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ESG disclosure score in emerging countries and liquidity: an overview

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Abstract

In the past decades, Responsible Investments were and continue to be steadily expanding. To help asset managers with this type of investments, some agencies have created a special score for them. Since 82% of the asset managers use ESG (Environmental, Social and Governance) integration in their selection process and of which 62% of them think it is important for assessing company performance, the scores generally take into consideration ESG factors. To find out if the scores really bring some performance information, as the asset managers think, we investigated the ESG scores.

In the first parts of this study, we observed that the general state of the ESG disclosure scores and the level of disclosure is quite similar in different markets and that this level is influenced by different factors. It is affected, among other things, by the culture of the country and the presence of regulation in the emerging market. For India, we confirm that the ESG disclosure score is indeed associated with performing Indian firms. Therefore, we tried to understand why and investigate the liquidity especially as the cost of capital is lower for firms with high ESG score. Considering, thanks to multiple studies, that liquidity can be improved as a result of valuable information for the investors, we review two studies linking a higher ESG disclosure score with a higher liquidity, one in a developed market and one in a broad market.

To dig deeper in this relation and have a better understanding of liquidity in this market, the emerging market was considered in the empirical part. To find any correlation between liquidity and the ESG disclosure score, a linear regression was created and two samples were used. The first sample is composed of 921 stocks including Chinese stocks, which represents the investors' opportunities in this market. The second sample is the same one but narrowed down to 521 stocks, excluding Chinese stocks as they were largely represented.

Moreover, three different liquidity proxies were used as they have each their particularities. The findings of the first sample are the opposite from what was found in the two studies. Which means liquidity is negatively correlated with the ESG disclosure score in the emerging market. In the second sample, this result is only significant for one measure and is not significant enough for the others. For this reason, asset managers should be careful when investing in high ESG disclosure score firms in the emerging countries.

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AuM: Asset under Management

CAPM: Capital Asset Pricing Model

CSR: Corporate Social Responsibility

ESG: Environment Social Governance

ETF: Exchange Traded funds

MSCI: Morgan Stanley Capital International

NYSE: New York Stock Exchange

ROA: Return on Asset

SRI: Social Responsible Investments

USD: United States Dollars

WACC: Weighted Average Cost of Capital

5 Introduction

The corporate and social challenges appear to me to be more and more present and significant over time. This is why I wanted to understand what was behind the "ESG score" and get a glimpse of what is done in the financial field on this subject. I also wanted to end my studies with a sustainable view in the financial field.

After researching a lot on this subject, I noticed there was a substantial amount of data on the link between financial performances and ESG scores but not on the link between ESG scores and liquidity. During the literature review, we will find some information to be able to respond to the main interrogation of this thesis: *"Is the ESG disclosure score correlated to liquidity in an emerging market?"*

In this thesis, the first chapter will develop the origins of Responsible Investments. I will introduce fundamental notions that will be useful to the reader for the rest of the thesis. I then focus on the tools available to the asset managers to achieve a responsible investment in their decision process.

Secondly, the next chapter about the literature review will focus on the ESG score and the CSR disclosure. Whether it is their meaning, the way CSR disclosure could be influenced or what the ESG score can bring to companies. Additionally, we will picture the state of ESG disclosure in different countries. Besides, we will get details on liquidity. First, we will see if liquidity has any link with the value of the information disclosed. We will then look at previous studies already carried out in the developed market and finally get a glimpse of the state and determinants of liquidity in the emerging market.

Thirdly, we will get into the empirical part of the thesis. Thanks to the literature, we will try to create a linear regression model to have an idea of the relation between liquidity and ESG score in emerging countries. We will firstly choose and explain the liquidity proxies and the reasons behind this choice. Then, we will designate an adequate ESG score for what we are trying to explain. Similarly, we will extract a sample for the emerging countries' stocks. We finally will discuss the results and expose some limitations of the study as well as clarify possibilities for further research.

6 Responsible Investments

6.1 Changes over time

In this part, I will explain the history of Responsible Investing, give some definitions and facts to understand where we are today, some tools available to the Asset Managers and the rise of my problematic.

First of all, let's start with the history. The origins of Responsible Investing could bring us as far as the 16th century. Indeed, John Wesley, Methodism's founder, has noticed that the use of money was one of the most important subjects in the New Testament. This is probably why religious investors did not invest in wars or violent firms and probably took those beliefs in the "New World" (Schueth, 2003).

Modern responsible investing, on the other hand, can be traced back to at least in the '60s for the US. In this decade, thematic investments considering the exclusion of firms related to the Vietnam War appeared. In this decade, they even took into consideration civil rights or women's equality, for example. This is also what laid the foundations to exclude investments with labor issues or nuclear power in the '70s (Schueth, 2003).

In 1992, The Social Investment Forum reported that approximately $600 billion was invested in Socially Responsible Investments (SRI or RI) around the World. At the time, the definition of this type of investment was unclear. In many instances, Portfolio Managers just used exclusionary criteria such as "do they make weapons?" or "do they produce tobacco?". Other investors had already considered renewable energy companies or considered the relationship the companies had with their employees (Hamilton, Jo, & Statman, 1993).

Recently, awareness of "ESG investments" (Environment-Social-Governance) has only grown over time. To show this trend, a study was conducted in December 2018 on the state of the market for funds listed in Europe and includes some sort of ESG characteristics in their names. At that time, funds having ESG names were 2,816 and were characterized as responsible investments. Their total assets under management were 496 billion euros, which represents an increase of 12.5% compared to 2017. The number of funds with ESG characteristics in their names also increased by 27% (Ganter & Hamon, 2019).

Additionally, in the European 2018 SIR study that compiles 79% of the total AuM (Asset Under Management) - or 22 trillion euros of the total 25 trillion estimated - in European funds, Eurosif stated, among other observations, that the asset allocation of the investments in funds was approximately 40% for bonds and 47% in equity. To include ESG investments in a portfolio, Eurosif, a leading European organization that promotes responsible investments, has classified seven different strategies that can be put in place such as Exclusion, Best-in-Class, Sustainability themed investments, Norms-based screening, ESG integration, Engagement and voting and Impact Investing. They noticed that the exclusion strategy was the most important one to be used in Europe as it accounts for 9 trillion euros of the 22 trillion euros. The exclusion of controversial weapons and tobacco companies are still the main types of exclusions (Eurosif 2018).

However, the main challenges the asset managers are facing today are to be efficient in this decision process and to find the optimal combination between the different strategies. To do this, they will need some help and clarity on what degree the different strategies could be used and how to choose optimally the potential sustainable investments to include in a portfolio. To cope with this problem, retail investors need to clearly identify sustainable investments thanks to a possible "green label" which would be coherent with their strategy or some help from the EU regulators for the identification of "green assets." The future European taxonomy below will ease them in their tasks (Eurosif, 2018).

6.2 Definitions

The term "Responsible Investments" is hard to define. Nevertheless, to give a first general idea, R. Lowry, defined four goals that Socially Responsible Investments try to achieve. R. Lowry was born in 1926 and is a Professor of Sociology at the Boston College and a promoter of social responsibility of that time. The first goal is to encourage the employment and retention of women or minorities. The second one is to humanize the work environment. That means a clean, safe environment and other factory plans than just establishing a simple production line. The third is the way profits are distributed within the company. The fourth is that finally the consideration of these elements should pay off (Hamilton, Jo, & Statman, 1993).

Today, Eurosif has given a clear but broad definition of Responsible Investments: *"Sustainable and Responsible Investment ("SRI") is a long-term oriented investment approach which integrates ESG factors in the research, analysis and selection process of securities within an investment portfolio. It combines fundamental analysis and engagement with an evaluation of ESG factors in order to better capture long term returns for investors, and to benefit society by influencing the behaviour of companies*." (Eurosif, 2021).

Furthermore, some regulations will arise in the future in Europe to define what exactly is Sustainable Finance. The European Council wants to use a classification system - a taxonomy - for sustainable activities. This will allow all actors to use the same register and avoid using sustainable finance terms for marketing purposes only. This will also help to identify more easily which investments are responsible. To be considered sustainable, companies will have to meet the following criteria:

- *"contribute substantively to at least one of the six environmental objectives that will be defined by the European Council:*
  - *climate change mitigation;*
  - *climate change adaptation;*
  - *sustainable use and protection of water and marine resources;*
  - *transition to a circular economy, including waste prevention and recycling;*
  - *pollution prevention and control; and*
  - *protection and restoration of biodiversity and ecosystems.*
- *not significantly harm any of the environmental objectives;*
- *be carried out in compliance with minimum social and governance safeguards;*
- *comply with specific technical screening criteria."* (European Council, 2019).

6.3 CSR

It is important to note that Corporate Social Responsibility (CSR) on the other hand, is different from the Responsible Investments or even the ESG disclosure definitions. Whereas SRI focuses on investments benefitting society, CSR refers to the actions inside a company, or, in other words, to the actions a company is taking to demonstrate that the firm takes into account social and environmental issues in its business operations and its disclosure with its stakeholders. CSR is based on actions such as transparency, reporting or dialogue (Van Marrewijk, 2003).

6.4 ESG Disclosure Scores

As we just saw, the regulations for determining which companies are sustainable or not are still under consideration, especially in Europe. While waiting for regulations, investors across the world can use their proprietary methodology or benefit from tools such as scores based on ESG data offered by different rating agencies. They provide information on the Environmental, Social and Governance aspects of the company.

The number of ESG data points gathered is increasing over time. Indeed, the number of companies disclosing ESG data has only grown over the past decades. In the early 1990s, only 20 companies voluntarily disclosed ESG information. This number was approximately 9,000 in 2016 (Amel-Zadeh & Serafeim, 2018).

6.4.1 Overview

The ESG rating scores are numerous, the main ones are the Sustainalytics ranks, the Iss quality score, the CDP integrated performance score and the Bloomberg ESG disclosure score.

They all have their particularities and consider different aspects of the company (see appendix 1 for more details on the scores). The Sustainalytics score for example is more focused on the quality of the management to deal with the ESG exposure of the firm. The CDP score is more focused on the impact the company has on climate change, water security or forests. The Bloomberg score and the ISS quality score are more concerned about the disclosure of information of the companies (Huys, 2020).

The aims of the sustainable disclosure of rating agencies would be of two natures. The first one would be to help the direction or boards of directors for their operational management. It would be used for the Balanced Scorecard or to value long-term assets, for example. The second aim is to disclose to all the stakeholders the performance of the company. This way, future candidates could choose to apply for a sustainable company, or another objective would be that the loyalty of customers could be improved. Even internally, publishing this data can be useful.

For example, if the CO2 emission is disclosed, some factories could decide by themselves to reduce their emissions (Chatterji & Levine, 2006).

An important criticism is that some companies could keep some information for themselves if the information has a negative impact. Others could distort information (Siew, Balatbat & Carmichael, 2016). This is probably why the most common ESG scores try to look at companies from one of the two following perspectives: either the ESG disclosure of a firm or the ESG performance of a firm.

6.4.2 Uses of ESG Information

This type of information on a company is useful and important while managing a portfolio. A study on "why and how investors use ESG information" by Serafeim and Amel-Zadeh made in 2018 shows why some institutional investors (pension funds' asset managers, etc.) use ESG information. Serafeim and Amel-Zadeh thought that social responsibility has grown over the years for the general public attention. Thus, following the assumption made by Becker (1971) and Merton (1987) that *"social norms shape economic behaviors and may influence market outcomes",* they felt they needed to know how the ESG data is being used to the service of the public.

Serafeim and Amel-Zadeh (2018) found that there is a growing number of investors (82%) who chose to use ESG information for the selection process. In those, 63% thought that it would bring information which would be important for the performance. These data are generally used for portfolio screening or during the valuation phase. In larger firms, there are other reasons involved to use them such as the need to respond to the clients' demands and the fact that it is part of their development of products. In the future, the ESG data will be more important for a positive screening strategy but there is no consensus. Furthermore, there is still some downside to those data. In these ESG reports, managers pointed the lack of ESG information comparability between companies and the lack of accuracy in these reports (Amel-Zadeh & Serafeim, 2018).

6.5 Problematic

During the following chapters, the scope and understanding of the research will become clearer. Nevertheless, I wanted to draw a clear picture on the subject first and encourage the reader to keep reading and understand the reasoning behind the research and where I want to go with it.

First of all, I oriented my research towards the financial aspect of things regarding the disclosure of ESG information. Fortunately, numerous research has been carried out on the link between CSR disclosure and financial performances. There is even a study regrouping at least 2,000 empirical studies (Friede, Busch & Bassen, 2015).

I then oriented the subject to the link between the information disclosed and the advantages of doing so in emerging countries. The link between the liquidity, the ESG score, and the emerging market made me ask the following question: "Is the information disclosed more valued in one part of the World?"

Unfortunately, as we will see later on, only a few studies tackled the link between liquidity and ESG score. I then searched for differences in the liquidity between emerging and developed countries in link with the ESG score. I found only a couple of articles reviewing solely the developed market. I thought it was odd because it is a broad subject and could potentially bring lots of information for asset and portfolio managers as this could reduce (or not) the cost of investing in emerging countries while considering the ESG impact. This thesis would be interesting for the understanding of liquidity and its determinants in an emerging market, understanding the state of sustainable finance in emerging countries or even the impact on the market of ESG information in those countries.

Therefore, in this master thesis, the first hypothesis I want to put forward is H1: *"The ESG disclosure score is correlated to liquidity in an emerging market."* Thanks to the literature review, the hypothesis will make sense and I wanted to know to which extent the ESG score can influence liquidity.

Afterward, I will make a link with the literature and see the differences or similarities between the emerging market and the developed market. Indeed, it is possible that liquidity may be more or less affected by ESG scores in the region of the world where an ESG information of a firm

could be more or less valued than others (or where the developments of industries are no longer the norm).

7 Literature Review

In this section, I first give a broader view on the challenges of the ESG scores, the differences between developed and emerging markets for the score and develop the factors affecting the ESG score between different parts of the world. I will try to understand the characteristics of the score and by what and how it is affected. This will greatly help our understanding of the different aspects of the ESG score.

Secondly, I provide details on the possible value the score can bring, especially in an emerging country.

Thirdly, I want to conclude on the possible link between the disclosure of financial or non-financial information and liquidity. Finally, we identify the liquidity and its differences across markets.

7.1 Understanding of the ESG Score

In the introduction, we saw what the ESG scores are and their usage. Now let's see what their challenges are, the situation in different parts of the world and what could affect them.

As we just saw, rating agencies face many challenges such as the lack of comparability stated above but also with other factors. First, some companies disclose higher scores than their peers even though they contain more ESG risks. This is partly because companies with higher market capitalization tend to have a higher ESG score than their peers (Doyle, 2018). MSCI (Morgan Stanley Capital International) views two possible explanations. They think this could be due to a better "ESG alignment" or another possibility is that they have the ability and financial possibility to invest in disclosing non-financial information more easily (Doyle, 2018).

To be precise, there is a lot of debate on the ESG score and the financial performance of a company. A higher valuation could be present thanks to a better managing team to deal with ESG issues and improve their scores as a byproduct. On the other hand, *"Companies with higher valuations might be in better financial shape and therefore able to invest more in*

measures that improve their ESG profile; such investments might lead to higher ESG scores." (Giese & Al., 2019).

Secondly, companies in countries with high legal standards tend to have a higher ESG score (Doyle, 2018).

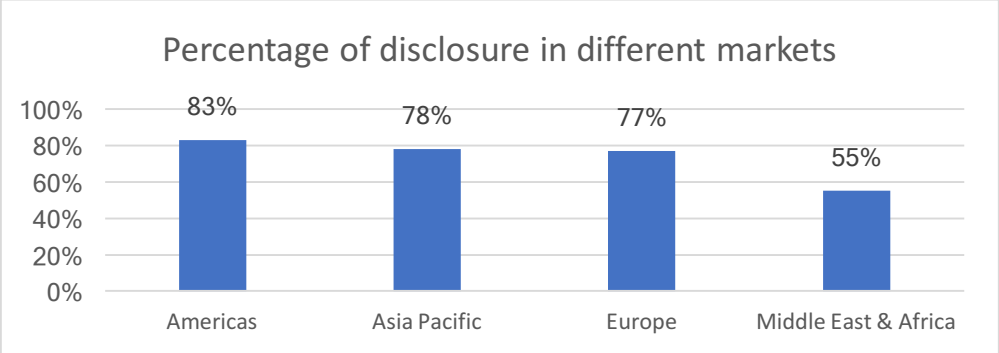
The most explicit example of challenges the score faces is that the VW group has a higher Bloomberg ESG disclosure score than Tesla (Doyle, 2018). It is important to note that Tesla is excluded from different responsible funds due to its Governance. The ESG disclosure scores from Bloomberg are 19.83 for Tesla and 63.64 for the VW group on the 31st December 2019.

7.1.1 ESG Scores in emerging markets vs. developed countries, an overview

Now that we have an overview of ESG scores and their challenges, let's see if there is a difference in the ESG scores across different countries.

In fact, with time, fewer discrepancies exist in disclosing ESG data across countries. Among the top 100 companies of 49 countries in the world, 75% of them disclosed some form of non-financial information. Still, climate change does not seem to be a big concern for them as 72% did not include that climate change would be a risk for their company in their annual report. The distribution of the percentage of firms disclosing non-financial information was 83% in the Americas, 78% in the Asia Pacific, 77% in Europe, and 55% in the Middle East and Africa (Blasco & King, 2017) (figure 1).

Figure 1 Percentage of disclosure in different markets (Author, based on Blasco & King, 2017)



This ratio of ESG disclosure keeps growing over time. Furthermore, the country with the highest increase in two years from 2015 to 2017 is Mexico. This country went from 60% of the top 100 companies disclosing ESG data to 90% of them. This was mostly due to mandatory government regulations. Nevertheless, the area with the biggest jump was the Latin American countries from 74% in 2015 to 81% in 2017. The score used is a proprietary score from KPMG (Blasco & King, 2017).

7.1.2 Location Matters

If we take a closer look inside a country, the more the headquarters of a company is closer to a financial center, the more likely they will disclose CSR information (more specifically the economic, environmental and social aspects of their company thanks to the Global Reporting Initiative, an institution that promotes firm's disclosure thanks to standards). This effect is amplified for non-cross listed firms, family firms and countries with higher income inequality (Zamir & Saeed 2020).

This finding is based on emerging economies. Zamir and Saeed tried to understand what impacts the CSR disclosure of 649 firms in emerging countries such as Brazil, China or Pakistan to name a few, from 2010 to 2015 (Zamir & Saeed, 2020).

Similarly, companies inside the US tend to show the same results. The CSR disclosure has been improved thanks to the localization near financial centers or a cluster of high CSR disclosing firms (Husted, Jamali & Saffar, 2016).

7.1.3 What impacts CSR scores between developed and developing countries, a first explanation

We now know the different scores, the challenges and the state of ESG score in the world. In this part, I will go further and try to understand what can influence the ESG score across different markets. As we just saw, the location of the headquarters plays some roles as well as higher market capitalization or regulations. I chose two studies, one broad and one specific, to have different views on the subject and possible different explanations. As a reminder, an ESG score is focused on the Environmental, Social and Government score of a company.

In the following two articles, they talk about "CSR score" and "CSR disclosure." As a reminder, CSR corresponds to the actions of the firm to disclose non-financial information. So, when it is a question of CSR disclosure, they incorporate ESG data but also disclosure for other fields in a firm such as information disclosed about their products, for example. This is why I will consider that "CSR disclosure" or "CSR score" covers a larger spectrum than the "ESG disclosure" or "ESG score."

In the first study, made by Ali, Frynas & Mahmood in 2017, many characteristics can influence CSR disclosure (taking into consideration environmental, HR, community, products and consumers, and CSR disclosure in general of a firm) and practices in a developing or a developed market. Three main categories of characteristics can be highlighted as follows:

- The company characteristics, which are unique to the firm, such as the sector;
- The general contextual factors, which are based on the culture of the firm's country, the political aspects, the regulations;
- The internal contextual factors, which is corporate governance (ownership concentration, board structure).

The study made by Ali, Frynas & Mahmood (2017) is based on 76 empirical studies and tries to put forward the factors influencing CSR disclosure in different markets. The methodology used was to find keywords in Google Scholar. The developed countries have been defined as *"having GDP per capita income above $12,276 in 2014"* (Ali, Frynas & Mahmood, 2017). The developing countries have been defined thanks to the World Bank list of 2012. In both the developed and the emerging market, it is important to note that the company characteristics have received more attention than the other factors. Let's first see the factors in the developed markets and then in the developing markets.

In the developed market, the *company characteristics* influencing the CSR disclosure are the company size, the industry sectors ("*oil and gas, forestry and paper, chemicals, mining, steel and other metals, electricity, gas distribution and water"* are considered as industries disclosing more due to their sectors (Reverte, 2009)), the social media visibility, and the age of assets are found to be positively associated with disclosure.

The *general contextual factors* of a country can influence CSR disclosure. There are some differences in disclosing information between Europe and the US, for example, or even across countries inside the European Union itself. Ali, Frynas & Mahmood (2017) compared the USA with Norway and Denmark, and the differences would be due to:

- Cultural systems (the culture of the country). If the country emphasizes climate actions, there will be more disclosure of environmental information.
- Governance systems, the company could be viewed as a multitude of contracts (contrarian view) that link each other thanks to contracts and tries to maximize the residual value (which is the shareholders). Or, the communitarian view, which increases disclosure, sees the firm as a social organization that has social responsibilities.
- Ownership structures, the firm could have a foundation (like in Norway) in its ownership structure, this will likely put more pressure to disclose information.

Moreover, the interest of stakeholders potentially has an influence on disclosing information or not. If the regulators, shareholders, creditors, investors, environmentalists or media have a particular concern, it may influence the CSR disclosure policy.

Additionally, in developed countries, the managers tend to view and acknowledge more that the decisions they make, have an impact on the local suppliers, the local community or their customers. Similarly, public pressure has a positive effect on the CSR disclosure of a company.

There is not a lot of research made for *the internal contextual factors*. Nevertheless, board structure (presence of non-executive in the board, independence of the board, larger board size, presence of an audit committee), the desire to present a CSR image to the general public and the need for a competitive advantage influence positively the disclosure.

Now let's focus solely on the developing countries. The developing markets have some similarities but also some differences with the developed markets. Unfortunately, CSR disclosure in developing markets is not studied as much as in other markets. Thus, there are fewer papers on the subject.

First, let's see the *company characteristics* influencing CSR disclosures for the emerging markets. They are almost the same as the developed markets, which are the size and the industry

sector. Media exposure also has an influence and the firms with multiple listings are associated with higher disclosure.

In developing markets, the influence of other participants (regulators) is more present than in developed markets. The *general contextual factors,* and more specifically, the national context of a firm, has a significant influence. It may lead to discrepancies between countries as the priorities are not the same. The presence or lack of government regulations or international regulators (World Bank) has an important effect on disclosure as we saw above in section 7.1.1. with Mexico.

Likewise, the firms will disclose more if they belong to an international value chain. If they have international buyers, foreign investors or if the international media has some concerns, there will be a positive effect on the disclosure.

Unfortunately, the public pressure in developing countries is not an important factor to be accounted for disclosure.

The *internal contextual factors* have received more attention in developing markets. Just like developed markets, firms tend to disclose more to gain an award or to gain a reputation. The corporate structure and especially the presence of international or external people influences disclosure. To go deeper, the external factors of a firm are more present in developing markets. For example, foreign, institutional or government ownership plays a positive role in disclosing. Oppositely, managerial and high concentration of ownership plays a negative role.

Regrettably, in developing countries, the motivation to disclose data is too low, the cost to report information is too high and the corporate governance being lower, there is a lack of CSR disclosure.

To sum up, the main differences between the two are that, in developed markets, disclosure arises as it is part of the culture of the country. In developing countries, on the other hand, disclosure is more likely if some regulation is present and/or if the company is part of an international integration of some form such as international investors or being part of an international supply chain (Ali, Frynas & Mahmood, 2017).

Here is a summary table of the characteristics:

Table 1: Summary of the factors affecting the CSR disclosure in different markets (Author)

	Developed markets	Developing Markets
Company Characteristics	Company size, industry sectors, social media visibility, age of assets	Company size, industry sectors, media exposure, multiple listings
General contextual factors	Culture of the country, governance systems, embedded ownership structures, view on the local community	Regulations, international value chain (buyers, investors)
Internal Contextual factors	Ownership structures, board structure, desire to present a CSR image to the general public, the need for a competitive advantage	Award, reputation, foreign or government ownership

7.1.4 What impacts CSR scores between developed and developing countries, a second explanation

The previous study was a summary of multiple studies. Therefore, I wanted to confront the findings with a more focused study.

Some factors are also pointed out by Bhatia and Makkar (2020), which can possibly explain the differences in disclosing scores across markets:

- *The influence of a country's governance interests in CSR.* Generally, developed countries have more NGOs. There are also more strict policy rules concerning CSR.
- *The developed economies have more capacity to develop CSR practices.* Developing countries lack resources to be able to afford an interest in CSR.
- *The higher the corruption in a country is, the lesser the CSR interests.*
- *Culture also has an impact.* Developed countries, being more individualistic, disclose more CSR information to their shareholders because there are more interests to do so (Bhatia & Makkar, 2020). For this hypothesis, note that, as a reminder from section 7.1.1., the Asia Pacific region which is not broadly considered

> as developed has a disclosure of 78% for its top 100 companies (as an example: 99% in India, 97% in Malaysia and 77% for Australia) compared to 77% in Europe.

In this environment of multiple hypotheses, Bhatia and Makkar (2020) wanted to summarize the different factors affecting CSR disclosure between developed and developing countries. The study was based on the index of BRICS (Brazil, Russia, India, China, South Africa) countries compared to UK and US firms. The indexes for BRICS are, in order, IBrX 100; Russia Broad Market index; BSE 100; SSE 180; JSE All-share index and for the US and UK: NYSE 100; LSE 100. Furthermore, if any information was lacking, they would directly eliminate the company from the list. It is important to note that data was taken in 2014 and 2015 because numerous BRICS countries have imposed CSR policies at that time. The CSR score is a proprietary disclosure score that was created with the data found in firms' reports.

They used 6 models for each market (see appendix 2 for all the models and comments). The different variables are the country of the stock (they used a dummy variable, India as a baseline for emerging market and the UK as a baseline for developed market), the governance environment (GEI index by Li and Filer), the globalization of a country (gross foreign direct investment as a percentage of GDP), the income distribution (GINI index), the industry sector (dummy variable with consumer goods as a baseline), the log of size (number of employees), the ROA, the leverage, the international listing ("*Number of overseas stock market in which a company is listed"*), the board size (number of directors on the board), the board independence (percentage of independent directors on the total number of directors) and the CSR committee (presence or not).

The results can be found in figure 2. It is a summary or synoptic view of all the models they created.

Figure 2 Summary of Regression Results - ESG factors (Bhatia & Makkar, 2020)

Variable	Expected sign	Actual sign: Developing countries (BRICS)	Actual sign: Developed countries (USA and UK)
Governance environment	+	+ **	+
Globalization	+	+ *	Ø
Income distribution	−	− *	Ø
Industry	+	+ **	+ ***
Size	+	+ *	+
Profitability	+/−	−	+
Leverage	+/−	−	+
International listing	+	+	+ ***
Board size	+	+ *	+
Board independence	+	+ **	+ **
CSR committee	+	+ *	+ **

* is significant at the 1% level, ** = 5%, *** = 10%

Firstly, they looked at the impact of the environment of the company.

They found that countries that are "relational based" disclose less ESG information (at the 5% level). Rule-based countries are based on a legal system that is transparent, fair and without any implication of the State. On the opposite, BRICS are considered relation-based due to laws that are not transparent and courts that are influenced by political parties. The public information is less trusted. Thus, if they need business-related help (loans, etc.), they will rely on their connections and not on the information publicly disclosed.

The more globalized a firm is, the more they will disclose ESG information (at the 1% level). This can be explained thanks to a larger stakeholder base to satisfy and this way, disclosure can be viewed as a competitive advantage.

The income gap also has an impact on disclosure. The higher the gap, the less disclosure there will be (at the 1% level). It could be explained by the priority of the disclosure in their daily lives.

Secondly, they looked at the different specificities of the companies.

The industry of a firm has some impact on disclosure (at the 5% to 10% level or none depending on the sector). For example, energy and basic materials-oriented companies bear pressure from environmentalists to disclose more information.

The size of the firm also has a positive influence to disclose more (at the 1% level solely for the developing market). The bigger the firm, the more likely it is known to the public. This could put public pressure on the company to disclose more.

The profitability (ROA) of the company is not significant enough to prove that higher profitability will help to disclose more.

The leverage is also not significant enough to prove that a higher leverage company will need to disclose more. They probably don't want to put resources in non-financial disclosure if they have a lot of debt. This result is contrasted because the firms could disclose by themselves to reduce the costs of debts as the creditors are more aware of the challenges the company is facing. On the other hand, they could use different methods to inform the creditors of the situation, methods which do not consist of publicly disclosing information.

The multiple listings have a positive impact on the disclosure but solely for developed markets and at a 10% level. It is probably due to the lack of experience in developing countries as it is quite new for them. This is contrasted with the previous study which found the opposite result.

A larger board size brings a significant positive influence on disclosure in developing countries (at the 1% level solely for the developing countries). It allows for more diversity and different points of view.

The independence of the board also has a positive impact (at the 5% level for both markets). Independent board member doesn't have a financial interest. This allows them to have another view and different interests in the firm.

The presence of a CSR committee positively influences the disclosure (at the 1% to 5% level). This presence allows the company to face more easily ESG issues (Bhatia & Makkar, 2020).

I want to highlight that in both markets the industry sector, the board independence and the presence of a CSR committee have an impact on disclosure in the same way and are significant.

Note that the Bhatia and Makkar (2020) study tried to disclose one regression model for the "full model" but it was not clear enough. This is the reason why I did not disclose the equation in this thesis but tried to write what was going on in the models. Moreover, they did not disclose

the governance environment in the model 5 and 1b (available in appendix 2) in the developed market even though it is not statistically significant, they should be present. It is strange considering all the variables (except the country dummy) are disclosed in the "full model."

7.1.5 What impacts CSR scores between developed and developing countries, summary

These two papers ("Stage of development of a country and CSR disclosure" by Bhatia and Makkar (2020) and "Determinants of Corporate Social Responsibility (CSR) Disclosure in Developed and Developing Countries: A Literature Review" by Ali, Frynas & Mahmood (2017)) have some similar findings.

Overall, the number of possible explanations for CSR disclosure is quite impressive.

- For the emerging countries: company size, industry sector, media exposure, multiple listings (mixed results), regulations, being part of an international value chain, reputation, ownership structure, governance environment, income distribution, board independence and size, presence of a CSR committee.
- For the developed markets: company size, industry sector, social media visibility, age of asset, governance systems, view on the local community, ownership structure, board structure and independence, the desire to present a CSR image to the public, the need for a competitive advantage or the presence of a CSR committee.

7.2 Does the ESG score bring value to Indian companies?

Now that we have seen what could affect the score, let's see if the score brings some sort of value. For this purpose, we will take India as an example of an emerging country. This part can be viewed in three ways. One, this could attract investors in high ESG scores companies. Two, this could help to understand if there is any reason for shareholders to disclose information in emerging countries. Three, this could attract international investors and maintain this disclosing effect as they are partly responsible, *via the international value chain*, for a higher disclosure in emerging countries (Ali, Frynas & Mahmood, 2017).

Chauhan and Kumar (2018) studied if the ESG disclosure score from Bloomberg during the period 2007 to 2016 had any impact on different measurements such as the firm value calculated by Tobin Q (*"total outstanding stock multiplied by the year-end stock prices plus total borrowing, divided by total assets"*), the cost of capital (*WACC*), debt (*computed by Bloomberg*) and equity (*CAPM, "the beta is a 24 months' rolling window, the risk-free rate is the 10 year bonds of the country"*), the operating cash flows (*nopat/total asset*), the dividend payout ratio (*dividend/profit after tax*) and the ROA on 630 Indian companies (Chauhan and Kumar, 2018).

Firstly, the study shows that the firm value is impacted by the ESG score (figure 3). If the company goes from the first quartile of the distribution in ESG score to the third, its valuation will increase by almost 10%. Since the average of the Tobin Q is 1.32, the interquartile of the ESG score is 6.23 and the ESG coefficient in the model is 0.021. We can calculate the increase of Tobin Q by doing: 6.23*0.021 = 0.13, which is around a 10% increase from the average score (1.32).

Figure 3 ESG and firm value model (Chauhan and Kumar, 2018)

Variable	Base model	Governance control
Intercept	2.074***	2.375***
	(3.360)	(3.870)
ESG	0.021***	0.021***
	(2.780)	(2.680)
*ESG * Group*		
Group	0.020	0.036
	(0.230)	(0.420)
Size	0.023	0.036
	(0.810)	(1.210)
Leverage	0.271	0.259
	(1.060)	(0.880)
ln (Firm age)	−0.006	−0.044
	(−0.090)	(−0.620)
Dividend dummy	0.323***	0.327***
	(4.950)	(4.670)
Board ind (%)		−0.004*
		(−1.690)
Tobin Q		
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Firm fixed effects	No	No
Adjusted R^2	0.23	0.23
N	3837	3837

*** significant level at 1%, **= 5%, * = 10%

Chauhan and Kumar (2018) acknowledge that this could be due to a good management team (better management tends to disclose more and have a better valuation as well as a better ESG score). So, they checked again the results with another variable, the board independence (figure

3, column 2). It did not change a lot the result. The firm value could still be explained and positively linked with the ESG score. The R^2 of this model is 0.23.

Secondly, they tested the costs of capital, equity and debt for stand-alone firms (figure 4). For the cost of equity, the ESG score is significant and negative at the 1% level, R^2 is 0.61. This means that 61% of the cost of equity could be explained by their model. This is interesting because the ESG score could therefore decrease the cost of equity. Indeed, a firm going from the first quartile of the ESG distribution to the third would decrease their cost of equity by 0.85%. The ESG score interquartile is 6.23, the mean cost of equity is 10.99, the ESG coefficient of the model is -0.015. We can calculate this 0.85% by doing: -0.0085 = *((6.23*-0.015)/10.99)*. For the cost of debt, their R^2 is 0.16 and the ESG score is not significant. The cost of capital is negatively impacted by ESG score, significant at the 5% level and their R^2 is 0.29. So, 29% of the cost of capital could be explained by their model.

Figure 4 ESG, Cost of funds model (Chauhan and Kumar, 2018)

*** significant level at 1%, **= 5%, * = 10%

Panel A-without group affiliation

Variable	Cost of capital	Cost of debt	Cost of equity
Intercept	11.109***	2.854***	11.201***
	(36.89)	(4.74)	(42.81)
ESG	−0.011**	−0.012	−0.015***
	(−2.11)	(−1.45)	(−4.22)
ESG ∗ Group			
Group	0.181**	−0.005	0.176**
	(2.22)	(−0.03)	(2.51)
Size	0.058**	0.49***	0.283***
	(2.33)	(10.34)	(12.93)
Leverage	−0.447***	0.996***	0.071
	(−2.75)	(2.77)	(0.64)
ln (Firm age)	0.066	−0.143	−0.072
	(1.16)	(−1.28)	(−1.49)
Board ind(%)	−0.001	0.011**	0.001
	(−0.36)	(2.35)	(0.27)
Tobin Q	0.141***	−0.089	−0.13***
	(5.19)	(−1.42)	(−5.46)
Adjusted R^2	0.29	0.16	0.61
Industry fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
N	3837	3837	3837

Thirdly, the ESG score could be explaining part of the higher operating cash flows and the dividend payout ratio (figure 5, columns 1 and 3). For stand-alone firms, the ESG score is significant at the 10% level and positively linked with operating cash flows/total assets. It means that a higher ESG score could mean a higher operating cash flow, their R^2 is only 0.10. The same observation can be made for the dividend payout. A higher ESG score means a higher dividend ratio, at a 10% level but with an R^2 of 0.16. So, the ESG score could explain the

dividend payout ratio and operating cash flows but it is less distinctive than other observations in this study.

Figure 5 ESG, CFO & dividend model (Chauhan and Kumar, 2018)

*** significant level at 1%, **= 5%, * = 10%

Variable	Operating cash flows (CFO/TA)		Dividend payout	
Intercept	−0.704	0.021	29.229***	33.703***
	(−0.200)	(0.430)	(3.710)	(4.160)
ESG	0.047*	0.002***	0.104*	0.166**
	(1.920)	(3.470)	(1.890)	(2.290)
ESG ∗ Group		−0.001**		−0.314**
		(−2.380)		(−2.310)
Group	0.973*	0.029***	0.870	−3.617*
	(1.790)	(2.780)	(0.900)	(−1.670)
Size	−0.209	0.001	−0.530	−0.544*
	(−1.210)	(0.490)	(−1.620)	(−1.670)
Leverage	2.558	0.020	−18.161***	−18.379***
	(0.680)	(0.570)	(−6.560)	(−6.640)
ln (Firm age)	−0.082	0.000	2.477***	2.408***
	(−0.240)	(0.010)	(3.590)	(3.490)
Board ind(%)	−0.014	−0.000	−0.076**	−0.081**
	(−0.840)	(−0.830)	(−2.210)	(−2.360)
Tobin Q	2.409***	2.109***	1.504***	1.520***
	(3.890)	(3.190)	(4.300)	(4.350)
Adjusted R^2	0.100	0.100	0.140	0.140
Industry fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
N	3837	3837	2385	2385

Finally, the ROA (EBITDA/total assets), an operating performance measure, could be explained by the ESG score (figure 6). Indeed, the significance level is at 1% and is positive. This means that the higher the ESG score the higher the ROA. So, even though the link between operating cash flows and ESG is fuzzy, the link between ROA and ESG is clearer. Note that the R^2 is 0.27 (Chauhan & Kumar, 2018).

Figure 6 ESG, ROA Model (Chauhan and Kumar, 2018)

*** significant level at 1%, **= 5%, * = 10%

Variable	ROA_{t+1}	
Intercept	11.001**	9.279**
	(2.490)	(2.070)
ESG	0.075***	0.195***
	(3.140)	(3.370)
ESG ∗ Group		−0.139**
		(−2.270)
Group	−0.438	1.528
	(−1.120)	(1.610)
Size	−0.282**	−0.275**
	(−2.320)	(−2.270)
Leverage	−4.940***	−4.914***
	(−8.260)	(−8.220)
ln (Firm age)	−0.117	−0.112
	(−0.410)	(−0.400)
Dividend dummy	6.223***	6.218***
	(14.890)	(14.890)
Board ind(%)	−0.012	−0.010
	(−0.860)	(−0.730)
Adjusted R^2	0.276	0.267
Industry fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
N	3837	3837

From these observations, we can conclude that the ESG score has a significant impact on the value of the firm (positive impact), the cost of equity (negative) and the ROA (positive). The same relation exists but to a lesser extent for stand-alone firms on the operating cash flows (positive) and the dividend payout ratio (positive). From that perspective, international investors could be interested in emerging companies with higher disclosure scores. On the other hand, the investors could be uninterested if the costs to invest in those countries are too high and one of these costs is the liquidity.

7.3 Liquidity and ESG Disclosure

Now, we have an understanding of what the ESG scores are, what impacts the CSR disclosure and the value it brings to the investors. Let's see the possible link between liquidity and the ESG score. As a reminder, some ESG scores are based on the amount of non-financial information that is being disclosed. Others create a score on the performance of a company on the ESG issues. I will focus on the ESG disclosure score as the link with liquidity might be clearer as it considers the amount of information disclosed and is not subjective. In this part, I think it is important to understand what happens with liquidity when a company discloses some type of information. I will begin with financial information and then look at non-financial information.

The link between financial information and liquidity could help us understand what might happen when the company discloses non-financial information to the stakeholders. The link with liquidity could be the same relation for financial and non-financial information. Indeed, the information disclosed is about the company and could be relevant in the way the management makes their decisions, for example, or the way they deal with ESG issues. Therefore, it could bring value to the investor and help him/her in the choice of buying or selling a company at the right price.

7.3.1 Liquidity and Financial Disclosure

The study chosen to make a link between liquidity and financial information is made by Leuz and Verrecchia in 2000. It was focused on firms going from German accounting reporting

standards to international accounting reporting (such as US GAAP or IAS). The mindset behind the study is that when a firm publishes some financial information which is value relevant, there is less asymmetry of information between the buyer and the seller[1].

This change of accounting reporting indeed reduced the cost of the adverse selection between sellers and buyers. This reduction of the cost was seen in the lowering of the bid-ask spread which is one of the proxies (as with the trading volumes or share price volatility) for the information asymmetry part embedded in the cost of capital (Leuz & Verrecchia, 2000).

7.3.2 Liquidity and Non-Financial Disclosure, a First Study

Now, let's see what happens with non-financial information. The next study by Egginton and Mc Bayer (2019) appears in an environment where the literature is composed of multiple studies linking ESG disclosure and the performance of the company.

A lot of studies have been made to try to show a link between CSR disclosure and financial performances. However, there has been no clear and definitive consensus on the question. This is mostly due to the different methodologies used and the choices of different approaches to calculate the performance or the CSR disclosure. Nevertheless, multiple studies found a positive link between ESG disclosure and the performance of a company. Therefore, some authors tried to go deeper and find which performance variable of the company could be affected by this disclosure.

In this environment, Egginton and Mc Bayer (2019) gathered different studies and presented their study as such [rephrased hereunder]:

"One of those characteristics of performance could be the cost of capital. Qhaliwal, Li, Tsang, and Yand (2011) and Revert (2012) found a link between the cost of capital and the transparent CSR strategy of a company. If there is a transparent CSR strategy, the cost of capital will be lower. But how the CSR strategy is transmitted in the cost of capital? It could be due to better

[1] This effect can be explained more easily thanks to The Market for Lemons by Akerlof. The seller knows the car and its issues while the buyer doesn't. This is why the buyer usually will ask for a lower price to compensate for this asymmetry of information.

risk management (Godfrey et al., 2019), investors might agree to pay a premium for a more responsible firm (Richardson & Welker, 2001) or, this corresponds to a shift in consumer behavior for those types of firms (Lev, Petrovits, & Radhakrishnan, 2010)" (Egginton and Mc Bayer, 2019).

By these hypotheses of transmission from CSR transparency to the cost of capital, we can see that CSR transparency is important. From what I have gathered above, one of the most important aspects when considering CSR disclosure is the value the information brings. For example, here are some of the values that can be brought by CSR disclosure:

- It brings information on the way management deals with ESG issues and risks for the company.
- It brings proves to the investors regarding the social responsibility of the company, for which they would be ready to pay a premium.
- It brings proves to the consumers that the company is socially responsible and corresponds to their values.

Disclosing information is one thing, but as explained, it's important to make sure that this data disclosed will be meaningful for the stakeholders. To that question Egginton and Mc Bayer (2019) answers as such [rephrased hereunder]:

"If there is no value in the disclosed data, the asymmetry of information is not improved and the investors will continue to try to protect themselves via the price, reducing liquidity or their willingness to trade (Barry & Brown, 1986; Copeland & Galai, 1983; Merton, 1987). The cost to trade will therefore be greater and decrease liquidity (Amihud, 2002; Amihud & Mendelson, 1986). It is via this way that the cost of capital can be affected" (Egginton and Mc Bayer, 2019).

In this study, Egginton & McBrayer (2019) found a link between the ESG disclosure score from Bloomberg and different liquidity proxies as the "Amihud illiquidity" multiplied by 10^6, the "Turnover" *("computed as the daily volume of a given security scaled by the shares outstanding of the security on the same day"),* and the "daily bid-ask spread" for 3,511 firms from 2006 to 2015. For interpretation, a lower Spread and Amihud illiquidity mean higher liquidity, a higher Turnover means higher liquidity.

The sample is probably from the CRSP Total market (US firms) as the authors measured liquidity from the Center of Research in Security Prices covering 3,511 firms and the total US market is near 4,000 securities. This assumption cannot be confirmed and the data will therefore be considered as a broad market.

Some descriptive statistics of the proxies which will be useful in the economic signification are available in figure 7. The model used is:

$$Liquidity_{i,t} = \alpha + \beta_1 ESGScore_{i,t} + \gamma Controls_{i,t} + \varepsilon_{i,t}$$

where:

$Liquidity_{i,t}$ is the average of one of the three liquidity measures of a firm i at time t (one given year) ;
$ESGScore_{i,t}$ is the Bloomberg disclosure score of the firm i on year t;
β_1 and γ are the coefficients of the different variables;
$\gamma Controls_{i,t}$ is the vector of the control variables of firm i on year t.

The different control variables are:

- *"Mkt. Cap. is measured as the average of the daily market capitalization for a firm over a given year in billions of dollars.*
- *10-K size as the file size of a firm's 10 K filing in a given year excluding tables and figures in megabytes.*
- *Volume is the average daily trading volume for a firm over a given year in millions.*
- *Volatility is the standard deviation of daily closing price returns over the year.*
- *Price is the average of the daily closing price for a firm over a given year."* (Egginton and Mc Bayer, 2019).

Figure 7 Statistics of the liquidity proxies (Egginton & McBayer, 2019)

TABLE 1 Descriptive statistics

Panel A: Full sample								
	N	Mean	Median	Std. dev.	p5	p25	p75	p95
Equity liquidity								
Spread	18,281	0.0092	0.0081	0.0045	0.0041	0.0060	0.0113	0.0175
Amihud	18,281	0.2531	0.0185	1.1281	0.0006	0.0038	0.1047	0.9511
Turnover	18,281	0.0094	0.0074	0.0078	0.0018	0.0046	0.0118	0.0232
CSR disclosure scores								
ESG score	18,281	0.1624	0.1272	0.0969	0.1116	0.1116	0.1579	0.4050
Control variables								
10-K size	18,281	7.2670	4.9440	8.4278	0.4461	1.6410	9.5264	22.3793
Price	18,281	34.2175	24.0323	45.5587	4.0652	12.5485	42.9533	86.1117
Mkt cap ($B)	18,281	6.7503	1.2465	23.1766	0.1347	0.4057	3.9846	26.9888
Volume (M)	18,281	1.8229	0.4824	8.1954	0.0266	0.1608	1.4151	6.6967
Volatility	18,281	0.0262	0.0230	0.0167	0.0110	0.0164	0.0323	0.0513

Thanks to this model, we can observe (figure 8) that the ESG score is significant at the 1% level for the *Spread* and the *Amihud* model and at the 5% level for the *Turnover* to explain the liquidity proxies calculated by the three measures. In economic terms for the Spread, the rise of the Bloomberg ESG disclosure score will decrease the spread. To be more specific, the interquartile of the ESG score (from 25% = 0.1116 to 75% = 0.1579) is 0.0463, the coefficient of the ESG score in the Spread model is -0.0051. We can calculate the decrease of the Spread by doing: -0.0051*0.0463 = -0.00023613 percentage points (coefficient of the Spread*the difference of the two quartiles = difference in Spread).

Figure 8 CSR disclosure and liquidity (Egginton & McBayer, 2019

*Is significant at 10% level, ** = 5%, *** = 1%

TABLE 3 CSR disclosure and equity liquidity

Dependent variable	Spread	Amihud	Turnover
ESG score	−0.0051***	−0.5918***	0.0073**
	(−5.460)	(−3.720)	(2.286)
10-K size	−0.0000*	−0.0022	−0.0000
	(−1.967)	(−0.693)	(−0.076)
Price	−0.0000***	−0.0017***	0.0000*
	(−3.435)	(−5.406)	(2.022)
Mkt cap ($B)	−0.0000	0.0009	−0.0000***
	(−0.712)	(1.534)	(−3.157)
Volume (M)	0.0000	−0.0052*	0.0002*
	(0.329)	(−1.852)	(1.829)
Volatility	0.1826***	9.9851**	0.1434**
	(3.930)	(2.779)	(2.830)
Constant	0.0059***	0.0940	0.0040**
	(3.750)	(0.739)	(2.251)
Observations	18,281	18,281	18,281
Adj. R^2	0.698	0.038	0.169

This value corresponds to almost a 2.5% decrease of the median Spread (=0.0092). Indeed, to check the answer we can do, -2.45%*0.0092 = -0.00023613. For the Amihud illiquidity mean value (0.2531), this change of quartile in the ESG score for a firm would correspond to a decrease of 10.8 % and, for the Turnover mean value (0.0096) this would correspond to an increase of 3.6%. This effect is also significant at the 1% level whether it is based on the Environment, the Social or the Governance issue of Bloomberg's score (figure 9).

Figure 9 CSR disclosure and liquidity, decomposed (Egginton and Mc Bayer, 2019)

*Is significant at 10% level, ** = 5%, *** = 1%.

TABLE 4 CSR disclosure components and equity liquidity

Dependent variable	Spread			Amihud			Turnover		
Environ	−0.0009***			−0.0557***			0.0022**		
	(−5.776)			(−2.914)			(2.226)		
Social		−0.0018***			−0.2024***			0.0035***	
		(−8.862)			(−2.853)			(3.139)	
Govnce			−0.0069***			−1.1834***			0.0145***
			(−7.705)			(−6.183)			(5.803)
10-K size	−0.0000**	−0.0000***	−0.0000***	−0.0008**	−0.0029**	−0.0022	0.0000	0.0000***	−0.0000
	(−2.407)	(−5.144)	(−2.820)	(−2.515)	(−2.349)	(−1.222)	(1.129)	(2.798)	(−0.099)
Price	−0.0000***	−0.0000***	−0.0000***	−0.0003***	−0.0006***	−0.0016***	0.0000	0.0000**	0.0000***
	(−3.688)	(−3.501)	(−3.836)	(−3.024)	(−3.045)	(−4.391)	(1.575)	(2.555)	(2.863)
Mkt Cap ($B)	0.0000	−0.0000	−0.0000*	0.0002***	0.0007**	0.0007*	−0.0000***	−0.0000***	−0.0000***
	(0.103)	(−1.551)	(−1.690)	(2.627)	(2.200)	(1.749)	(−3.476)	(−3.160)	(−3.432)
Volume (M)	−0.0000***	−0.0000**	0.0000	−0.0008**	−0.0037*	−0.0050*	0.0001**	0.0001**	0.0002**
	(−3.510)	(−2.497)	(0.182)	(−1.992)	(−1.888)	(−1.742)	(2.049)	(2.090)	(2.096)
Volatility	0.2605***	0.2566***	0.1828***	4.3155***	16.0719***	9.7753***	0.4455***	0.2805***	0.1457***
	(44.174)	(25.769)	(4.177)	(3.494)	(3.322)	(2.816)	(11.569)	(11.701)	(3.151)
Constant	0.0018***	0.0027***	0.0086***	−0.0324	−0.1372	0.6000***	0.0002	0.0019***	−0.0022
	(12.180)	(9.456)	(5.222)	(−1.306)	(−1.136)	(3.940)	(0.194)	(2.742)	(−1.044)
Observations	4,538	9,525	18,274	4,538	9,525	18,274	4,538	9,525	18,274
Adj. R^2	0.888	0.828	0.695	0.041	0.050	0.039	0.364	0.245	0.171

Based on this study, we can see that the Bloomberg ESG disclosure score could increase liquidity in a broad market (as we don't have the composition of the sample).

7.3.3 Liquidity and Non-Financial Disclosure, a Second Study

A study made by Siew and al. (2016) stressed this finding but on the developed market. The development of their hypothesis is quite the same as Egginton and Mc Bayer (2019). The development is [rephrased hereunder]:

"In the literature, the corporate governance has been studied with the market information asymmetry. The result is that a lower market information asymmetry occurs when the corporate governance is better. This could be due to two reasons. Better management tends to be better at disclosing information qualitatively and quantitatively. Secondly, the reduction of market information asymmetry will increase market liquidity. […] Moreover, El Ghoul et Al. (2011) found that the cost of capital is cheaper if the firm has better ESG performance" (Siew, Balatbat & Carmichael, 2016).

Therefore, Siew and al. (2016) wanted to go deeper and link the two discoveries to find if "*there is an impact of ESG disclosure on market information asymmetry*" (Siew, Balatbat & Carmichael, 2016).

Siew and al. (2016) used 683 firms in the NYSE to study this relationship. They made a correlation table of coefficients between the spread (defined as *"the annual average ratio of the daily closing bid-ask spread to the closing price"*), the Bloomberg ESG disclosure score and different control variables such as the size (log of assets), the debt-to-equity ratio, the standard deviation of daily returns and the inverse of the daily closing stock price for the years 2007 to 2011. The results are that the spread and the ESG score are negatively correlated for the years 2007, 2008, 2009 (with a p-value of 0.000, the p-value is 0.176 for 2010 and 0.450 for 2011). So, the negative relationship between the Bloomberg ESG disclosure score and the bid-ask spread can be found in the US market in this period (Siew, Balatbat & Carmichael, 2016).

This is where this master thesis will be useful. We just saw that the Bloomberg ESG disclosure score and liquidity are linked in the US (or in a broad market for the Egginton and MC Bayer study in 2019). But what about the emerging market? First, let's see the state of liquidity in this market.

7.4 Liquidity in Emerging Countries

We just saw that some of the liquidity proxies of a firm could have a relation with the ESG score of the firm. But this finding was not specifically targeted in the emerging countries. Let's continue to understand the determinants of liquidity and especially in emerging countries.

In this thesis and this part, we must keep in mind that measuring the liquidity of the emerging market is not that easy due to the inactivity of some stocks to be exchanged during some period. Even the data retrieval is complicated as not all the information is perfectly disclosed. Moreover, many papers are written to explain new measures of liquidity more than being interested in the determinants of liquidity in emerging countries.

Nevertheless, Kang & Zhang (2014) compared the emerging markets, which is composed of countries with high, medium and low GDP per capita such as Greece, Singapore, Taiwan, Poland, Portugal, South Korea, Israel for *high GDP/capita*, Brazil, Malaysia, Turkey, Russia, Mexico, Chile for *medium GDP/capita* and India, Philippines, Indonesia, China, Thailand, South Africa, Argentina for *low GDP/capita*, and the US market.

The emerging market seem to be less liquid compared to the US market. The average effective spread (calculated as $2 * \frac{|P-K|}{K}$ where P is the trading price of the trade and K is the mid quote when the trade happens) of those 20 emerging countries is 2.8% compared to the average spread of 0.5% for the NYSE stocks from January 1996 to December 2007 (Kang & Zhang, 2014).

It is similarly important to note that there are differences in the spread between emerging countries themselves (the higher the GDP per capita, the lower the spread). Countries like Taiwan or Portugal (considered as emerging countries with high GDP/capita) have on average, a lower spread of 1.284 percentage points compared to India or China (considered as emerging countries with low GDP/capita). Moreover, the number of days with zero trading volumes is twice as important in poorer than in richer emerging countries (Kang & Zhang, 2014).

To go deeper, another study made by Lesmond (2005) found that the number of zero return days, in emerging markets, is more important for LATAM (Latin American countries) and Middle East countries than for European or Asian countries.

The second observation he made was that high volatility, a low stock price and low trading volumes result in a low liquid market. This is based on the following statements:

> *"Price is a proxy for bid-ask spread and risk (Benston & Hagerman, 1974)"* – in the OTC market.
>
> *"Volume is a proxy for market depth (Pagano, 1989)."*
>
> *"Volatility is a proxy for liquidity (Cohen & Al., 1976) – thin markets are more volatile."*

For example, the market in Korea is characterized by lower median volatility, a higher median price and a higher median trading volume than the region. This results in a higher liquid market.

On the opposite, Russia has higher volatility, lower prices, lower trading volumes and so a lower liquid market.

He continued to explain the possible determinants of liquidity in emerging markets (comprised of 23 countries). The basis of the reflection is that the legal presence inside a country should influence liquidity as there are probably more rules to protect investors. In the same way, rules protecting insider trading from appearing should lower the spread because there is less adverse selection. Another aspect is the political risks, recognized as such by the International Country Risk Guide (ICRD). Corrupted countries do not provide security and stability for investors. Of those assumptions, only the political risk is significant to explain part of the Amihud liquidity measure used. This way, the higher the stability of a country is, the higher the liquidity (Lesmond, 2005).

Thanks to those two articles, we can agree that liquidity is lower in emerging countries than in developed countries, as higher liquidity will be found in countries with higher GDP per capita and where political risks are less present.

7.5 Conclusion of the Literature Review

First of all, we saw that ESG investment kept growing over time and was more and more present in the investment decision process. This is why some tools were developed to help the asset managers decide if a firm discloses enough ESG criteria or is performant in this field.

Secondly, we saw the disclosure of companies around the world and how it is affected (either in developed or emerging countries). The CSR disclosure could be affected by different factors such as company characteristics, culture and belonging to an international value chain for emerging countries' firms. These factors have been identified in the studies made by Ali, Frynas and Mahmood (2017) and Bhatia and Makkar in 2020.

Then, we identified an interest for the companies and investors to disclose more as it could bring value to investors in India. It brings value thanks to the value of the firm (positive relationship with ESG disclosure score), the cost of equity (negative relationship with ESG score) and the ROA (positive relationship with ESG score) (Chauhan and Kumar, 2018).

To go deeper, we asked ourselves how the ESG score has transmitted value to the investor. One explanation could be the cost of capital and more specifically through liquidity. We found that liquidity was positively affected by the ESG disclosure score in the developed market or broad market.

We could conclude that ESG disclosure score has an influence on liquidity (higher score, higher liquidity) but that is only true in the US (Siew & Al., 2016) or at least in a broad market (to be determined for the Egginton and Mc Bayer 2019 study). No research was made to check this relation in emerging countries. This is where the thesis will play a role. Therefore, the first hypothesis I want to raise is H1: *"The ESG disclosure score is correlated to liquidity in an emerging market."*

To try to check this hypothesis, we looked at the initial state of liquidity in this market. Compared to developed countries, emerging markets face less liquidity (Kang & Zhang, 2014; Lesmond, 2005). We saw that there are disparities in liquidity among emerging countries themselves thanks to Kang & Zhang (2014). Thanks to Lesmond (2005), we saw that the stability of a country could affect its liquidity.

Moreover, we can have an idea of the state of ESG disclosure thanks to Blasco & King (2017). There are at least fewer differences over time in disclosing ESG data between emerging and developed countries partly due to newer regulations (83% in the Americas, 78% in the Asia Pacific, 77% in Europe, and 55% in the Middle East and Africa).

Nevertheless, thanks to Bhatia & Makkar (2020) as well as Ali, Frynas & Mahmood (2017) we can assume that we will probably find a lower average ESG score in emerging countries as:

- The company sizes are probably smaller in emerging countries than in developed countries, leading to lower disclosure;
- The media exposure is probably lower or at least not much covered in the developed market, leading to lower disclosure;
- The sectors are probably more manufacturing than in the developed market, they will have more pressure to disclose;
- The regulations are less important, even though they are recently increasing, leading to lower disclosure;

- Relation based countries disclose less;
- The income gap is bigger in emerging countries, leading to less disclosure as it is not their primary concern.

I also found arguments that could support H1.

1) We should see some interest from the investors in firms with higher ESG scores in emerging countries. At least in India, companies reporting on ESG are bringing value to investors (Chauhan and Kumar, 2018). As this might raise investors' interest in the said companies, liquidity could be improved as a result.

2) Liquidity is positively impacted by the ESG disclosure score in developed countries (or at least in a broad market for the Egginton and Mc Bayer study in 2019). This effect could be transferable to the emerging market.

3) Another very important assumption to consider is the value of the information disclosed. If the information disclosed is not valued, the asymmetry of information will indeed not be fixed. This argument is important as more regulations appear in emerging countries to disclose non-financial information as we saw with Mexico in the first part (Blasco & King, 2017). But, is the information relevant?

   - First, in the case of Mexico, they probably disclosed information because they were legally bounded to do so. Therefore, it was not a desire on their part to do so. This could probably have an effect on the type of information disclosed as it could be the minimum legal required (and not contain very valuable information).

   - The disclosure score is calculated thanks to the amount of non-financial information disclosed [reminder]. Some companies, however, may keep some information to themselves. As a matter of fact, if the information has a negative impact on the company, they might not disclose the information so as not to hurt the company, even though disclosing information could improve their scores. It is important to understand that even by disclosing other meaningless information to the investors, companies can still improve their ESG disclosure score while maintaining other valuable information.

Considering this, some companies might even be tempted to distort information and not reflect their actual situation (Siew, Balatbat & Carmichael, 2016).

Regarding the liquidity factor, it is not studied as much in emerging markets as it is in the developed markets, which currently creates a lack of understanding of its impact. We know, however, that emerging markets are less liquid and there are disparities between emerging countries (Kang & Zhang, 2014; Lesmond, 2005).

To summarize the arguments in favor of a positive relationship:

- ESG scores bring value to Indian firms and could be more interesting for investors (Chauhan and Kumar, 2018).
- Egginton & McBayer (2019) and Siew & Al. (2016) found a positive and significant relationship between liquidity and ESG score in the developed market.

By contrast, the arguments in favor of a negative relationship or no relationship:

- We saw that ESG disclosure was increasing in emerging countries thanks to Blasco & King (2017). However, there is still a question to understand if the disclosed information is relevant for investors.
- The emerging market is relatively less liquid and we have less comprehension of it than in the developed market (Kang&Zhang, 2014) (Lesmond, 2005).

These arguments lead us to the following hypothesis:

H1: *"The ESG disclosure score is correlated to liquidity in an emerging market."*

The null hypothesis is therefore:

H0: *"The ESG disclosure score is not correlated to liquidity in an emerging market."*

8 Empirical study

As a reminder, the scope of this Master's thesis is to find if there is any link between liquidity and the ESG disclosure score in emerging markets thanks to a model. The objective is to go further than the Egginton and Mc Bayer (2019) study. It could be interesting to see if there is a relation between the ESG disclosure score and liquidity in emerging markets to attract international investors in those countries and understand the market conditions of those countries. I will choose some liquidity proxies, the securities of the emerging countries as well as some control variables for the liquidity to be sure to include other factors affecting the liquidity. I will also need to choose the ESG score I will use.

The methodology I will adopt is based on the methodology of the different papers viewed in the literature review, especially the Egginton and Mc Bayer (2019) paper. Principally because the Egginton and Mc Bayer (2019) paper tries to demonstrate the same link as this Master's thesis but with a different sample. Therefore, I will use a linear regression in order to explain the chosen liquidity proxies thanks to control variables.

8.1 Methodology

In this empirical part, it is important to note that different significance levels will be used. They represent the type 1 errors which is the probability to reject H0 even though H0 is true (De Winne, 2018). There will be significance levels of 99.9%, 99%, 95% and 90%. At the 90% level, there is a probability of 10% to reject H0 event tough H0 is true, etc. As a reminder, H0 is generally expressed as a conservatory or expected hypothesis. In this thesis, H0 is: *"The ESG disclosure score is not correlated to liquidity in an emerging market."*

8.1.1 Liquidity Proxies, Dependent Variables

For the linear regression, the dependent variable will be liquidity. Liquidity is not defined with one unique formula. For example, Egginton and McBayer (2019) used three proxies for liquidity: Spread, Amihud ratio (measures illiquidity) and Turnover. I will base my measures on those three. However, I will change some of them for an easier understanding.

As I will make some analysis with different currencies, the Spread will become the Relative Spread. It will be easier to compare percentages between currencies than to leave the original monetary values of the stocks.

The turnover will be the same measure as in Egginton and McBayer (2019) study. This is because I wanted to have at least one liquidity proxy in relation to the volume exchanged.

The Amihud ratio of illiquidity will be replaced by the Zero return days measure proposed by Lesmond in 1999. This replacement is made because of three reasons. The first and main one, Bloomberg, a data provider for financial information, is not very relevant in disclosing volume exchanged in emerging countries. I stumbled upon stocks that are traded but have "#N/A N/A" errors multiple times. Therefore, with this issue in mind, I didn't want to rely too heavily on liquidity measures related to the volume exchanged. Secondly, the intuition of the zero return measure is that informed traders will need to offset the transaction cost if they are in possession of a new piece of information. In other words, the traders will trade the stock only when a new piece of information can offset the transaction costs. Therefore, illiquid stocks should display a higher rate of zero return days (Kang & Zhang, 2014). In that sense, the zero return measure will therefore be more relevant for what I want to check, which is the relevance of ESG information. Thirdly, we already viewed the zero return measure in the literature review. Therefore, we have an understanding of this measure. Besides, we know there is more zero return days in Latin American countries and Middle East countries than for European or Asian countries.

I will use three measures because of their characteristics. Indeed, one measure (the relative spread) calculates liquidity thanks to "high-frequency" data such as spread or the price. But, in emerging markets, there is a possibility that high-frequency data could not be observed every day or with accuracy. Hence, I will also use two "low-frequency" measures for liquidity, the zero-return measure and the turnover.

8.1.2 Definitions of the Dependent Variables

As I just explained, I will first take the average *relative spread* of a stock during the year 2020, which allows us to normalize the spread as the stocks chosen are in different currencies. For a stock, the spread is the best-selling price (Ask) minus the best-buying price (Bid). The stock is

considered more liquid when the relative spread is lower. The closing relative spread of each stock is averaged for the whole year 2020. It is defined as:

$$RS_i = \frac{1}{D}\sum_{1}^{D}\frac{ASK_{i,d} - BID_{i,d}}{\frac{1}{2}(ASK_{i,d} + BID_{i,d})}$$

Where RS_i is the average relative closing spread of stock i for the year 2020; D is the number of days a particular stock has been traded during the year 2020; $ASK_{i,d}$ is the closing best-selling price for a stock i at day (d); $BID_{i,d}$ is the closing best buying price for a stock i at day (d).

I will then take the average *turnover* during the year 2020. It represents the number of shares exchanged in one day compared to the total number of shares outstanding of the stock. The daily turnover of each stock is averaged for the whole year 2020. Its formula is:

$$Turnover_i = \frac{1}{D}\sum_{1}^{D}\frac{Volume_{i,d}}{Share\ outstanding_{i,d}}$$

Where $Turnover_i$ is the average turnover of stock i for the year 2020; D is the number of days a stock is traded during the year 2020; $Volume_{i,d}$ is the number of shares exchanged for the stock i on day d and the $Share\ outstanding_{i,d}$ is the number of shares outstanding for the stock i on day d.

I will finally take the average *zero return days' measure*. It was used in the literature review to compare the liquidity between emerging and develop countries. It represents the number of time a stock has experienced a zero return between two consecutive days. In other words, when the stock has the same price from one day to another. It is important to note that it is not a measure to know if the stock is traded or not. Indeed, two consecutive days ending with the same share price will have a zero return day but some shares could have been exchanged. Only the price is the same as the previous day, but the volume could be different. It is averaged for the year 2020 and is defined as:

$$ZeroRet_i = \frac{1}{M}\sum_{1}^{M}\frac{Number\ of\ days\ with\ zero\ returns_{i,m}}{total\ number\ of\ trading\ days\ in\ a\ month_{i,m}}$$

Where $ZeroRet_i$ is the average zero return measure of a stock i for the year 2020; M is the number of months a stock has been traded during the year 2020; $Number\ of\ days\ with\ zero\ returns_{i,m}$ is the number of zero returns for the stock i in month m; $total\ number\ of\ trading\ days\ in\ a\ month_{i,m}$ is the number of trading days for the stock i in month m.

For the interpretation, we can say that the lower the relative spread the higher the liquidity, the higher the turnover the higher the liquidity, the lower the zero return the higher the liquidity.

8.1.3 Sample

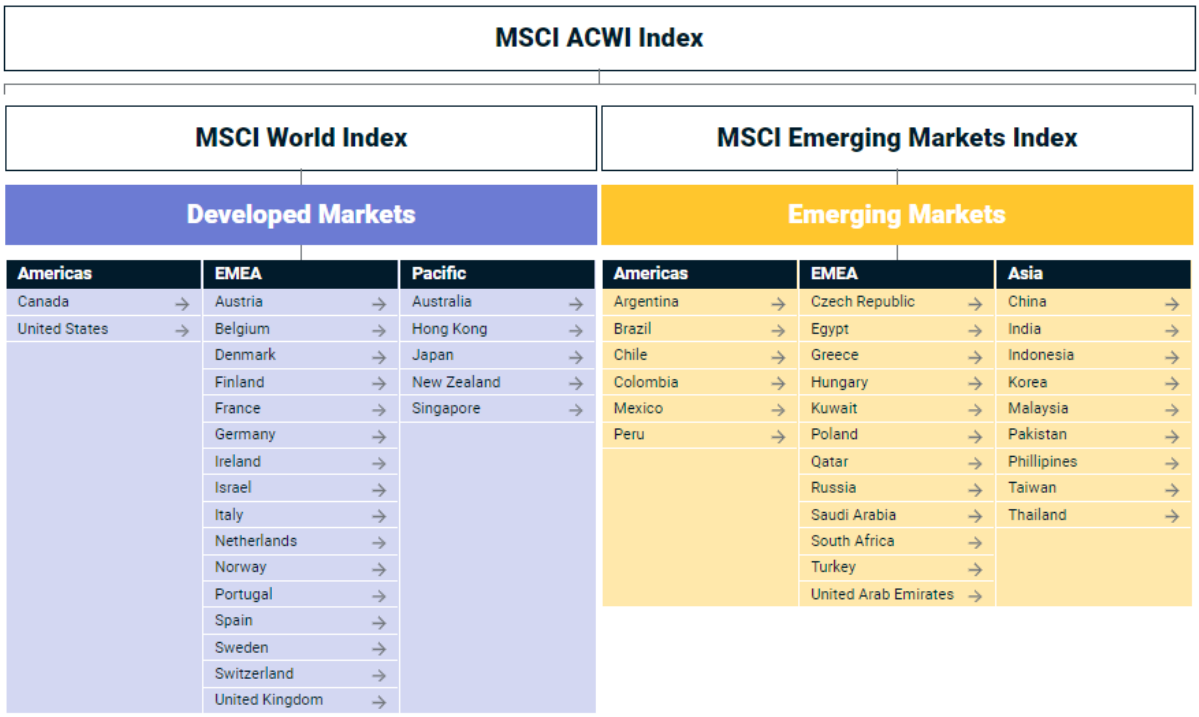
As this Master's thesis attempts to have a first broad view on the subject and not on the specificities of a specific country, I chose securities covering large parts of the emerging market. This is why the choices of the firms will be based on the MSCI Emerging Markets index. The MSCI Emerging Markets index was created in 1988 and is composed of 27 countries from different parts of the world (figure 10). The aim of the index is to offer investors the last opportunities in the emerging market (MSCI, 2021). This will therefore reflect the appetite of the investor for emerging countries offering high potential growth (MSCI, 2021).

Bloomberg prevented me to see the composition of the official index provided by MSCI as I do not have access. So, I had to use a proxy. As the weights of the composition of the index are not important, but solely the equities composing it, I used an ETF. I had to use iShares ETF. Specifically, I used the iShares MSCI Emerging Markets ETF with the Bloomberg code: "EEM US Equity." This ETF is composed of 1,130 stocks. I took each equity security composing the ETF and gathered different information useful for the test of the hypothesis. This ETF does not cover all of the emerging market stocks as the sample would be very large otherwise. I also had some data collection issues explained later, therefore, my final first sample including Chinese stocks is composed of 939 securities from those original 1,130. Furthermore, as I am working on a sample (939 securities) and not on the total population of the emerging market, there will be a sampling error in my models.

The first part of the empirical study will be based on the first sample including Chinese stocks. To go deeper, I continued the research with a different sample. This second sample is composed

of 521 stocks extracted from the 939 securities from the first sample and excludes Chinese stocks.

Figure 10 MSCI ACWI index components (MSCI, 2021)



8.1.4 Variables, choice of the ESG score

This thesis is focused on the amount and quality of ESG information available to the public as viewed in the literature review and makes a link with the asymmetry of information. This is why I will use a disclosure score for the ESG score and not a performance score. The disclosure score is only based on the disclosed data of a firm. The performance score is different and can be based on the nature of the feuds the firm is facing.

For the ESG score, I will use the ESG disclosure score from Bloomberg. We saw multiple studies in the literature review using the disclosure score from this firm. Therefore, it will be easier to compare the results. Bloomberg is a data provider. It delivers business news and financial data to financial participants (Bloomberg, 2021a). In the last 10 years, the data has been gathered on 11,500 firms (82% of the global equity market capitalization) thanks to public disclosure in annual reports, company websites or corporate responsibility reports (Bloomberg 2021b). The value of the score is 0 if the company does not disclose any information to 100 for the companies disclosing every data point in the industry they are in (Bloomberg, 2020).

The ESG disclosure score from Bloomberg is composed of three categories which are Environmental, Governance and Social. The categories themselves are divided into different sections and the weight of each section is based on the industry sector of the company. This way, the score is standardized inside a sector. For example, since the oil sector generally reports oil produced in barrels, Bloomberg has decided to report GHG (GreenHouse Gases) per barrel for this sector. Each industry will have some specific data points (Bloomberg, 2020).

For the data collection, the ESG score is available once per year for every stock although not all the stocks receive the score on the same date. In this empirical study, a stock A could receive its annual score on the 31st December 2019, another stock B could receive its annual score on the 31st March 2020, a stock C could receive its annual score on the 30th June 2020 and a stock D could receive its annual score on the 30th September 2020.

I choose to take the last score available in 2020 as those days represent what the investors could have seen on the terminal during the year 2020. Therefore, the investor can decide based on the last score and last information available. Also, if the score had changed from 2019 to 2020, the new score and the effect of it in the different liquidity proxies would be incorporated.

8.1.5 Control Variables

In the literature review, multiple control variables were used for the measure of liquidity such as the 10-K file size in megabytes, the share price, the market cap, the trading volume, the volatility (Egginton and McBayer, 2019) or the size (log of total assets), the debt-to-equity ratio, the standard deviation of daily returns, the inverse of the daily closing stock price (Siew, 2016). I will try to use all of them as explained below. Some of them are taken daily and then averaged for the whole year (inverse stock price, trading volume, standard deviation of daily returns and market capitalization), while others are available one time during the year (total of assets and debt-to-equity ratio). All the data are from a Bloomberg terminal. They are collected in an Excel document thanks to the API of Bloomberg. I will now explain the control variables and their link with liquidity (table 2).

The inverse stock price is used in scientific papers because it shows a better “fit” for the spread in regression than the stock price. Note that none of the studies in which Siew & Al. (2016)

based this information (which are Barclays in 1997 and Cho, Lee and Pfeiffer in 2013) have explained why. From the study made by Lesmond (2005), we can have an explanation of the negative relation between the inverse stock price and liquidity. Indeed, Lesmond quoted: *"Price is a proxy for bid-ask spread and risk (Benston & Hagerman, 1974)"*. Therefore, a lower price, or higher inverse price, could mean a lower liquidity. To be able to compare the stock prices, I had to use exchange rates to convert all currencies into US dollars. The sample is composed of firms from different countries and not all of them have exchange rates easily accessible. This is why the exchange rate used is the closing exchange rate on the 4th January 2021 for all the currencies, except for the PKR (Pakistani Rupee) which was taken on the 5th January of 2021. For the data, the inverse share price is (1/(share price in USD)). It is then average for the whole year for each stock.

The trading volume has a positive relationship with liquidity, a higher exchanged volume could mean a lower bid-ask spread (Siew & Al., 2016). For the data, volume is the volume that Bloomberg discloses (1 share exchanged = 1 volume). The data exposed in the emerging market is not as precise as in the developed market. The main issue encountered was that some stocks were traded but no volume was disclosed. The daily volume of each stock is then averaged for the year.

The next control variable used is the volatility or, the standard deviation of daily returns. Higher volatility of stock returns could mean a higher bid-ask spread. The market makers could profit from this situation and charge higher rates due to the risk incurred. This situation will increase the bid-ask spread. On the other side, a higher number of disclosure documents could reduce the stock price volatility (Siew & Al., 2016). For the data, the return is calculated thanks to the price of the last trade of the day, this is a close-to-close return: $\frac{closing\ price_t - closing\ price_{t-1}}{closing\ price_{t-1}}$. It is then average for the whole year for each stock.

The size of the firm (total of assets) could have a positive influence on liquidity. As the firm gets larger, there are likely more news or analysts covering the firm. A larger firm could mean more information available about it and so, a lower relative spread. Larger firms could also be more attractive to investors, implying a higher trading volume and more liquidity (Siew, 2016). The assets of the firms are collected on the 31st December of 2020 from Bloomberg. To be able to compare the total assets, I had to use exchange rates to convert all currencies into US dollars.

The sample is composed of firms from different countries and not all of them have exchange rates easily accessible. This is why the exchange rate used is the closing exchange rate on the 4th January 2021 for all the currencies, except for the PKR (Pakistani Rupee) which was taken on the 5th January of 2021.

The same logic could be applied to the market capitalization of the firm. A higher market cap could mean a higher liquid stock. It could, furthermore, have higher turnover and lower volatility (Kang Zhang, 2014). The data used is the average of the daily disclosed market capitalization from Bloomberg. To be able to compare the market capitalization, I had to use exchange rates to convert all currencies into US dollars. The sample is composed of firms from different countries and not all of them have exchange rates easily accessible. This is why the exchange rate used is the closing exchange rate on the 4th January 2021 for all the currencies, except for the PKR (Pakistani Rupee) which was taken on the 5th January of 2021.

The debt-to-equity ratio or leverage influences liquidity in a certain manner. A firm with high leverage could represent a higher level of risk for the firm, as there is increasing uncertainty about the capacity to repay the debts. This would push the firm to not disclose all the bad information of the company to protect itself. This lack of information could be included in a higher spread. Higher leverage possibly means a higher spread (Siew, 2016). The total debt-to-equity ratio is collected on the 31st December of 2020 from Bloomberg.

Note that some industries naturally have a higher level of debt. For example, financial firms must comply with some regulations. Also, the information could be exchanged differently in an emerging market like "relational based" countries relying less on public information (Bhatia & Makkar, 2020).

Table 2: Control variables and relationship with liquidity (Author)

Control variable	Expected relationship with liquidity
Inverse stock price	?
Trading volume	+
Volatility	-
Size (total of assets)	+
Market capitalization	+
Debt to equity	-

The variable 10-K size file in megabytes is not covered in Bloomberg. This control variable won't be used as the retrieval of data won't be possible. Indeed, this is a very specific variable as it needs to collect the megabytes of a file, without the tables and figures. The relation would have been positive, a heavier file could mean more disclosure, less asymmetry of information and more liquidity.

We can now write the three different models for the linear regression. The models with liquidity proxies, ESG disclosure score and the control variables are:

$$RS_i = \beta 0 + \beta 1 * ESGscore_i + \beta 2 * Assetusd_i + \beta 3 * Mkcusd_i + \beta 4 * Pxusd_i + \beta 5 * stdev_i + \beta 6 * TOT\_DEBT\_TO\_TOT\_EQY_i + \beta 7 * PXVOLUME_i + \varepsilon_i$$

$$Turnover_i = \beta 0 + \beta 1 * ESGscore_i + \beta 2 * Assetusd_i + \beta 3 * Mkcusd_i + \beta 4 * Pxusd_i + \beta 5 * stdev_i + \beta 6 * TOT\_DEBT\_TO\_TOT\_EQY_i + \beta 7 * PXVOLUME_i + \varepsilon_i$$

$$ZeroRet_i = \beta 0 + \beta 1 * ESGscore_i + \beta 2 * Assetusd_i + \beta 3 * Mkcusd_i + \beta 4 * Pxusd_i + \beta 5 * stdev_i + \beta 6 * TOT\_DEBT\_TO\_TOT\_EQY_i + \beta 7 * PXVOLUME_i + \varepsilon_i$$

Where RS_i is the average relative spread of stock i during the year 2020,
$Turnover_i$ is the average turnover of stock i during the year 2020,
$ZeroRet_i$ is the average zero return of stock i during the year 2020,

$ESGscore_i$ is the annual ESG score for the stock i on the 31st December 2019 or on the 31st March of 2020 or on the 30th June 2020 or on the 30th September 2020,

$Assetusd_i$ is the amount of the total assets in USD for the stock i on the 31st December 2020,

$Mkcusd_i$ is the average market capitalization during the year 2020 for the stock i in USD,

$Pxusd_i$ is the average of the inverse last traded price during the year 2020 for the stock i in USD,

$stdev_i$ is the average of the standard deviation of the daily returns during the year 2020 for the stock i,

$TOT\_DEBT\_TO\_TOT\_EQY_i$ is the total debt to equity ratio for the stock i on the 31st December 2020,

$PXVOLUME_i$ is the average of the traded volume during the year 2020 for the stock i.

8.2 Preliminary findings - sample 1

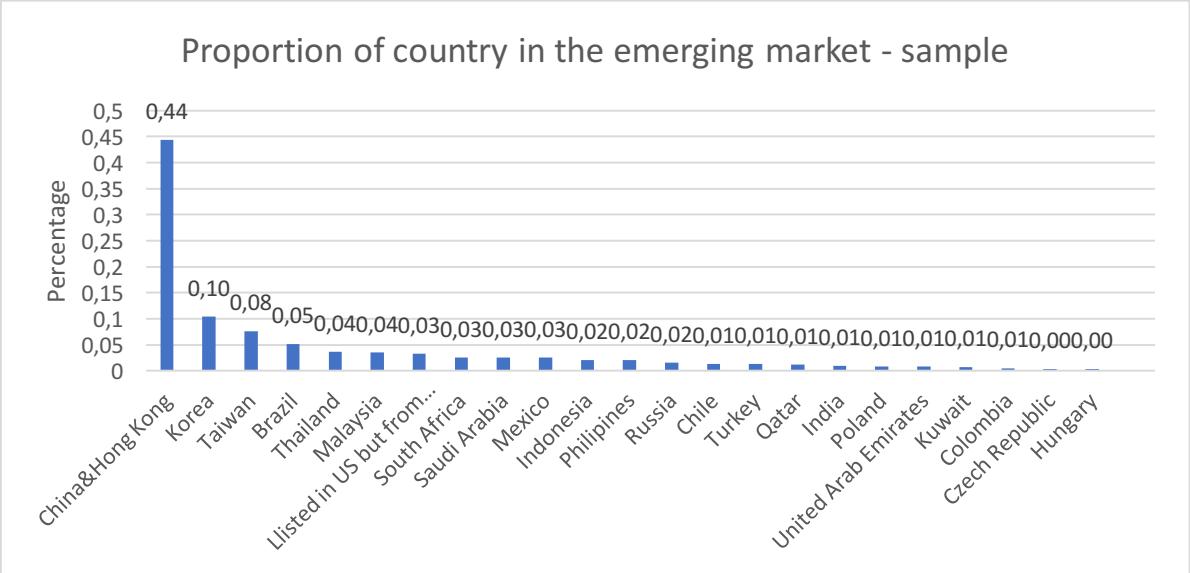
The sample was originally composed of 1,130 stocks from emerging countries for the year 2020. With the data collection, some information was not available with Bloomberg. This is why I had to delete some securities. The final sample is composed of 939 stocks.

To be more precise about the information missing, the debt-to-equity ratio and the total of assets were not always available for all the firms. The zero return variable and the relative spread were not calculated correctly with "#DIV/0!" commentary due to a lack of quoted bid price, ask price or last price. There were even some securities with a negative average relative spread. The ask price was lower than the bid price but there was not an exchange and this happened for different days. Those securities were removed from the sample. Some securities did not have an ESG score available during the year 2020 and were also removed.

Moreover, some stocks were not traded during the whole year 2020 and were removed. Some stocks might be private in the beginning and went public during the year 2020. This means that before they went public, no data about the last traded price was disclosed for the stock. Nevertheless, the stock was kept in the sample. Similarly, some stocks might be going private and therefore no data was available after, but the stock was kept in the sample.

The final first sample (figure 11) is composed of 939 stocks and each stock has 2,943 entry points such as the daily last traded price in 2020, the daily closing bid price, the daily close-to-close returns, etc. The stocks are primarily from China or Hong Kong (but covering Chinese stocks) for 44.52% of the sample and Korean stocks representing 10.44% of the sample (more details on the number of stocks per country are available in appendix 3).

Figure 11 Proportion of country in the emerging market – sample 1 (Author)



The cross-sectional descriptive analysis (table 3) is as follows. Each of the 10 variables has 939 observations (one observation per variable for each stock). On average, the total assets in USD is 105,756 million the 12/31/2020. The companies have on average a debt-to-equity ratio of 101.07 the 12/31/2020. On average for the year 2020, the firms have a standard deviation of the daily returns of 0.0278. The companies have on average an ESG score of 37.09. In comparison, the mean ESG score in the Egginton and Mc Bayer study (2019) was 16.2. In the Siew & Al. (2016) study, the mean ESG score was 21.75 for 2007 and increased to 25.54 in 2011.

In the sample, the company with the highest asset is the ICBC (Industrial Bank of China) with USD 5,160,575,000,000 (5 trillion) and the company with the highest market capitalization of USD 1,789,315,000,000 (1.79 trillion) is Aramco.

We can observe that the liquidity proxies are scattered even though between the 25% and 75% quartile, the dispersion is less important.

The minimum zero return is 0 because the stock has never a zero return day between two consecutive days. We can extrapolate and say that the stock was traded every day. On the opposite, the maximum represents a stock with almost a third of the days with zero return between two consecutive days. It is important to understand that it does not mean that the stock was not traded during this period.

The minimum relative spread is very low: 0.012% of the stock price and the highest represents 3%. The minimum turnover is 0.004% which means that only a very small amount of the total shares was exchanged. This company is Aramco and only a few percentages of its shares are in free float. Indeed, the Saudi Arabia government owns 98% of the shares in 2020 (ABC News, 2021).

Table 3: Descriptive analysis - sample 1 (Author)

Variable	Min	25%	Median	75%	Max	Mean	stdev
Zret	0.00000	0.00826	0.02834	0.06048	0.27869	0.04021	0.03975
Relspread	0.00012	0.00108	0.00194	0.00307	0.03106	0.00261	0.00265
Turnover	0.00004	0.00176	0.00427	0.00841	0.15753	0.00700	0.01043
ESGscore	3.31	24.90	38.16	47.77	71.49	37.09	14.31
stdev	0.0064	0.0222	0.0271	0.0328	0.0929	0.0278	0.0087
Assetusd in millions	0.46	4,358.61	12,314.75	50,344.65	5,160,575.41	105,756.06	420,120.35
Pxusd	0.00013	0.09	0.29	0.82	20.75	0.75	1.65
Mkcusd in millions	1,408.44	4,504.72	7,613.20	15,351.67	1,789,315.99	18,683.54	68,212.10
Volume	4,570	2,775,318	8,628,786	28,946,946	923,053,728	26,822,278	55,190,801
TOT_DEBT_TO_TOT_EQY	0.00	24.68	64.56	123.80	3,293.70	101.44	163.65

8.3 Tests

Now, let's try to respond to the hypotheses H1: *"The ESG disclosure score is correlated to liquidity in an emerging market"* and H0: *"The ESG disclosure score is not correlated to liquidity in an emerging market."* To do this, I will use linear regression. So, I will focus on some of the assumptions that need to be met (H. Greene, 2003):

"H1: Linearity: the model specifies a linear relationship between y and x1, …, xk

H2: Full rank: There is no exact linear relationship among any of the independent variables in the model

H3: Exogeneity of the independent variable: there is no correlation between the disturbances and the independent variables

H4: Homoscedasticity and nonautocorreltion: each disturbance, ε_i has the same finite variance,σ^2 and is uncorrelated with every other disturbance, ε_j

H5: Exogenously generated data: The data may be any mixture of constants and random variables.

H6: Normal distribution: The disturbances are normally distributed"

8.3.1 Exogeneity of the Independent Variables - H3

The normality is checked to make sure that any observation of x does not convey any information about the disturbances (H. Greene, 2003). We can show graphically this condition in figure 12. Each Y corresponding to its population X is distributed around its mean (N. Gujarati, 2004). The normality can be assumed as there are 939 observations in sample 1 and 521 observations in sample 2 for each of the variables, far more than 30.

Figure 12 Exogeneity (N. Gujarati, 2004)

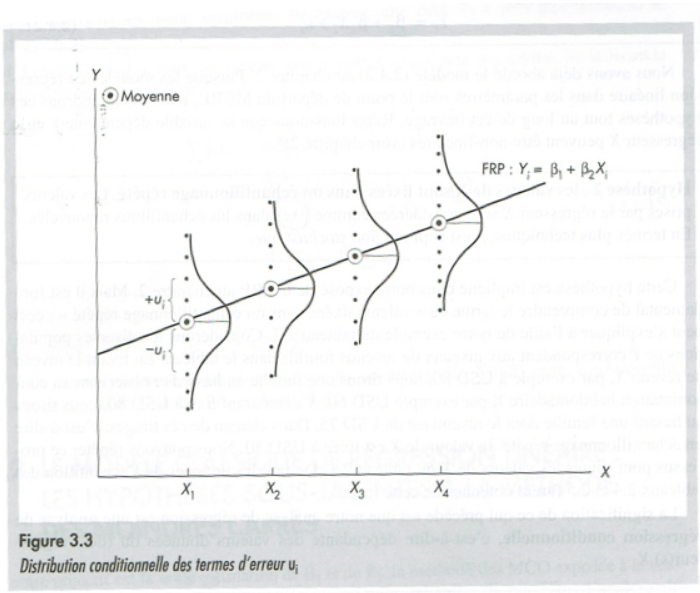


Figure 3.3
Distribution conditionnelle des termes d'erreur u_i

8.3.2 Multicollinearity - H2

There is a possibility in a model to have some highly correlated variables. This problem happens when we do no declare correctly a model. Indeed, two variables could be essentially the same. This could result in high standard errors for the coefficients and low significance levels but, in reality, they should be similarly significant.

One way to check would be thanks to the correlation matrix below (figure 13). It is made via Excel data analysis. A correlation higher than 0.5 would be problematic.

In the model, the highest correlation in the control variables is between the inverse stock price in USD and the volume which is 0.32. The explanation could be that if an investor wants to invest USD 1 million in a stock trading at USD 10 and a stock trading at USD 100, the cheaper stock will be traded with higher volumes, ceteris paribus.

The next highest correlation is 0.31 between the total of assets and the market capitalization both in USD. This could be explained as they are both proxies for the size of the firm.

Then, a correlation of 0.28 can be found between the volume and the total of the asset in USD. One explanation could be that bigger firms attract more investors as bigger firms are probably more followed by analysts. Therefore, the trading volume tends to be higher for bigger firms (Siew, Balatbat & Carmichael, 2016).

Figure 13 Correlation matrix (Author)

	Relspread	*Zret*	*Turnover*	*Assetusd*	*mkcusd*	*Pxusd*	*stdev*	*ESGscore*	*)EBT_TO_TO1*	*PXVOLUME*
Relspread	1									
Zret	0,44865435	1								
Turnover	-0,266337	-0,2310646	1							
Assetusd	-0,0393739	0,15563226	-0,0785971	1						
mkcusd	-0,0764886	0,0411366	-0,0529859	0,31521667	1					
Pxusd	0,30225205	0,29646076	-0,1039243	0,04985081	-0,0263632	1				
stdev	-0,0698065	-0,398032	0,42690263	-0,1962265	-0,1358989	-0,0691382	1			
ESGscore	0,1391615	0,10486635	-0,2064774	0,0545455	0,02964158	0,08218291	0,04509608	1		
TOT_DEBT_T	0,09582149	0,15567598	-0,0535564	0,14218776	-0,0147823	0,16633799	-0,0490923	0,06291305	1	
PXVOLUME	-0,0531386	0,09496198	0,24046261	0,28345669	0,10431587	0,32085087	-0,0502869	-0,0292795	0,07944889	1

8.3.3 Homoscedasticity - H4

Homoscedasticity is present when the observations are evenly distributed on both sides of the linear regression. Homoscedasticity is important because we could be wrong in the conclusion we make if there is heteroscedasticity (N. Gujarati, 2004).

To alleviate this issue, the models are run using a standard robust test for heteroscedasticity in R Studio. Standard errors will be in parentheses next to their corresponding coefficient.

8.4 H1: "*The ESG disclosure score is correlated to liquidity in an emerging market*"

Now that we have defined the three models, let's interpret the results. In table 4 and figure 14, we can observe the coefficients and the significance of the variables used in the different models.

First of all, the adjusted R^2 of the models is 13.06% for the Relative Spread model. The R^2 means that the model explains liquidity as defined by the relative spread in the sample used for around 13%. It is the same meaning for the Turnover model but with 31.93% and 24.71% for the zero return model. In the literature and as a comparison, Egginton and McBayer (2019) could explain 69.8% of the liquidity with the Spread model and 16.9% with the Turnover model.

Now, I will explain the relationship found between the control variables and liquidity and check with what was expected. This is a way to check the reliability of the models used. Indeed, if all the control variables act in the opposite way as what was expected, this could mean a wrongdoing somewhere in the methodology. Therefore, I would have investigated even more either in the literature or in my models to understand what could have been wrong.

Table 4: Expected relationship and empirical results (Author)

Control variables	Expected relationship with liquidity	Liquidity relationship in the relative spread model	Liquidity relationship in the Zero return model	Liquidity relationship in the Turnover model
Inverse stock price	-	-***	-***	-***
Trading volume	+	+**	+	+***
Volatility	-	+**	+***	+***
Size (total assets)	+	+	-.	-.
Market capitalization	+	+	+	-
Debt to equity	-	-	-**	-

'***' is significant at the 0.1% level, "**"= 1% level, "*" =5% level, "." =10% level

From the study made by Lesmond (2005), we can have an explanation of the negative relation between the inverse stock price and liquidity. Indeed, Lesmond quoted: *"Price is a proxy for bid-ask spread and risk (Benston & Hagerman, 1974)"*. In the models, we can find the same

relation: the higher the price, the higher the liquidity. It is translated as the higher the inverse stock price (and so, the lower the stock price), the higher the relative spread (and so, the lower the liquidity).

Compared to what was expected with the control variables, the trading volume decreases the relative spread and the zero return and increases the turnover. The expected relation is respected for the three measures (higher volume means more liquidity).

The volatility decreases the relative spread and the zero return at the same time, it increases the turnover. The expected relation (higher volatility means less liquidity) is not respected for the three measures. Indeed, the volatility decreases the relative spread, so liquidity is improved. Which is the opposite of what Lesmond (2005) and Siew & Al. (2016) acknowledged.

The size (total of assets in USD) decreases the relative spread but increases the zero return and the turnover. The expected relation is respected solely for the relative spread (higher size of the company means more liquidity). Moreover, this control variable is slightly significant at the 10% level for the zero return and turnover model.

The market capitalization decreases the relative spread and the zero return but it also decreases the turnover. The expected relation with liquidity was positive (higher market capitalization for higher liquidity). Two models, the relative spread and the zero return models respect this relation. This control variable is not significant for any of the three models.

The debt-to-equity ratio increases the relative spread and the zero return and decreases the turnover model. The relation corresponds to the expectation for the three models (higher leverage means less liquidity) but it is significant only for the zero return model.

To sum up, only the volatility has not the same relation as what was expected for the control variables.

Figure 14 Linear regression models results (Author)

	model1	model2	model3
Dependent Var.:	Relspread	Zret	Turnover
(Intercept)	0.0022*** (0.0003)	0.0717*** (0.0063)	-0.0026 (0.0027)
Assetusd	-1.32e-10 (1.54e-10)	6.44e-9. (3.79e-9)	-1.61e-9. (8.94e-10)
mkcusd	-2.23e-9 (1.39e-9)	-1.34e-8 (2.89e-8)	-1.07e-9 (1.92e-9)
Pxusd	0.0005*** (9.06e-5)	0.0063*** (0.0018)	-0.0010*** (0.0002)
stdev	-0.0212** (0.0066)	-1.706*** (0.1872)	0.5146*** (0.1273)
ESGscore	2.05e-5*** (5.94e-6)	0.0003** (7.97e-5)	-0.0001*** (2.99e-5)
TOT_DEBT_TO_TOT_EQY	7.25e-7 (5.18e-7)	1.98e-5** (7.59e-6)	-6.77e-7 (1.06e-6)
PXVOLUME	-7.21e-12** (2.63e-12)	-1.87e-11 (2.89e-11)	6.18e-11*** (1.5e-11)
S.E. type	Heteroskedastici.-rob.	Heteroskedasti.-rob.	Heteroskedastic.-rob.
Observations	939	939	939
R2	0.13714	0.25273	0.32446
Adj. R2	0.13066	0.24711	0.31938

'***'is significant at the 0.1% level, "**"= 1% level, "*" =5% level, "." =10% level

Finally, for the ESG score variable, the null hypothesis "*The ESG disclosure score is not correlated to liquidity in an emerging market,*" is rejected.

In the first model, the relative spread model, the null hypothesis is rejected as the variable is significant at the 99.9% level but positive (the higher the ESG disclosure score, the higher the relative spread and so, the lower the liquidity). Economically, the rise of 1 point in ESG score will increase the relative spread of 0.0000205 points.

So, if the company goes from the first quartile of the distribution in ESG disclosure score to the third, its relative spread will increase by almost 18% of the average relative spread. Since the average relative spread is 0.261%, the interquartile of the ESG score is 22.87, which is a significant jump, and the ESG coefficient in the model is 0.0000205. We can calculate the increase of the relative spread by doing: 22.87*0.0000205 = 0.00046884, which is around a 17.96% increase from the average relative spread (0.00261).

In the second model, the zero return model, the null hypothesis is rejected as the variable is significant at the 99% level but positive (the higher the ESG score, the higher the zero return and so, the lower the liquidity). Economically, the rise of 1 point in ESG score will increase the zero return of 0.0003 points. If the stock has a higher ESG score, the amount of zero return days will be higher.

So, if the company goes from the first quartile of the distribution in ESG disclosure score to the third, its zero return proportion will increase by almost 17% of the average zero return. Since the average zero return is 0.04021, the interquartile of the ESG score is 22.87 and the ESG coefficient in the model is 0.0003. We can calculate the increase of zero return by doing: 22.87*0.0003 = 0.00686, which is around a 17.06% increase from the average zero return (4.02%).

In the same way, in the turnover model, the ESG score is significant at the 99.9% level and negative and has the highest adjusted R^2 of the three. The null hypothesis is rejected (the higher the ESG score, the lower the turnover and so, the lower the liquidity). Economically, the rise of 1 point in ESG score will decrease the turnover by 0.0001 points. If the stock has a higher ESG score, the volume traded compared to its shares outstanding will be lower.

So, if the company goes from the first quartile of the distribution in ESG disclosure score to the third, its turnover will decrease by almost 33%. Since the average turnover is 0.007, the interquartile of the ESG score is 22.87 and the ESG coefficient in the model is -0.0001. We can calculate the decrease of turnover by doing: 22.87*-0.0001 = -0.002287, which is around a 32.67% decrease from the average turnover (0.007).

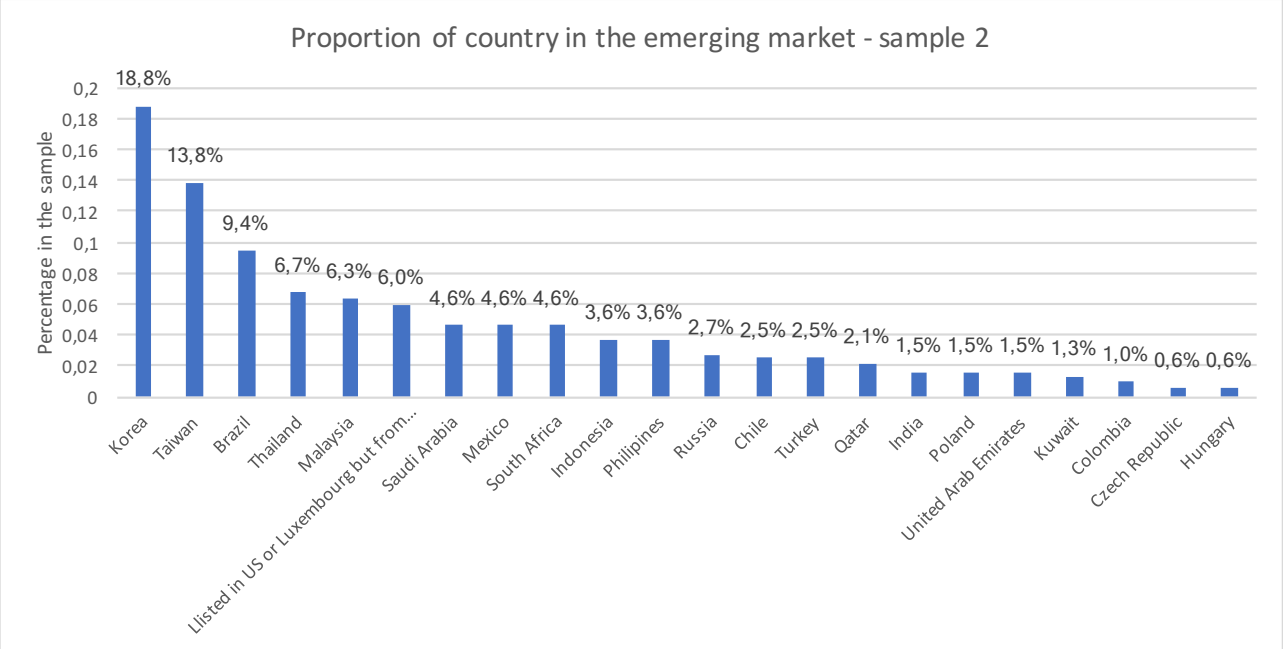
8.5 Model without Chinese Stocks

In the model we just reviewed, one country in particular is quite present. Indeed, with approximately 44% of the stocks, China is largely represented. This is why, to go further in my analysis and in this thesis, I will go deeper and exclude Chinese stocks in this section. In the MSCI Emerging Markets Index, the countries are not pondered with the same percentage as the index considers new opportunities for the investors.

This section tries to recreate an environment where all countries have approximately the same weight. This way, we can also have a view on how the investors are attracted to the emerging markets with or without China being their main interest thanks to the previous model. In this section, we will consider the emerging market as a uniform market represented equally across countries.

This is what we can observe in figure 15. Even though Korea (18.8%), Taiwan (13.8%) and Brazil (9.4%) are quite present. This new sample is composed of 521 stocks. To give an idea, an equally weighted index would ponder each country at around 4.5%. (more details on the number of stocks per country are available in appendix 4).

Figure 15 Proportion of country in the emerging market - sample 2 (Author)



I will now review the descriptive analysis of this new sample (table 5). As the new sample is based on the first sample, I will highlight the differences. Compared to the model with China and Hong Kong stocks included, we can observe a higher average zero return variable (0.04803 compared to 0.04029 previously) and a higher average relative spread variable (0.00350 compared to 0.00261 previously). Furthermore, the average turnover variable is lower (0.00558 compared to 0.00702 previously). This means that all the liquidity proxies indicate lower liquidity for the sample without China and Hong Kong stocks. The standard deviation of the three variables is also higher and could mean the liquidity proxies are more scattered in the new sample.

Table 5: Descriptive analysis - sample 2 (Author)

Variable	Min	0.25	Median	0.75	Max	Mean	stdev
Zret	0.00000	0.01195	0.04382	0.06967	0.27869	0.04803	0.04255
Relspread	0.00013	0.00161	0.00244	0.00449	0.03106	0.00350	0.00309
Turnover	0.00004	0.00124	0.00288	0.00592	0.15753	0.00558	0.01182
ESGscore	3.31	28.51	43.39	52.48	71.49	40.32	15.69
stdev	0.00635	0.02218	0.02817	0.03438	0.09288	0.02880	0.00988
Assetusd in millions	0.46	4,556.20	11,943.96	51,128.99	2,059,178	58,536.38	163,676.22
Pxusd	0.000	0.033	0.192	0.654	20.754	0.778	2.083
Mkcusd in millions	1,408.44	3,553.75	5,803.86	11,136.80	1,789,315.99	14,780.29	81,342.65
Volume	4,569	843,435	3,721,203	10,055,302	284,529,187	13,044,912	29,714,022
TOT_DEBT_TO_TOT_EQY	0.00	27.53	67.02	120.73	1780.25	102.60	142.73

Moreover, the mean ESG score is higher (40.32 compared to 37.09 previously) but is more dispersed. The mean total assets in USD dropped to USD 58,536 million compared to USD 105,756 million. Just like the average daily volume dropped from 26 million to 13 million.

Furthermore, the inverse stock price, the standard deviation of daily returns and the leverage ratio are relatively equal. The main difference is that their standard deviation increased except for the leverage ratio which decreased. We are facing stocks in the new sample that are less liquid and companies that are smaller in size than in the first sample.

Figure 16 Linear regression models results - sample 2 (Author)

'***' is significant at the 0.1% level, "**" = 1% level, "*" =5% level, "." =10% level

	model1	model2	model3
Dependent Var.:	Relspread	Zret	Turnover
(Intercept)	0.0044*** (0.0004)	0.0988*** (0.0081)	-0.0043 (0.0031)
Assetusd	-1.61e-9* (6.76e-10)	-6.5e-9 (1.15e-8)	-4.31e-9** (1.39e-9)
mkcusd	-1.64e-9. (8.54e-10)	4.06e-9 (1.34e-8)	6.12e-10 (1.93e-9)
Pxusd	0.0005*** (0.0001)	0.0036** (0.0014)	-0.0016*** (0.0004)
stdev	-0.0346*** (0.0083)	-1.826*** (0.2242)	0.5131** (0.1681)
ESGscore	1.1e-6 (7.97e-6)	-1.64e-8 (0.0001)	-0.0001** (4.76e-5)
TOT_DEBT_TO_TOT_EQY	1.04e-7 (6.34e-7)	4.13e-6 (9.82e-6)	5.28e-7 (2.1e-6)
PXVOLUME	-1.66e-11** (5.98e-12)	-8.39e-11 (6.97e-11)	1.47e-10*** (4.08e-11)
_____	_____	_____	_____
S.E. type	Heteroskedastici.-rob.	Heteroskedasti.-rob.	Heteroskedastici.-rob.
Observations	521	521	521
R2	0.09259	0.20871	0.29805
Adj. R2	0.08021	0.19792	0.28847

In comparison with the previous models with sample 1, we can observe (figure 16) that all the R^2 of the models decreased. This means the three new models explain the liquidity proxies less accurately than the previous models.

Furthermore, the total assets in USD, the standard deviation and the market capitalization in USD gained significance in the *relative spread* model. Nevertheless, in the *zero return* model, the market capitalization in USD became positive even though it is not significant enough in both samples (with and without China) and the total assets lost significance just like the debt-to-equity ratio. In the *turnover* model, the market capitalization also changed sign just like the total debt to total equity ratio even though they are not significant enough in both samples. The total assets gained significance while the standard deviation lost some.

More interestingly for this thesis, a lot happened for the ESG score variable in the three new models. In the *relative spread* model, it lost its significance previously at the 0.1% level. So, this actually means that the null hypothesis (H0) cannot be rejected so easily. In the *zero return* model, it also lost significance previously at the 1% level and changed sign. All in all, for these two models, we can conclude by this data that the null hypothesis is not rejected.

Only in the new *turnover* model is the ESG score still significant enough (at the 1% level compared to 0.1% previously) and where the sign did not change. The null hypothesis is still rejected for this model. Economically, the rise of 1 point in ESG score will decrease the turnover by 0.0001 points just like in the previous model.

If the company goes from the first quartile of the distribution in ESG disclosure score to the third, its turnover will decrease by almost 43% from the average turnover. Since the average turnover in this sample is 0.00558, the interquartile of the ESG score is 23.97, which is a significant jump, and the ESG coefficient in the model is -0.0001. We can calculate the decrease of turnover by doing: 23.97*-0.0001 = -0.002397, which is around a 42.95% decrease from the average turnover (0.558%).

8.6 Discussion on the Results

In this part, I will go into more details thanks to the results found. Firstly, I will discuss the model without Chinese stocks and then I will go back to the main model with all the countries. Finally, I will compare the two models.

With the three models without Chinese stocks, we cannot reject the null hypothesis for two of the models. In the relative spread model and the zero return model, the ESG score and liquidity are not correlated enough to be significantly positively or negatively correlated. Therefore, ignoring China and the turnover model (which proves a consistency in the findings), the results could be explained this way:

- The asset managers might not find enough value in the information disclosed to be interesting and to offset the information asymmetry. This could be due to uninteresting mandatory disclosure. As a reminder, the average Bloomberg ESG disclosure score in the sample is 40.32 in 2020 which is higher compared to Bloomberg ESG disclosure score from the Egginton and Mc Bayer study (2019) which was 16.2 for a broad market. The same observation can be made for the Siew & Al. (2016) study, the mean ESG score was 21.75 for 2007 and increased to 25.54 in 2011. This may be due to mandatory disclosure. Therefore, I would probably advise regulators to impose an independent member of the board or the presence of a CSR committee in the companies and not mandatory regulations. It is to be determined but, the value of the information disclosed might be more accurate and value relevant thanks to an external view on the company.

Furthermore, in the main model including China stocks, we have seen that the ESG disclosure score decreases liquidity in the emerging market for at least the 99% level in the three models. Therefore, we rejected the null hypothesis. The ESG score is negatively correlated with liquidity in an emerging market. The ESG disclosure score in emerging countries may be irrelevant for investors.

If we take the arguments in favor of a positive relation:

- ESG scores bring value to Indian firms and could be more interesting for investors (Chauhan and Kumar, 2018).
- Egginton & McBayer (2019) as well as Siew & Al. (2016) found a positive and significant relation between liquidity and ESG scores in the developed market.

The ESG score might not be sufficient to increase interest in investing in a high ESG score company even though the score brings value to this firm in India. This statement could be improved with a specific study in the Indian market alone as India represents 0.85% of the sample.

Moreover, the findings in the developed market cannot be transferred into the emerging market. The determinants of liquidity in the developed market do not behave in the same way as in the emerging market. The ESG score is positively correlated to liquidity in the developed market but negatively correlated in the emerging market. One of the explanations could be that the information disclosed does not bring value.

If we take the arguments in favor of a negative relation or no relation:

- We saw that ESG disclosure was increasing in emerging countries thanks to Blasco & King (2017). However, there is a question to know if this information is relevant for investors.
- The emerging market is relatively less liquid and we have less comprehension of it than in the developed market (Kang&Zhang, 2014) (Lesmond, 2005).

The information disclosed is probably irrelevant for the investor in the emerging market. We cannot say it destroys value for the firm as it brings some sort of value at least in India.

We have now more understanding of liquidity and the emerging market. We know that Chinese stocks have an important influence in the emerging market and that the ESG disclosure score is negatively correlated with liquidity.

Now that we saw both models, I will make a comparison with the two. China seems to have a big influence in the relation ESG score and liquidity. Indeed, without it, there is only one model

that is still significant enough to say that the ESG score is negatively correlated with liquidity. The relation is therefore still present but with less significance than before.

All in all, it means we still need more explanation on how the emerging market liquidity works, especially at the country level to have a bigger picture after. Furthermore, this would imply that the asset managers should be careful when considering a company from the emerging market with a high ESG disclosure score, especially as 82% of them use ESG information and 62% of the 82% think it would bring information on the performance. In fact, a higher score would imply a lower liquidity for the stock.

8.7 Limits and Future Studies

In this section, now that we have a better understanding of the issue, I will mainly focus on the limits I stumbled upon in this thesis as well as opportunities to make future research for this subject.

One of the limits of my research comes from the sample. Indeed, the stocks are from different countries. I chose to take an investor point of view by choosing stocks that came from the MSCI Emerging Market as the index represents future investing opportunities in the emerging market. It could be interesting to make future research for every country but taken separately and with different stocks to understand more deeply the determinants of liquidity in each country.

Another limit is that I did not find a lot of studies on the subject. I mainly searched for literature thanks to the Discovery tool from the UCL and Google scholar for French and English keywords. There might be studies and explanations on this subject I did not see.

Furthermore, Bloomberg was not consistent in delivering the accurate volume exchanged for some stocks. Also, 2020 was a particular year for the volatility and the markets in general as the pandemic strongly affected the markets. It could be interesting to do the study with other years and see if the effect evolves over time.

Another interesting study could be made thanks to the ESG performance score. It would be interesting to see if the results are different. If they are, the value of the information could be

of less importance than the actions taken to deal with ESG issues in emerging markets. Furthermore, as they are relation-based countries, investors might want to have other information than what is disclosed to the public to make an investment decision. The performance score of a company could help to have an idea of the real actions the company is making.

In the same way, as they are relation-based countries, the information can be kept private for a certain amount of time. It could be interesting to see if there is any insider trading made thanks to non-financial information.

9 Conclusion

The object of this thesis was to find a relation between liquidity and the ESG score in emerging countries. To have an idea of this relation, we created a linear regression model with the help of previous studies.

To understand this relation, the first part of this thesis allowed us to understand the state of Responsible Investments. We understood the characteristics of different ESG scores such as the Bloomberg disclosure score. We acknowledged that investors use ESG information in the decision process because they believed it would bring some financial performance in the future (Amel-Zadeh & Serafeim, 2018).

In the second part, we understood that the state of ESG disclosure was disparate in different parts of the world and that it could be affected by various characteristics such as the company size. We also saw that the ESG score brings value to Indian firms. Furthermore, we acknowledged that the value of the information disclosed was important for liquidity. Then, we looked at previous studies and found a positive link between ESG disclosure score and liquidity in the developed and the broad market but no research was made on the emerging market. Lastly, we understood that liquidity was less studied in emerging countries.

In the last part, we tried to answer the main hypothesis of this thesis: *"The ESG disclosure score is correlated to liquidity in an emerging market"* thanks to a regression model. We chose three liquidity proxies which are the relative spread, the zero-return measure and the turnover and based our sample on 939 securities from different emerging countries. We also chose the Bloomberg ESG disclosure score and different control variables thanks to previous studies. This allowed us to understand that there is actually a negative relation between ESG score and liquidity in emerging countries, including Chinese stocks. This finding is the opposite of what was observed in the developed market.

To go further, as Chinese stocks were largely represented, we added three models by narrowing down our sample to make a new one. The new sample is composed of 521 stocks which does not include Chinese stocks. With this new sample, we partly found a non-correlation with emerging countries without Chinese stocks as two of the three models were not significant

enough to prove a correlation, the third one still indicated a negative relationship between the ESG disclosure score and liquidity.

Therefore, the asset managers need to be careful when considering an investment in an emerging country for a company with a high ESG disclosure score, especially from China. Moreover, we gained an understanding of the way liquidity is affected in emerging countries.

To go further, it might be interesting to extend the model and take into account different aspects exposed in the last pages of this study. In particular, it could be interesting to recreate this study country by country and with an ESG performance score.

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11 Appendices

11.1 Appendix 1: ESG scores available in Bloomberg, summary

Made by the author based on Huys (2020). This appendix is quoted on page 12.

ESG Scores in Bloomberg

Score	Rating (worst-best)	Coverage	Data	Pros & Cons
Robeco sam corporate sustainability assessment – S&P global esg rank	0 to 100	4 500 companies	Broad - ESG risk & opportunities + management efforts - Inside score from 0 to 100 - Surveys sent to big companies and checked with public information - Score assessment different for each industries	Opaque (don't know what it takes to be at 100), Surveys need to be correctly completed Low coverage *"Are the risks managed?"*
Sustainalytics ranks	100 to 0	12 000 companies	Broad - Management practices to ESG risk exposure - Based on 20 material ESG issues which is composed of 300 ESG indicators specific for each industry with 1300 data points - Backed by 200 analysts with public information & peer review - Company feedback	Quality of management Probably representative due to feedback & review *"Are they doing their best?"*
Iss quality score	D- to A+	10 000 companies	Broad - Disclosure and ESG materials - 200 analysts with public information, 800 data points which are 90% industry specific, 5 important element represent 50% of the score - Compare firm in sector by decile	Don't know what it takes to be at 100 *"How are they disclosing compared to their peers?"*
CDP integrated performance score	D- to A	8 500 companies	Focus on climate change, water security and forests - Highest score between disclosure and management practices - Send survey with 175 indicators	Emphases in changes, Surveys need to be correctly complete *"Are they doing or disclosing to their best?"*
Bloomberg ESG Disclosure Score	0 to 100	11 500 companies	Broad - Score based on public information with 13 categories which are industry specific - Assess the disclosure between firms	Disclosure easily comparable within industry, Not emphasis on management best practices *"How are they disclosing?"*

11.2 Appendix 2: Bhatia and Makkar (2020) study, regression models and comments

This appendix is quoted on page 23.

Image from Bhatia and Makkar (2020)

	Developing countries						Developed countries				
Model specifications	1a Country dummies	1b Country factors	2 Industry dummies	3 Firm-specific factors	4 CG factors	5 Full model	1 Country dummies	2 Industry dummies	3 Firm-specific factors	4 CG factors	5 Full model
Constant	59.89* (28.52)	74.93* (12.60)	55.00* (15.81)	28.87* (4.147)	39.25* (9.44)	21.14** (2.239)	53.02 (30.34)	53.60 (17.73)	26.14** (2.29)	32.44* (3.96)	−1.76 (−0.039)
Brazil	−10.20* (−3.30)										
Russia	−18.85* (−6.31)										
India (Baseline)	–										
China	−10.60* (−3.01)										
South Africa	−12.85* (−4.32)										
USA							1.87 (0.75)				
UK							–				
GE		1.87* (4.78)				1.288** (2.50)					
Global		2.66* (2.62)				4.849* (5.12)					
GINI		−0.59* (−5.10)				−0.628* (−5.348)					
Banking and financial services			−8.693** (−2.106)			−3.22 (−0.88)		−3.44 (−0.85)			−2.98 (−0.72)
Energy and other utilities			3.418 (0.811)			8.05** (1.98)		1.98 (0.43)			5.39 (1.17)
Basic materials			0.805 (0.185)			9.11** (2.30)		8.73 (1.54)			10.51*** (1.84)
Industrials			−9.16*** (−1.96)			−2.13 (−0.54)		−3.47 (−0.67)			−1.966 (−0.41)
Consumer goods			–			–		–			–
Consumer services IT and telecom			−10.32** (−2.35)			−4.125 (−1.094)		5.01 (1.22)			5.10 (1.29)
Pharmaceutical, health care and others			−7.88 (−1.26)			−2.99 (−0.58)		−2.47 (−0.58)			−3.25 (−0.81)
Log of size				1.912* (2.678)		2.37* (3.68)			1.47 (1.35)		1.28 (1.05)
ROA				0.137 (1.074)		−0.013 (−0.120)			0.01 (0.05)		0.036 (0.17)
LEV				−0.409 (−0.832)		−0.32 (−0.80)			0.707 (1.08)		0.487 (0.759)
Int_List				0.96*** (1.69)		0.658 (1.28)			1.727* (2.714)		1.30*** (1.97)
BS					0.35 (1.10)	0.943* (2.94)				0.72 (1.41)	0.656 (1.25)
Indep					−0.04 (−0.80)	0.130** (2.009)				0.13*** (1.86)	0.180** (2.436)
Comm					13.83* (6.065)	9.731* (3.811)				6.27* (2.63)	5.80** (2.37)
R^2	0.165	0.134	0.072	0.06	0.176	0.442	0.006	0.10	0.16	0.11	0.354
Adjusted R^2	0.150	0.122	0.045	0.05	0.164	0.397	−0.004	0.04	0.12	0.08	0.238
F-statistic	10.44	10.97	2.68	3.72	15.084	9.81	0.57	1.972	4.20	3.78	3.063
F-sig	0.000*	0.000*	0.014**	0.000*	0.000*	0.000*	0.45	0.091	0.00	0.01	0.000
DW	1.41	1.37	1.23	1.18	1.27	1.55	1.82	1.90	1.96	1.71	2.0

Notes: GE: governance environment; Global: globalization; GINI: income distribution; Log of Size: size of company; ROA: profitability; LEV: leverage; Int_List: international listing; BS: board size; Indep: board independence; Comm: CSR Committee; and *, ** and *** significant at the 1%, 5% and 10% level, respectively. T-statistics are given in the parenthesis

Commentary from the study:

Model 1a developed market: "*As UK was taken as baseline country, the positive value of beta coefficients of country dummy variable, USA (b = 1.87), highlights that extent of CSR communication is higher in USA in contrast to UK. However, the difference in the extent of CSR disclosure scores between two countries is statistically insignificant."* (Bhatia & Makkar, 2020).

Model 1b developed market: "*However, in case of developed countries, the three country variables (governance environment, globalization and income distribution) are perfectly correlated with each other. This is because country variables consist of only two observations. Thus, only one country variable (governance environment) has been taken for final analysis."* (Bhatia & Makkar, 2020).

Model 5 developing countries: *As "Consumer Goods" industry was taken as baseline industry, the positive value of coefficients of companies belonging to "Energy" (ß = 8.05) and basic materials (ß = 9.11) industries state that these industries present more CSR information in comparison to "Consumer Goods" industry."* (Bhatia & Makkar, 2020).

Model 5 developed market: "*The country variable governance environment is found to have positive but insignificant relation with CSR."* (Bhatia & Makkar, 2020).

The regression model used is:

This study involves the use of multiple regression models to ascertain the relationship between the extent of CSR disclosure and the various factors affecting CSR disclosure. The regression equation investigating the impact of multi-level factors on CSR disclosure score for 2014-2015 is outlined as below:

$$Y = \beta 0 + \beta 1X1 + \beta 2X2 + \beta 3X3 + \beta 4 - 9X4 - 9 + \beta 10X10 + \beta 11X11 + \beta 12X12 + \beta 13X13 + \beta 14X14 + \beta 15X15 + \beta 16X16 + \varepsilon$$

where:
Y = CSR disclosure score (Score);
X_1 = governance environment (GE);
X_2 = globalization (Global);
X_3 = income distribution (GINI);
$X_{4\text{-}9}$ = industry type;
X_{10} = size of a company (Log of Size);
X_{11} = profitability (ROA);
X_{12} = leverage (LEV);
X_{13} = international listing (Int_List);
X_{14} = board size (BS);
X_{15} = board independence (Indep);
X_{16} = CSR committee (Comm);
β = slopes of the independent variables;
β_0 = constant or the value of Y when all values of X are zero; and
ε = εi $\sim$ (0, N).

Image from Bhatia and Makkar (2020)

This regression is only applicable to the model 5 of the developing countries. The "β_4 - $9X_{4\text{-}9}$ " element could be more explicit as to how it works.

11.3 Appendix 3: summary of the sample 1 by country

This appendix is quoted on page 53, made by the author.

Country	Percentage	number of stocks
China&Hong Kong	44.52%	418
Korea	10.44%	98
Taiwan	7.67%	72
Brazil	5.22%	49
Thailand	3.73%	35
Malaysia	3.51%	33
Listed in the US but from emerging markets	3.30%	31
South Africa	2.56%	24
Saudi Arabia	2.56%	24
Mexico	2.56%	24
Indonesia	2.02%	19
Philippines	2.02%	19
Russia	1.49%	14

Chile	1.38%	13
Turkey	1.38%	13
Qatar	1.17%	11
India	0.85%	8
Poland	0.85%	8
United Arab Emirates	0.85%	8
Kuwait	0.75%	7
Colombia	0.53%	5
Czech Republic	0.32%	3
Hungary	0.32%	3

11.4 Appendix 4: summary of the sample 2 by country

This appendix is quoted on page 59, made by the author.

Country	Percentage	Number of stocks
Korea	18.81%	98
Taiwan	13.82%	72
Brazil	9.40%	49
Thailand	6.72%	35
Malaysia	6.33%	33
Listed in the US or Luxembourg but from emerging market	5.95%	31
Saudi Arabia	4.61%	24
Mexico	4.61%	24
South Africa	4.61%	24
Indonesia	3.65%	19
Philippines	3.65%	19
Russia	2.69%	14
Chile	2.50%	13
Turkey	2.50%	13
Qatar	2.11%	11
India	1.54%	8
Poland	1.54%	8
United Arab Emirates	1.54%	8
Kuwait	1.34%	7
Colombia	0.96%	5
Czech Republic	0.58%	3
Hungary	0.58%	3

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