Forum (2017)¹ és Climate Bonds Initiative (2020)

The essence of these securities is that the issuer commits to use the funds raised through the bond for environmentally beneficial investments, typically to mitigate climate change. Based on this dedicated goal and the dynamic expansion, the green bond segment carries with it the opportunity to create the financing background for the necessary green projects. However, the author of this dissertation found it important (and continues to find so) to examine whether

¹ The list of literature referenced in this extract of the theses can be found in the Dissertation.

green bonds contribute to environmental sustainability to the extent commensurate with the spectacular expansion. In other words, do they really deliver extra capital into green investments - the latter is called additionality in the international literature.

Based on the review of foreign and domestic literature, I came to the conclusion that while the topic of green bonds appeared relatively quickly in foreign scientific studies, and additionality itself became a hotly debated topic in foreign professional discussions, research and analyses only tangentially deal with additionality (e.g. Gunther (2014), DuPont et al (2015), Canfin - Grandjean (2015), Shislov et al (2016)). To the best of my knowledge, no comprehensive, methodologically sound and conclusive analysis of this issue has been done so far. To the author's knowledge, the Hungarian green financial literature is minimal. Explicitly empirical research - again only on the basis of the author's knowledge and research - has not been done in Hungary so far in connection with green bonds.

Due to the importance and urgency of the green financing challenge, the dynamic growth of the green bond market, and the empirical unexploredness of the specific issue of additionality, I hope that my dissertation can add significant value to public thinking on the topic.

Although no green bonds have been issued in Hungary so far, I expect the research to be of domestic relevance and benefit. Planning and thinking on green bonds is already underway at several economic actors, including the Ministry of Finance and the Public Debt Management Center announcing the Hungarian green government bond plan at the end of 2019 (Ministry of Finance 2019), and the Magyar Nemzeti Bank has also examined the - hitherto untapped – potential of green bonds (Magyar Nemzeti Bank (2019a, b and c)).

2. Hypotheses

Based on the above considerations and considerations, I set up the following three hypotheses during the research.

1. a) hypothesis : Green² bond issuers do not issue green bonds primarily because they can attract more, cheaper, or longer-term funding than otherwise.

One of the most important drivers of corporate investment is the financial parameters of funding: the amount, pricing, and maturity of the funding that can be tapped all affect which potential projects pay off and which ones are worth accomplishing (see, e.g., Chirinko et al. 1998). The question of whether an issuer decides to use green bonds on the basis of these financial parameters also comprises important information on additionality. For example, if an issuer believes that it is cheaper to obtain financing with green bonds than with a normal bond or bank loan, this may indicate that the green bond may contribute to more green investments, as more potential projects may move into the net positive present value range. However, this consequence is not necessary. Moreover, the fact that an issuer does not issue a green bond in

² The term „green” is used in line with the internationally accepted terminology, ie. supporting environmental sustainability and in particular climate change mitigation.

the hope of a cheaper (or even longer-term, higher volume) funding does not preclude green bonds from yielding more green investment nonetheless.

1. b) Green bond issuers do not have access to funding via green bonds on more favourable terms (in terms of pricing, volume, maturity) than with their other available options.

The logical “pair” of the former hypothesis is the examination of the financial benefits achieved (or not achieved) with the green bond already issued. I considered it important to examine this issue separately, as the issuer motivation according to Hypothesis 1 a) does not necessarily move together with what actually materializes under market conditions. It is also true, of course, in the case of Hypothesis 1 (b), that its rejection does not in itself imply that there is additionality in green bond financing, just as its confirmation does not automatically mean the opposite.

2. hypothesis: Thanks to green bond issues, more green projects will not be realized than if funds had been raised in other ways

I intended to examine the main question of the research directly in the form of this hypothesis. Although the theory of investment decisions suggests that the decisive factor is whether green bonds allow for cheaper, more or longer maturities of funding, it is by no means self-evident that these financial characteristics of financing would exclusively guide the implementation of green projects. In theory, green bonds can contribute to additionality in a number of ways, and I thought that one of the significant added values of my research would be to explore a mechanism related to green bonds that induces the expansion of green investment in addition to “classic” financial drivers.

3. hypothesis: Emerging-developing³ market green bond issuers operate differently from developed country issuers in terms of additionality.

Environmental sustainability issues are similarly global as bond markets. Yet, there can be significant differences in the environmental, climate and economic policies of different countries, as well as in the development of capital markets. Although essentially the same international standards are followed by green bond issuers in each country, national investment needs, priorities and, above all, market conditions, especially in terms of funding, may differ.

Both on the basis of the existing - theoretical, hitherto unsupported - empirical literature (e.g. DuruNyong 2016) and in view of the fact that the funding supply of emerging-developing (and

³ I used the distinction among developed, emerging and developing countries based on IMF (2019).

especially developing) countries is generally lower than that of developed countries, it seemed reasonable for me to assume that in their case an innovative financial instrument would be more value-adding and could improve the possibilities of raising funds, which in turn could result in additionality. In other words, according to the hypothesis, the geographical background of issuers may still influence the answers to the core research questions.

3. Research methods used

Additionality is a very complex concept to define and a particularly difficult one to grasp and measure in practice. During the design of the research, I considered several possible empirical strategies. A promising option was to analyze green bond issuers' own disclosures as well as market data, but I eventually had to drop these methods.

Issuers' disclosures typically do not address additionality at all, and I considered them to be relatively unreliable anyway, as they serve reputational and communication purposes to their external stakeholders (investors, customers and authorities) in addition to the factual disclosure. In other words, I thought there was a risk, that they paint a more idealized picture than the real one in issues in which they are not accountable legally, and where there is no actual auditor verification. In the case of market data, the main constraint was that, in principle, only data on the pricing of green bonds would have been available. However, the latter is only one possible driver of additionality, and on the other hand, the price difference between green bonds and "traditional" bonds has already been widely analyzed (e.g. Bank of America Merrill Lynch 2014, Barclays 2015, Schrodgers 2015, London Stock Exchange 2016). I did not see any significant added value in expanding this already existing literature.

After thinking through all of these options, I decided to use a questionnaire survey to be deployed to examine green bond issuers directly. A questionnaire survey is a common practice in business economics and, by its very nature, is suitable for asking research questions directly and in a targeted manner. At the same time, this method does not lack the risks, disadvantages and limitations, which in the case of my own research can be divided into two groups due to the following.

The main limitation in terms of *representativeness* was that I did not have the opportunity for random sampling. On the one hand, I did not have access to the contact details of all issuers from the core population (i.e. one of the green bond registers), and on the other hand, the willingness of companies that were eventually asked to complete the questionnaire were

obviously different and most likely driven by cultural patterns. In terms of the *reliability* of the answers, in addition to the subjective nature of the questionnaires, the distorting effect of the “socially desirable” answers, the greenwashing phenomenon (according to which companies tend to suggest a more environmentally friendly picture of themselves) (Furlow 2010).

I could not eliminate the representativeness challenge, so the findings of the research do not necessarily apply to the entire global green bond issuer segment. At the same time, respondents embody a balance sheet total of thousands of billions of dollars, and although their geographical composition differs from that of the base population, they are fairly well represented in their sectoral composition. In view of these, the survey, even if we can consider it to be only partially representative, is in my opinion informative in any case. I took a number of steps to ensure the reliability of the answers: I did not explain my hypotheses (or the problem of additionality at all) during the call for proposals, provided the possibility of anonymity (which no company eventually used), and committed not to publish individual answers. I also sought to eliminate biased responses through the non-biased wording of the questions, their order, and the neutrality of the possible answer options. I checked the built-in consistency check question pairs afterwards and found that the responses of each respondent were consistent with themselves, which again only indicates the reliability of the survey.

In a significant share of the questions, I used a 4-point, forced Likert scale for the response options, i.e. the respondent should indicate the degree of agreement (or disagreement) with a statement. In this case the survey forces respondents to take a stand by omitting the neutral option. I chose the Likert scale because it allows the quantification of fundamentally qualitative responses and, through this, the application of statistical tests.

In order to examine the practical operation according to the currently “valid” green bond standards, I limited the investigation to green bonds issued between 1 January 2017 and 31 December 2019 in the database of the Climate Bonds Initiative⁴, which comprised approximately 600 issuers. For the first round, between March 2 and December 31, 2019, I sent the questionnaires in two “waves” to the publicly available email addresses of the companies involved, to a total of 374 institutions. I excluded sovereign green bonds and green ABSs from the survey, as in both cases the situation of the issuer is significantly different from that of normal corporate, financial institution and municipal issuers.

⁴ A londoni székhelyű Climate Bonds Initiative globálisan a legfontosabb zöld kötvényekkel foglalkozó sztenderdalkotó, elemző és kutató intézet.

Obviously, a simple summary of the responses to the questionnaires would not have been suitable for drawing well-founded conclusions, so - based on the possibilities arising from the ordinal nature of the Likert scale - I used the following types of statistical tests for the responses in the survey:

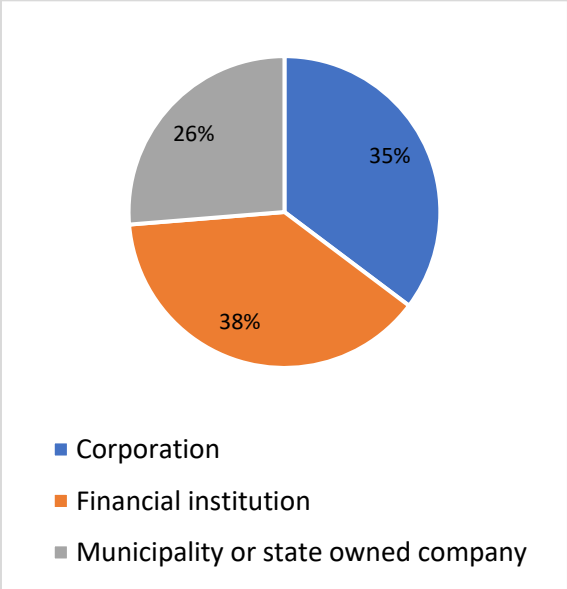
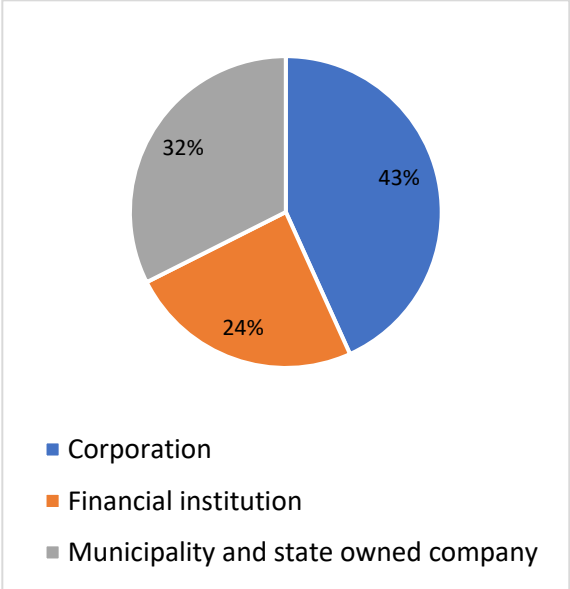
- One-sample sign test (tests whether the respondents significantly agree or disagree with the statement made in a given question),
- Mann-Whitney tests (testing the significance of differences between the two subsamples after breaking down respondents by geographical location),
- correlation analysis (examining the correlations between the answers of a given respondent to different questions - examining Spearman's correlation due to the ordinal nature of the answers).

4. Summary of results

A total of 41 valid fills were received, representing a completion rate of more than 10 percent of all respondents and also a rate of more than 6 percent of the core population. The sectoral composition of the respondents is very close to that of the base population (Charts 2 and 3).

Chart 2: Composition of survey respondents in terms of economic sectors

Chart 3: Composition of basis population in terms of economic sectors

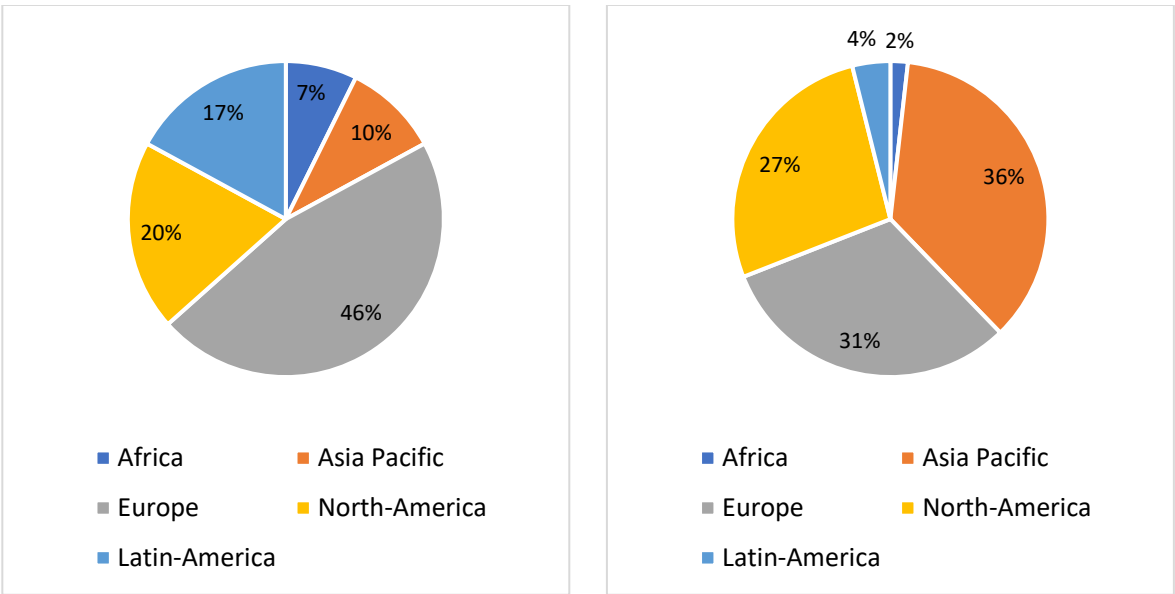


Source: Based on Climate Bonds Initiative (2019) alapján

Responding green bond issuers “come from” a total of twenty countries. Most respondents were based in Sweden (7), the United States (5) and Brazil (4), but several replies were received from

Germany (3), Finland (3), Canada (3), Denmark (2) and even Thailand (2) as well. The questionnaire was completed by one issuer from each of the other countries, which, of course, in some cases, if there were very few issuers in that country, could mean full or a majority coverage of that country: Peru (1), Lebanon (1), Austria (1), Namibia (1), Norway (1), South Africa (1), Ivory Coast (1), New Zealand (1), Belgium (1), Italy (1), Chile (1), Iceland (1). Geographically, therefore, respondents represent all continents, although the composition differs from the base population (Charts 4 and 5).

Chart 4: Composition of survey respondents in terms of headquarters *Chart 5: Composition of the base population in terms of headquarters*



Source: Based on Climate Bonds Initiative (2019)

The share of Asian respondents was visibly significantly lower than in the base population, which, as mentioned above, reduced representativeness. However, I found it particularly valuable that a large number of organizations from both Africa and Latin America participated in the survey, as these regions are financially less developed than a significant part of Europe, North America or Asia.

Based on the responses to the survey and their statistical tests, the specific results of the research itself can be summarized as follows:

Hypothesis 1 (a) (“Green bond issuers do not issue green bonds primarily because they can attract more, cheaper, or longer-term financing than otherwise”) was only partially supported by the survey.

Based on the responses, the majority of issuers agreed with the statement in the hypothesis: the decision to issue green bonds was basically for non-financial (CSR⁵, communication) purposes. The vast majority of issuers stated that the green bond was issued for communication purposes or because the issue harmonized with an existing CSR program. The financial aspects were basically not important to them (in terms of maturity, quantity) or moderately (in terms of pricing). An exception to this is diversification, a consideration that had not yet emerged as an idea in the original design of the research, and thus I did not include it in the hypothesis. Still, many green bond issuers stated that green bonds were issued to diversify their source side. However, the expressed opinions in the questionnaires proved to be statistically significant only in terms of maturity and diversification. That is, the study confirmed that green bond issues were motivated by diversification and not motivated by the desire to attract longer-term funding. However, the research could not reasonably rebut that achieving a cheaper or larger amount of funding as a goal would motivate the issuance of green bonds (Table 1).

Table 1: Results of sign tests for Hypothesis 1. a)

Question		
<i>To what extent do you agree with the statement that the main purpose of the green bond issuance was to...</i>	<i>p-value</i>	<i>Outcome (α=5%)</i>
... help us collect more funds than we would otherwise be able to.	0,1055	H ₀ was not rejected.
... help us collect cheaper funds than we would otherwise be able to.	0,6224	H ₀ was not rejected.
... help us collect longer term funds than we would otherwise be able to.	0,0002	H ₀ was rejected. Respondents disagreed with the statement to a statistically significant extent.
...help us diversify our funding mix	0,00001	H ₀ was rejected.

⁵ Corporate Social Responsibility

		Respondents agreed with the statement to a statistically significant extent.
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Hypothesis 1 (b) (“Green bond issuers do not obtain funding with green bonds on more favorable terms (in terms of pricing, volume, maturity) than with their other available options.”) was also only partially confirmed by the research.

Similarly to that described for Hypothesis 1 (a), the responses of the majority were consistent with the Hypothesis. The majority of issuers were clearly of the opinion that they could not raise more or even longer-term funds with green bonds than they could have achieved with their other fund-raising channels. In terms of cost of funding, on the other hand, the responses were balanced, with about the same number saying that they had managed to raise cheaper funds with green bonds than those who took the opposite view.

However, the majority was again only significant in terms of one factor, maturity, and the answers to the other questions did not prove to be “decisive” (Table 2).

Table 2: Results of sign tests for Hypothesis 1. b)

Question		
<i>To what extent do you agree with the statement, that, with the help of the green bond issuance...</i>	<i>P-value</i>	<i>Outcome ($\alpha=5\%$)</i>
<i>... help us collect cheaper funds than we would otherwise be able to.</i>	0,5000	H ₀ was not rejected.
<i>... help us collect longer term funds than we would otherwise be able to.</i>	0,1055	H ₀ was not rejected.
<i>...help us diversify our funding mix</i>	0,0001	H ₀ was rejected. Respondents disagreed with the statement to a statistically significant extent.

Evaluating Hypotheses 1 a) and b.) together, we can say that the survey did not in any way support (although it could refute only in terms of maturity) the common belief that green bonds enable issuers to collect funds on more favorable terms, which in turn could help make more positive investment decisions about green projects.

However, such a positive effect may exist thanks to diversification: green bonds can be used to reach investors who do not, or at least are less inclined to buy traditional bonds (or stocks). Diversification allows issuers to reduce their liquidity risk as they can put their funding on more “feet”. This, in turn, strengthens the balance sheets and liquidity of issuers, which can indirectly improve the willingness to invest, ie. it might also indirectly lead to additionality.

Hypothesis 2 (“Thanks to green bond issues, more green projects will not be realized than if funds had been raised in other ways”) was confirmed by the study, although not completely.

A significant majority of respondents stated that their green projects would have been implemented even if they had not issued the green bond, and - also by a significant majority – the specific green projects had already been decided to be launched before the decision to issue the green bond was issued. Moreover, these projects typically started or even ended before the bond was issued.

Similarly, the majority agreed with the statement (included in the question) green bonds had not led to more green projects. Contrary to previous opinions, however, this majority was not statistically significant. That is, there was a non-negligible (albeit minority) group that nonetheless believed the green bond had contributed to more green projects. Meanwhile, there was an almost complete consensus that the main motivation for green bond issuance was to fit into the communication, marketing, CSR strategy.

Table 3: Results of sign tests for Hypothesis 2

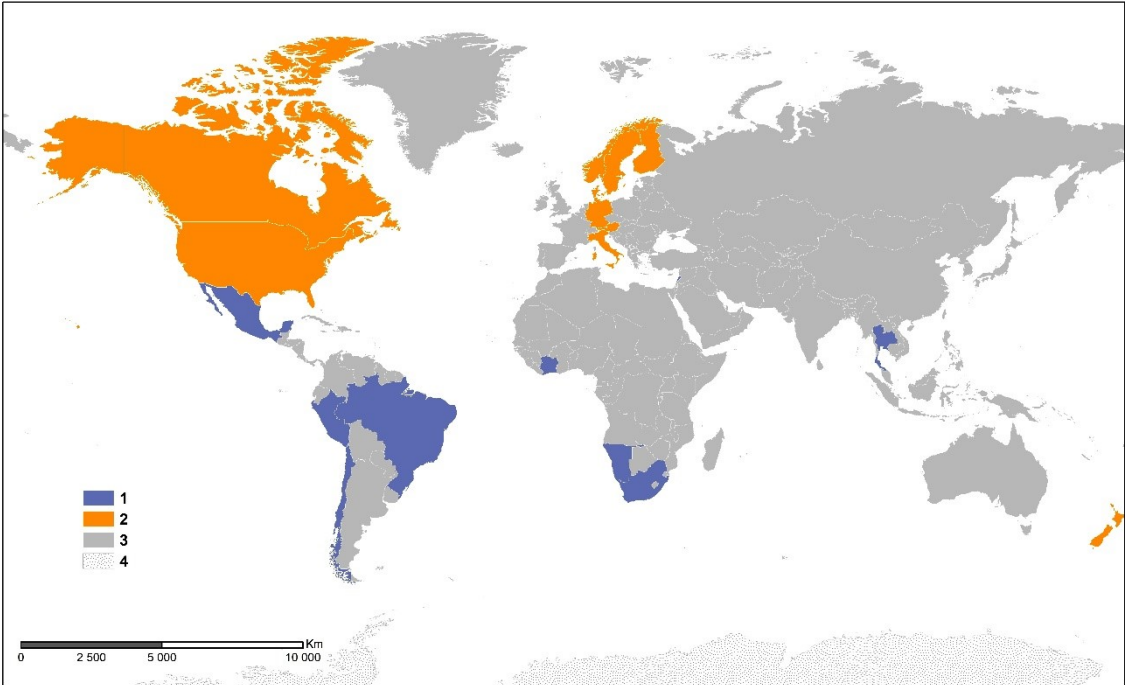
Question			
#	To what extent do you agree with the statement, that...	p-value	Outcome ($\alpha=5\%$)
Question 20.	<i>...the green projects would have been accomplished, if the green bond had not been issued?</i>	0,0000004	H ₀ was rejected. Respondents agreed with the statement to a statistically significant extent.
Question 21.	<i>...the decision to launch the green projects had been taken before the decision to issue the green bond was taken?</i>	0,00000001	H ₀ was rejected. Respondents agreed with the statement to a statistically significant extent.
Question 22	<i>...the green projects had started or even been completed before the issuance of the green bond?</i>	0,0058	H ₀ was rejected. Respondents agreed with the statement to a statistically significant extent.
Question 23	<i>...thanks to the green bonds, more green projects could be accomplished?</i>	0,0586	H ₀ was not rejected.

Hypothesis 3 (“Emerging-developing market green bond issuers operate differently from developed country issuers in terms of additionality.”) was only confirmed by the research in terms of longer funding maturity as issuance goal.

I also analyzed the responses to the questionnaire segmented by geography among developed and developing-emerging countries, examining the question of whether “geography matters”, i.e., whether green bonds (or their issuers) work differently depending on how developed a

market we are talking about. Of the total of 41 responding organizations, 28 are headquartered in developed countries and 13 in emerging and developing countries (Chart 6).

Chart 6: The geographic composition of the sample



Legend: 1. Emerging and developing countries in the sample; 2. Developed countries in the sample; 3. Countries not included in the sample; 4. The territory of Antarctica.

Source: Own editing. Data source: IMF.

There were remarkable differences between the responses of the two groups of countries in terms of the financial benefits expected or realized from green bonds. More representatives of emerging and developing countries said that the collection of more or longer-term funds was the goal of green bond issuance than issuers from developed countries. Likewise, emerging and developing market issuers agreed to a greater extent that they were actually successful with the aforementioned goals. In contrast, in terms of lower funding costs, developing countries indicated to a greater extent that this was the main motivation for issuance and that this goal was more or less met.

However, between these differences, the statistical test confirmed a significant difference only in terms of maturity, and even there only in terms of issuance motivation.

There was virtually no (and, consequently, not at all statistically significant) difference in the questions that directly addressed additionality. That is, respondents in the two groups of

countries rebutted, to a practically equal extent, that they were able to implement more green projects with the green bond, and were in agreement that the projects were implemented essentially independently of the bond issuance (Table 8).

Table 8: Results of the Mann-Whitney tests examining the differences between the two country groups

Question <i>To what extent do you agree with the statement, that the main goal of the green bond issuance was ...</i>	Results	Outcome ($\alpha=5\%$)
...to collect more funds	<i>U-value: 118.5</i> <i>Z-value: -0.94952.</i> <i>p-value: 0,34212</i>	H ₀ was not rejected.
...to collect cheaper funds	<i>U-value: 111</i> <i>Z-value: 1.19092.</i> <i>p-value:0,23404.</i>	H ₀ was not rejected.
...to collect longer term funds, than what could have been achieved by using other funding options	<i>U-value: 111,5</i> <i>Z-value: -1,96116</i> <i>p-value: 0,025</i>	H ₀ was rejected, there is a significant difference between the two samples.
Question <i>To what extent do you agree with the statement below about your latest green bond issuance?</i>	Eredmények	Eredmény ($\alpha=5\%$)
...the green projects would have been accomplished even if we had not issued a green bond	<i>U-value: 131</i> <i>Z-value: 1,41484</i> <i>p-value: 0,15854</i>	H ₀ was not rejected.
...we could accomplish more green projects	<i>U-value: 159,5</i> <i>Z-value: -0.61636</i>	H ₀ was not rejected.

	<i>p</i> -value: 0,26763	
... we could obtain cheaper funding than what would have been otherwise achievable	<i>U</i> -value: 135,5 <i>Z</i> -value: 1,28876 <i>p</i> -value: 0,19706	H ₀ was not rejected.
... we could obtain more funding than what would have been otherwise achievable	<i>U</i> -value: 132.5. <i>Z</i> -value: -0.4989 <i>p</i> -value:0,61708.	H ₀ was not rejected.
...we could obtain longer term funding than what would have been otherwise achievable	<i>U</i> -value: 119.5. <i>Z</i> -value: -0.91733. <i>p</i> -value:0,35758.	H ₀ was not rejected.

Overall, therefore, there was no statistically significant difference between the opinions and experiences of issuers in developing and emerging countries regarding green bonds, with the exception of one topic. The only real difference is that among green bond issuers in emerging and developing countries (according to their own statements) there were more entities who issued green bonds in order to obtain longer term funding compared to their other funding options. This is in line with the research history and literature on less developed countries: in both Africa and Latin America, the capital market is relatively underdeveloped, and the specialty of green bonds is to provide long-term funding with small amounts (see, for example, the Market Overview for Latin America in Standard & Poors (2019)).

My research - based on the combined evaluations of the three hypotheses - can be summed up in such a way that green bonds do not, or only in a few cases, result in more green projects. It is not characteristic that green bonds would reduce funding costs, extend funding maturities or make available more funding, and green projects usually start and are implemented independently of green bond issuances. In essence, the same can be said for green bonds in emerging and developing countries, even if the longer maturity of green bonds there is a more pronounced, special advantage. In financial terms, diversification was the only substantial “benefit” of green bond issuance that emerged clearly (and statistically significantly) from the responses.

In the research, I also examined the correlations between the answers. Based on these, the most important correlation is that the more true it was that green bond issuers issued these instruments in a targeted way to attract more or longer term funds, the more they assessed that they were able to deliver more green projects thanks to green bonds. Thus, although most issuers turned to green bonds for marketing rather than financial reasons and did not “experience” additionality, a group could be identified that used these instruments consciously from a financial point of view, and this – according to the organizations' own assessment. - also led to more green projects.

5. Conclusions and opportunities for further development of the research

If green bonds serve (at least primarily) marketing or communication, or similar "soft" purposes (with which they can demonstrate their green commitment to customers and authorities), and have essentially no substantial financial advantage over other financial instruments, the question arises as to whether they actually serve environmental sustainability at all.

My own conclusion is that green bonds are still useful, and that they do not merely green the image of the issuing entity. Compliance with green bond standards, in particular the corporate governance and disclosure obligations contained in the standards, and last but not least, the opinion or even audit of the green bond framework by an external, independent party, all require real, environmental sustainability performance. In addition, reputation and external judgment can, in the long run, help to divert capital to a real green direction.

In this area, the picture emerging from my research is consistent with the analysis of Kidney (2018). In my survey, a large number of issuers “confessed” that green investments had very often already taken place before the green bond itself was issued. While this fact seems to preclude additionality, looking deeper, my survey showed otherwise. Agreeing with the argument of Kidey (2018), it is appropriate to assess the situation in a nuanced way. In refinancing (when the funds raised through the green bond replaces an existing funding for a project), the key question is what the released capital will be invested in. And while there is nothing to oblige the issuer to invest the reinvested capital in green investments as well, the importance of reputation (which again was affirmed in my survey) can still be compelling. It is very unlikely that, following a refinancing with a green bond, the company will be involved in

an environmentally harmful project, because if it did, it would soon fall out of the green financial segment.

The results of the research may add new aspects and possible directions to the emerging financial regulations related to green bonds, in which field the author of the present dissertation is already working. Based on my research, I consider green bonds to be a useful tool with great potential, although not a “silver bullet”, and I believe that, in the light of urgent sustainability challenges, it would be worthwhile to promote green bonds with regulatory incentives.

However, as my investigation makes it likely that the rise of green bonds alone will not directly result in more green projects, I believe that green bond issuance itself with regulatory incentives (such as tax breaks) is only worthwhile to be encouraged if it can be linked to additionality in some way. As such a conditionality currently seems difficult to establish, an instrument-neutral approach would be more logical instead, and I think it is worth encouraging green investments themselves, independently whether they are financed by bonds, loans or even equity.

In the markets of developing and emerging countries, where only short-term bank loans for green projects may be available, green bonds can be vital to attract foreign capital and, in particular, to extend maturities. Green bonds in these countries can therefore really fill a gap, which provides an additional argument in addition to their regulatory support and encouragement.

Given the topicality of the topic and, in particular, the ongoing regulatory discussions mentioned above, I think it would certainly be useful to continue and further develop the research I carries out – for instance, on a larger and more representative sample (including Asia better); to further “unravel” the correlation relationships revealed in the dissertation in the direction of exploring causal relationships, or even to move on in relation to the “problem area” of lower cost of funding. In my survey, it became clear that even if not all issuers, but a significant part of them do seek to reduce financing costs with green bonds, with which (possibly: due to this) green projects will expand. However, in the research presented in the present dissertation, I could neither confirm nor refute this correlation to a statistically significant extent, so it can be - and in my opinion it should be - further analyzed in the future.

6. The author's main publications on the topic

Publications in scientific and professional publications:

Gyura, G. (2020): *Green Bonds and Green Bond Funds: The Quest for the Real Impact*. Journal of Alternative Investments, Summer 2020; DOI: <https://doi.org/10.3905/jai.2020.1.098>

Gyura, G. (2020): *Green regulatory approaches*. IN: Bethlendi, András és Vértessy, László, eds. (2020) *Sustainability, innovation and finance: integration challenges*. Budapesti Műszaki és Gazdaságtudományi Egyetem Gazdaság- és Társadalomtudományi Kar, Pénzügyek tanszék, Budapest. ISBN 978-963-421-809-8.

Gyura, G. (2020): *Mennyire felelősek ténylegesen bankjaink?*. Origo.hu – internetes Available at: <https://www.origo.hu/gazdasag/20200306-mennyire-felelosek-tenylegesen-a-bankjaink.html>

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