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The marketing capabilities of non-profit organisations and its performance

A quantitative study of the marketing capability of humanitarian NPOs compared to the performance

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Abstract

This thesis is based on a quantitative study that is conducted by comparing the fundraising effectiveness of humanitarian non-profit organisations (NPOs) to their program expenditure. The fundraising effectiveness of NPOs is derived from fundraising expenses over donations received. Using two hypotheses that were developed using literature revolving around capabilities, with a special focus on marketing capabilities, and performance measurements of NPO, we implement these findings to investigate how marketing capabilities can be linked with the performance of humanitarian NPOs. This was done through a deductive approach by analysing data from the financial statements of NPOs. The data that was found in these financial statements were used in a panel data regression and these results are then connected to the theory regarding marking capabilities and performance measurements of non-profit organisations. With the results that were derived from the panel data regression, a positive correlation between fundraising efficiency and the performance of NPOs. The results also reveal a diminishing marginal return with the performance of NPOs concerning the fundraising efficiency, meaning that an increase in fundraising efficiency for NPOs will only increase the performance to a certain point.

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1.Introduction

The introduction section will present the role of non-profit organisations within the society, as well as explain the goal of these organisations. Marketing capabilities will also be presented in this section, explaining how they are incremental for organisations to implement. Finally, this section will end with the research aim of the thesis being introduced, along with the purpose of the thesis.

1.1.Background

Throughout the 20th and 21st centuries, the topic of firms' roles in society has been debated and questioned. The topic first rose to scholarly debate in 1970, when Milton Friedman published a New York Times article where he argued that firms' role in society is exclusively to provide wealth to shareholders (Friedman, 1970). This theory suggests that all firms should disregard all other societal responsibilities, rather leaving societal problems for the state to handle (Friedman, 1970). Friedman's thoughts on the responsibilities of corporations were however not shared with everyone, as new stakeholders theories began to arise, with emphasis on companies having social responsibilities beyond providing wealth to their shareholders (Friedman, 1970). One of the more prolific stakeholder theories that arose after Friedman's theory was The Stakeholder Theory of R. Edward Freeman, published in 2002. This American philosopher opposed the view of Friedman, with regard to the social responsibility of firms, and wrote a theory based on his view of this discussion. His theory, called The Stakeholder Theory, argued that companies should not exclusively focus on providing value to their shareholders, but rather focus on providing value for all the stakeholders (Freeman, 2002).

Freeman believed that firms had a responsibility to create value for both internal and external stakeholders, instead of solely providing it to shareholders of the firm (Freeman, 2002).

The Idea of what responsibilities companies have towards society has continued to evolve since those publications. The discussion around the responsibility of firms has reached a point where it is expected by companies to provide value to all stakeholders and not just value to shareholders (Latapí Agudelo, Jóhannsdóttir and Davíðsdóttir, 2019). This Idea developed into modern Corporate social responsibility (CSR)(Latapí Agudelo, Jóhannsdóttir and Davíðsdóttir, 2019). The main ideas behind this concept have been around for a long time, however, it has been growing in actual presence and popularity with companies since the 1950s (Carroll, 2008). In this day and age, corporate social responsibility has become an institutionalised concept, with many firms striving to fully integrate CSR into their core operations (Carroll, 2008).

This does, however, not mean that all companies are equally striving for a high implementation of CSR within their operations. Some companies choose to follow Friedman's philosophy of 1970, and mainly focus on profits, while other companies have societal gain as the fundamental reason for the company (Latapí Agudelo, Jóhannsdóttir and Davíðsdóttir, 2019). The organisations that forego all profit in order to just provide societal needs are classified as non-profit organisations (NPO).

1.2.Non-profit organisations

As described in the section above, the underlying assumption of shareholder theory is that there are societal problems that are not properly addressed and that private companies and consumers should invest in NPOs to have them effectively fixed (Bottiglieri et al. 2011).

Non-profit organisations are defined as charities, associations, and other types of voluntary organisations that promote cultural, educational, religious, or public service goals (Bottiglieri et al. 2011). These types of organisations aim to serve a purpose to society that is beyond creating profit for its stakeholders. The overarching goal of NPOs is to use all incoming assets to provide help for societal problems (Bottiglieri et al. 2011).

Many NPOs are dependent on donations as the main source of income (Bottiglieri et al. 2011). Non-profit organisations are operating in a substantially competitive environment, in regards to competing for potential funding sources (Holloway, 2012). Public funders around the world have created high demands for NPOs as a central role in solving increasing societal issues, and NPOs are therefore expected to effectively allocate their funds towards solving them (Holloway, 2012). An assumption is therefore that an increase in the effectiveness of NPOs towards solving their outlined goals should result in more funding received.

When examining NPOs, it is important to distinguish between the different types of NPOs that exist, since NPOs often differ in terms of what they aim to achieve and which areas they are operating. Examples of the different areas that non-profit organisations engage in, include education, social issues, politics, health care, animal protection, environment and humanitarian (Soriano & Galindo, 2012). Humanitarian non-profit organisations aim to aid people in vulnerable situations, which often includes people that are victims of war, natural disasters or famine (Worden & Saez, 2021).

1.3.Marketing Capabilities and Fundraising Efficiency

Capabilities are key components to both for-profit organisations and non-profit organisations as it is crucial for performance and competitive advantages. The article written by Barney,

(1991), proposed a basic framework of the resource-based view to complement the environmental factors that influence the performance of a firm. There is a difference between tangible and intangible capabilities. Intangible capabilities are capabilities that can not be sensed, but rather is a notion of values or culture (Krasnikov & Jayachandran, 2008). They define what a business does, and are categorised within different fields of business operation, such as data management-, leadership-, manufacturing- and marketing capabilities.

In particular, Krasnikov and Jayachandranm, (2008), concluded that marketing capabilities have a stronger positive impact on the performance of firms compared to other resources and capabilities. The capabilities of companies reflect effectively on the firm's intentions and goals. It even shows the internal culture as well as their effectiveness (Krasnikov & Jayachandranm, 2008). Marketing capabilities add to a company's ability to effectively communicate a firm's capabilities as well as intentions (Krasnikov & Jayachandran, 2008). Having effective marketing capabilities, therefore, become crucial for organisations that strive to operate effectively..

As mentioned, raising funds is the financial source for the work of NPOs, therefore their fundraising efficiency becomes of utmost importance. Nageswarakurukkal, Gonçalves and Moshtari, (2019), explained that in order to have fundraising efficiency, efficient marketing capabilities are crucial. Throughout their article a couple of aspects of marketing capabilities are proposed as essential, to develop multiple channels for income, improve communication and information management and develop strong relationships with stakeholders (Nageswarakurukkal, Gonçalves and Moshtari, 2019). Studying fundraising efficiency is therefore important in order to understand the marketing capabilities of NPOs.

1.4.Research Aim

To be able to receive funding through donations, people and firms need to understand the goal of NPOs, what societal value they bring, as well as how effective they are at solving these societal problems. Therefore, substantial investments are made by NPOs in their marketing department to attract donations. It is also of relevance to look at the relationship between marketing capabilities and fundraising efficiency in order to effectively raise funds for projects. The issue within this field is that little research has been done on the effectiveness of NPOs using marketing to accrue more investments. The purpose of this thesis is therefore to investigate marketing as an effective capability for NPOs, by studying its effectiveness compared to other performance measurements of NPOs.

Properly studying the aforementioned topic requires a quantitative study, as well as literature about the subject needing to be gathered. Regression analysis is found to be the best option to investigate the interrelationship between the fundraising efficiency and performance of NPOs. A valid regression analysis requires an adequate amount of data. Thus, a sample of more than one hundred yearly financial statements was gathered. And to get an accurate picture of NPOs and marketing correlation, the sample was collected within at least three years of financial statements from individual NPOs. This was to ensure that correlations had implications between years and were not a cause of a one-year anomaly. The sample consisted of multinational humanitarian NPOs that are based in countries which are members of the Organisation for Economic Co-operation and Development (OECD), narrowing the scope of the implication of the results. These procedures are all done to have an adequate amount of research for answering our research question, which is as stated:

"How is fundraising efficiency, as a representation of marketing capabilities, interrelated with the performance of humanitarian NPOs in OECD countries?"

2.Theory

The theory section reviews the literature that is relevant to the topic of marketing capabilities and performance measurements for non-profit organisations. The section starts with a discussion of how resources and capabilities are important implementations for firms. Following this, marketing capabilities will be analysed with regard to how it affects a firm's performance. Theory regarding non-profit organisations and the performance measurements of NPOs will then be discussed, succeeding with the connection between marketing capabilities and the performance of NPOs. Finally, the section will end with a description of our hypothesis for the thesis.

2.1.Marketing Capabilities

Resources of a firm can generally be described as all the assets, both intangible and tangible, controlled by a firm that enables it to plan and implement the strategy with the aim of improving performance (Barney, 1991). Berney Jay, (1991), included capability as resources but did not give it an explicit definition. Arguments have been made for capabilities being a combination of skills and knowledge that are embedded in organisational processes and routines (Krasnikov & Jayachandranm, 2008). While Ray et al., (2004), use research and capabilities interchangeably for assets that firms use to develop and implement strategies. It can therefore be argued that both resources and capabilities are vital for any company to succeed.

Complementary assumptions of resources and capabilities of a firm have generated the resource-based view and the environmental model of strategic management (Barney, 1991). In resource based-view, resources and capabilities are heterogeneous within an industry and are not perfectly mobile across firms (Barney, 1991). Despite the effect of the environmental factors on the performance of a firm, Barney argued that it is only complementary to the resource-based view framework (Barney, 1991). Firms with homogeneous and mobile assumptions can not obtain sustained competitive advantage or first-mover advantage (Barney, 1991). Under these assumptions, neither market exit barriers nor mobile barriers would exist (Barney, 1991).

Building upon the previous section, this section will help demonstrate a company's capabilities impact on performance. The resource-based view assumptions have suggested links between capabilities and performance. For resources and capabilities to create sustained competitive advantage, several criteria need to be satisfied. These criteria include resources and capabilities inhabiting these specific characteristics: valuable, rare, imperfectly imitable and substitutable (Barney, 1991). For resources to be imperfectly imitable, Barney, (1991), discussed that they need to be history-dependent, causally ambiguous, and socially complex. Adding to the resource-based logic, it is argued that tangible resources and capabilities could not contribute to the performance of a firm unless they are involved in the business processes (Ray et al., 2004). It implies that tangible resources could enable a business process, but they are not adequate to sustain competitive advantage (Ray et al., 2004). Business processes that combine intangible resources and capabilities and tangible resources can have a higher chance of being a source of competitive advantage (Ray et al., 2004).

To legitimise the foregoing section, this section will investigate the empirical evidence on capabilities and performance. Empirical evidence on the performance of a firm has shown a trend of positive correlation between the capabilities of a firm and its performance, but inconsistencies in the results suggest ambiguities. Krasnikov and Jayachandranm, (2008), used meta-analysis suggesting that marketing capabilities have a stronger impact than research and development capabilities on the performance of a firm. Ray et al., (2004), found resources such as customer service, and IT knowledge to contribute to the performance of a firm while technology resources have no significant correlation to performance. The logic that the value of the resource and capabilities contributes to competitive advantage, which in term leads to performance advantage was tested (Ferreira & Fernandes, 2017). But the same research also suggests that the rareness of the research and capabilities does not lead to a competitive advantage or increase in performance (Ferreira & Fernandes, 2017). Additionally, Ferreira & Fernandes, (2017), point out that the resource-based view assumption also allows the existence of performance differences over time.

Many studies have investigated the relationship between capabilities and the performance of a firm, but there could be causal obscurities between capabilities and performance. As suggested by Ray et al., (2004), the performance of a firm is a highly aggregated dependent variable. It is the result of multiple business activities, the advantage in one process can be masked by the deficiencies in others (Ray et al. 2004). In for-profit organisations, stakeholders may appropriate profit from business processes before being included in performance measurements (Ray et al. 2004). Profits can be reinvested obscuring the causal relationship between resource and competitive advantage (Ray et al. 2004). As a result, Ray et al., (2004), suggested measuring the efficiency of individual business processes instead of using traditional performance measurements.

The preceding sections have looked at the evidence of capabilities importance, whereas this section will look more specifically at marketing capabilities, which is a specific type of capability that most organisations have as a core future in their structure. Marketing capability fits into the description of the type of intangible asset of a firm which depends on an underlying resource but is important in terms of sustainable competitive advantage. For a firm to succeed with its marketing capabilities, market knowledge is needed, which is usually gained through repetition, interaction and experimentation (Krasnikov & Jayachandran, 2008). A considerable part of market knowledge is embedded in employees and is socially complex, hence such characteristics make marketing capability rare, and difficult to imitate (Krasnikov & Jayachandran, 2008). As a result, marketing capabilities should be critical to a firm that aims to develop sustained competitive advantages over its competitors. As discussed, it is important not to overlook the enabling of tangible resources and capabilities to the competitive advantages.

Marketing capabilities are the capabilities that help firms reap superior performance in the market (Krasnikov & Jayachandran, 2008). Marketing capabilities are composed of different subgenres, which function to better understand what underlying focus on marketing capabilities does to the profit growth in a firm (Morgana, Slotegraafa & Vorhiesb, 2009). The authors concluded that capturing more profit growth depended on how it was to be detained and then accompanying it with the appropriate marketing capability (Morgana, Slotegraafa & Vorhiesb, 2009).

To understand how marketing capabilities were to be used in the market, frameworks regarding this topic have been constructed (Day, 2011). The first framework explored was the

resource-based view. It explains how investigating the internal capabilities of a firm could help with exploiting the market (Day, 2011). The second marketing framework was further added to the dynamic capability framework, which looked to leverage the internal capabilities to explore new market capabilities (Day, 2011). The third framework constructed, capabilities of market-driven organisations, focused on finding gaps in the market and later seeing if the firm had the appropriate capabilities to exploit the gap (Day, 2011). The latest framework explaining the implication of marketing capabilities is the framework of adaptive marketing capabilities (Day, 2011). It was developed in response to the increase of data that digitalisation gave, it argues that properly understanding the influx of data would be fruitful, but the lack of theory to interpret data has caused a large amount of data to be a hindrance (Day, 2011). The authors argue that the increase in data uncovers the potential to explore possibilities that are outside the current scope of the company and effectively adapt to them (Day, 2011).

Multinational companies do not all possess the same capabilities and they differ in how they choose to prioritise their capabilities. Studies have shown that certain capabilities prove to be more influential in reaping profits of multinationality (Kotabe, Srinivasan & Aulakh, 2002). Based on previous theories, a quantitative study provided evidence that firms that focused on their marketing and research and design capabilities were better at reaping benefits from being multinational (Kotabe, Srinivasan & Aulakh, 2002). The study incorporated multi-industry, and it spanned across multiple years to further enhance the significance of the study (Kotabe, Srinivasan & Aulakh, 2002).

Nageswarakurukkal, Gonçalves & Moshtari, (2019), argues that strategic capabilities are of significance to enabling fundraising processes and their efficiency. The article explains that

the main capabilities and resources that are needed in order to capture the fundraising efficiency are: to develop multiple channels for donations, to improve communication and information management, to develop strong relationships with donors as well as supporters, and to invest in IT (Nageswarakurukkal, Gonçalves and Moshtari, 2019). These capabilities make it clear that fundraising capabilities and marketing capabilities share similar traits and make for a comparable base for analysing fundraising efficiency.

The relationship between non-profit organisations and their marketing will be analysed in this thesis, however, an important note is that most of the NPOs do not list their marketing expenses in their financial statements, but rather list them as fundraising expenses. Marketing research and capabilities for NPOs will therefore be referred to as fundraising for non-profit organisations in this thesis

2.2.Non-Profit Organisations

As mentioned in the introduction section, non-profit organisations are organisations that serve the purpose of working towards solving societal issues, which include issues such as famine and natural disasters. These types of organisations aim to serve a purpose to society that is beyond creating profit for its stakeholders. Here lies the distinction between non-profit organisations and regular operating companies (also known as “for-profit companies"), as one common opinion regarding the purpose of business is that they only serve the social responsibility of increasing their profits (Friedman, 1970). Non-profit organisations do not strive to create value for their internal stakeholders, such as shareholders and managers, but rather to produce social value for a specific cause (Soriano & Galindo, 2012).

Non-profit organisations are funded uniquely, compared to the usual funding of regular operating companies which often consists of funding through revenue. The funding of NPOs usually derives from endowments, donations and government funding, meaning that they heavily rely on the public to finance their projects (Bottiglieri et al. 2011). A difference between non-profit organisations and regular companies is also found in terms of the ownership of the organisations. NPOs are structured around the fact that they lack traditional ownership since the public is not able to trade ownership as a result of NPOs not issuing stocks to the public. (Bottiglieri et al. 2011). The absence of ownership in non-profit organisations will contribute to ensuring that the goals of the NPOs are pursued rather than trying to keep stockholders satisfied by pursuing increasing profits. This is done to prevent corruption within a non-profit organisation, in order to make the NPOs work fully towards their goals.

Non-profit organisations are also unique in terms of their organisational structure since the most common type of employees at NPOs is volunteer workers, instead of paid employees. (Soriano & Galindo, 2012). This does however not mean that non-profit organisations do not have any paid staff or full-time employees, but rather that there is a higher proportion of volunteer workers at NPOs than at regular companies (Soriano & Galindo, 2012). Another way that non-profit organisations differ from for-profit companies is that leaders of NPOs often have to behave differently than those who lead for-profit companies (Holloway, 2012). This is because the leaders of NPOs have the responsibilities of more parties since they for example need to be able to oversee multiple funding sources, their projects and their clients (Holloway, 2012).

Resources and capabilities are increasingly more important to NPOs. Vasfi, (2016), suggested that marketing capabilities spread awareness of issues in order to gain social and political support in the forms of volunteers, and funding attractions. This is especially important since most NPOs compete for the same pool of donations, making the awareness of the issues crucial. Another reason that NPOs choose to adopt market-oriented strategies is the decrease in government funding, as seen in the UK, and the increase of competition for attraction and resources in the NPO sector (Vasfi, 2016). As the main input of a non-profit organisation depends on social attraction and resources, marketing capabilities are argued to be essential to NPOs (Vasfi, 2016).

2.3.Performance measurements of NPO

The performance measurements of NPOs are those that suggest their level of achievement towards their respective societal missions. Hence, the best measurement of performance should be specialised for each organisation according to its mission. However, general measures are needed to compare different non-profit organisations. Performance measurements in NPOs are a heavily debated topic in the NPO effectiveness research field, with NPOs having different performance measurements and scholars highlighting different measures of importance in their article (Ritchie & Kolodinsky, 2003).

Prior articles have suggested different factors that determine the performance of an NPO. Ritchie & Kolodinsky, (2003), has suggested a way for NPOs to evaluate their performance through public support, and fiscal performance. Boateng, Akamavi & Ndoro, (2015) identified five factors that are significant for the performance of NPOs through principal component analysis. They are the financial perspective, client/customer satisfaction, management effectiveness, stakeholder involvement, and benchmarking. Epstein & Buhovac,

(2009), outlines fundraising efficiency, administrative efficiency, and program efficiency as the financial performance measures of NPOs through case studies. This article uses many different measurements and is all used for different categories.

It is also important to note that studies on performance measurements of NPOs have different goals compared to this study. A wide range of measurements has been investigated regarding their ability to assess the general performance of non-profit organisations. It is however important to note that each measurement could reflect the performance of processes at different organisational levels. In particular, fundraising efficiency and program spending are both treated as performance measurements (Boateng et al., 2015). However, the two measurements have different implications when evaluating the performance of an NPO. The program spending directly contributes to the societal goal of an NPO and the fundraising efficiency reflects the efficiency of the internal process of NPOs. This is reflected in the assumption that the internal capabilities of an organisation influence its competitive advantage and that the two measures should be treated separately.

The performance of NPOs with regards to achieving their societal goal needs to be reflected upon, with how you measure their ability to achieve this goal. Fiscal measurements such as program expenses and growth in program expenses are consistently referenced across articles for this purpose. Program spending to total income is regarded as the most relevant performance measurement for NPOs in the UK (Boateng et al. 2015). Boateng, Akamavi & Ndoro, (2015) uses principal component analysis related to total program spending to client/customer satisfaction. Epstein & Buhovac, (2009), regards program expenses as a key indicator of organisational capacity. Thus, total program spending and growth of program

spending will be used. Program spending to total income (donations) will not be used due to the numerical relations with fundraising efficiency .

In terms of fundraising efficiency, it is also important to analyse the different ways this is being presented. Measurements such as the percentage of donations left after subtracting fundraising expenses and the percentage of revenues spent on fundraising expenses are mentioned (Epstein & Buhovac, 2009). Epstein & Buhovac, (2009), also suggests the total public contribution over fundraising expenses as one of the measurements for organisational efficiency. Additionally, Ritchie and Kolodinsky, (2003), discovered that direct public support over fundraising expenses has the highest loading in their principal component analysis for fundraising efficiency. Hence, direct public support over fundraising expenses will be used in this study to measure fundraising efficiency.

2.4.Marketing capabilities and the performance of NPOs

There are multiple papers in the theory section that are relevant in order to motivate the hypotheses of this paper. Barney, (1991), introduces the idea that the firm would need certain capabilities in order to obtain a sustained competitive advantage. Kotabe, Srinivasan & Aulakh, (2002), explains how multinational companies that implement marketing as a core capability will be in a better position for reaping the potential benefits of companies operating internationally. The unique attributes of NPOs have been discussed earlier in the theory section, as well as their relation with contemporary studies in capabilities with a closer look at marketing capabilities and their relationship to fundraising efficiency. The articles that were discussed in the section on performance measurements of NPOs adjust the importance of studying performance measurements in NPOs and also lays a foundation for the evaluation of the effectiveness they are aiming to reach. Ritchie & Kolodinsky, (2003), suggests tools

for examining fundraising efficiency. Boateng, Akamavi & Ndoro, (2015), further explores how client satisfaction and management effectiveness have an impact on the overall performance of non-profit organisations. Epstein & Buhovac, (2009), supply tools to uncover the optimal way of figuring out a performance measurement process for NPOs by looking at key financial strategies along with setting specific targets.

2.5.Hypothesis

The importance of capabilities when staying competitively advantageous is well established in the foregoing section of this paper by analysing for-profit companies, especially regarding marketing capabilities for fundraising efficiently. It is also established that capabilities are essential to the long term performance of NPOs, thereby insinuating marketing capabilities' effect on the performance of NPOs. Thus, a positive relationship between the marketing capabilities and the performance of NPOs can be hypothesised. The performance of NPOs is however not as easily measured as with for-profit organisations. With the discussion in the previous section, the influence of fundraising efficiency on the growth of program expenses and program expenses will be investigated. Therefore, the use of these tools will uncover two distinct relations between capabilities in our humanitarian non-profit organisation sample. Our hypotheses for the results are as stated:

Hypothesis 1: There is an interrelation between fundraising efficiency and growth in program expenses.

Hypothesis 2: There is an interrelation between fundraising efficiency and program expenses.

3.Methodology

In this section, the method of this study will be explained and motivated, as well as the possible changes and limitations to the approach of this study. The methodology section will start with an overview of the research approach for the thesis and will follow with an explanation and motivation of the scope of the study. The data collection method will also be discussed, followed by the explanation and motivation behind variables that are used in the statistical analysis. Selection of the panel data regression model will also be motivated. Lastly, the validity and reliability of our data will be discussed, along with the possible limitations of our study.

3.1.Research approach

In order to investigate the marketing capabilities of humanitarian NPOs compared to their performance, a quantitative study of data from the financial reports of humanitarian NPOs was conducted. Using a quantitative study, a deductive approach was used in order to analyse the data findings. The first step that was taken towards this detective approach was to conduct research on the purpose of firms, with literature such as Friedman, (1970), and Jóhannsdóttir & Davídsdóttir, (2019), was done in order to establish the need for NPOs in our society.

Following this research, further exploration of marketing capabilities, as well as the performance measurements of NPOs, were done with help of literature such as Krasnikov & Jayachandran, (2008), and Boateng, Akamavi & Ndoro, (2015). These academic papers explained how the implementation of effective marketing capabilities is important for firms, as well as the main performance measurements within non-profit organisations. Further research was made regarding how NPOs use performance measurements in order to measure

effectiveness. The performance measurements found in the literature were then explored further and then trimmed down to focusing on the growth of program expense as well as actual program expense. After the literature was gathered and reviewed, a research question based on the literature started to be developed. The hypotheses were worded based on the research of marketing capabilities and the performance measurements that were chosen from the literature.

3.2.Research design

3.2.1.Scope of the study

The scope of the research was narrowed down due to the time and resource constraints of this research. As mentioned, there exists a big variety of non-profit organisations. They function in different markets and span across political boundaries. This study investigated humanitarian NPOs that have their head office in an OECD country, though they typically operate in other countries. The rationale behind the choice is to ensure the quality and credibility of financial data. Although it would be incorrect to assume that since a country has low corruption risk individual organisations also have low corruption, limiting to NPOs where the financial market is well regulated will still minimise the risk of dubious data. Additionally, many of the financial reports used are audited by reputable accounting firms.

To allow us to conclude marketing capabilities' effect on performance, limitations to how this was going to be investigated were set. The decision was to look at fundraising efficiency as it could be measured financially. The time constraint did not allow for a qualitative analysis of other aspects of the marketing capabilities of NPOs. Humanitarian non-profit organisations, which focus on humanitarian missions, are used due to the multinational nature of these organisations and to narrow the scope of research questions. Compared to NPOs focusing on

environments, the NPOs with humanitarian missions usually have their mission abroad giving them multinational characteristics. Additionally, there could be distinctions in the correlation between marketing capabilities and donations across NPOs in different markets. Due to the time and resource constraint, only NPOs with a humanitarian mission were investigated.

3.2.2.Data Collection Method

Several steps had to be taken to collect the necessary data for the study. The first step that was initiated was to look for the financial statements of humanitarian NPOs in the Lund University Library database. This was done by looking through the digital archives of the library for past financial statements of non-profit organisations. After a thorough investigation of this database, it was realised that the financial statements of the NPOs that were needed for the study did not exist in this particular database. The majority of the data needed was not found, and the relevant datasets that were found were mostly insufficient.

After the first failed attempt of gathering data, the second step was to send out emails to the selected humanitarian non-profit organisations with the initiation of inquiring about the financial statements from the last ten years from these NPOs. Our selected humanitarian NPOs were based on the most reputable and well-known NPOs in this category. Emails were sent out to a total of 31 humanitarian NPOs, where 12 of the NPOs that were emailed responded with either attachment of the financial statements that were requested or with a link to where to find the data in question. The rest of the NPOs did not respond to the email or replied with an email stating that they did not want to be a part of this thesis.

With the inquiry of sufficient data from the financial statements of the humanitarian NPOs, the following step was to convert this data into a spreadsheet, since the data was found in

financial statements and not in datasets. It was done to make the data more accessible for analysing. Using the financial statements, the data that was gathered into the spreadsheet was total fundraising expenses, total donations received, total program expenditure and the size of total assets each year for each NPO. After this was gathered into the spreadsheet, all the numbers were calculated from nominal value into USD as of 2021. This was done to make the numbers easier to compare and analyse since the data were from different years as well as some of the data of the NPOs differed in the currency being used.

3.3.Variables

Three variables were used to test the hypothesis of this study: Percentage growth of program expenses, relative change of program expenses, and relative change of size. Each variable has two dimensions, time and NPO, to account for the possible variation across time and between the organisations. For each NPO analysed, four data points were recorded: marketing expenses, donation received, total assets, and program expenditure. The program expenses growth was calculated from expenditure.

3.3.1.Transformation

The numbers were transformed before the regression analysis, with the financial figures being adjusted to the price of USD in 2021. As the relevant data spans over a time range of ten years, inflation and exchange rate fluctuations could obscure the correlation between marketing expenses and donations received over years. For example, using nominal values would create the illusion of growth while the change of real value is considerably smaller. Thus, all the data is adjusted to the price of the U.S. dollar in 2021 for calculation. The financial data that was gathered turned out to be substantially skewed. The skewness of the variables is shown in *appendix 1*. Due to the skewness, the resulting linear regression model

would not satisfy the additive assumption. To address the issue, the logistic transformation was used in several variables. However, the transformation of variables ended up bringing inference implications. The absolute value of numbers became the relative changes of values. Because of this, the results of the regression needed to be interpreted accordingly. Additionally, percentage growth was used instead of absolute growth to compensate for the fact that bigger organisations tend to have a bigger absolute change in growth. Growth in program expenditure can, however, not be log-transformed as it contains negative value. Thus, the data need to be scaled before being log-transformed, the process can be seen in *appendix 7*.

3.3.2.Dependent variables

As explained in the performance measurement section, growth in program expenditure, and program expenditure were investigated for the two hypotheses respectively. As explained in the previous section, transformations were needed for the two dependent variables. They can be summarised as follows:

Percentage Growth of Program Expense:

$$ln(Percentage\,Growth) = ln(\frac{Program\,Expense_t - Program\,Expense_{t-t}}{Program\,Expense_{t-t}})$$

Program Expense:

$$ln(Expenses) = ln(Program\,Expense)$$

3.3.3.Independent variables

As discussed, fundraising efficiency is used to represent the marketing capabilities of NPOs. Based on previous literature, fundraising efficiency for this study is calculated as follows:

$$ln(Frundraising\ Efficiency) = ln(\frac{Donation\ Received}{Fundraising\ Expense})$$

3.3.4.Control variables

Size, as represented by total assets, was used as a control variable only for the first hypothesis. This was due to the suspected effect of the size and influence an organisation has over its fundraising process. However, for the second hypothesis, size was not used as a control variable due to its high correlation with total assets, as shown in *appendix 2*. Most program expenditure of an NPO is taken from its total assets. As a result, the use of size, and total assets, as a control variable would also create inference problems. However, since the first model specifies the percentage growth of program expenditure, the correlation between the control variable and performance is weak (*appendix 2*). Additionally, the previous empirical literature has found few significant control variables for the regression of fundraising efficiency on performance (Krasnikov & Jayachandranm, 2008).

For other possible control variables, the means to collect them would require more resources than the constraints of this study would allow. Hence, no other control variables are used. The formula for size used in the regression is:

$$ln(size) = ln(Total\ Asset)$$

3.4.Panel data regression

The nature of the data for this study is multidimensional since it varies with time and between organisations. Panel data regression incorporates multi-dimensional data, and assumptions need to be made about the structure of the regression. The structures considered are the independently pooled ordinary least square (OLS) model, the fixed-effect model, and the

random-effect model. Torres-Reyna, (2010) suggested three ways to determine the structure: F-test for individual effects, Hausman test, and Breusch-Pagan Lagrange multiplier (LM). F-test for individual effects is used to determine between the pooled OLS model and the fixed-effect model (Torres-Reyna, 2010). The Hausman test is used to decide between the fixed-effect model and the random-effect model (Torres-Reyna, 2010). Lastly, the Breusch-Pagan Lagrange multiplier can help selecting between the random-effect model and pooled OLS model (Torres-Reyna, 2010). The test results are shown below (*Figure 3.1, 3.2 and 3.3*):

Figure 3.1: Summary for F test for individual effects

Null-hypothesis: Fixed-effect mode is not better than Pooled OLS model		
	p-value	*null-hypothesis (95%)*
Model 1	*0.942*	*Accept*
Model 2	*<2e-16*	*Reject*
Note: full result see appendix 3		

Figure 3.2: Summary for Hausman test

Null-hypothesis: Fixed-effect model is not better than Random-effect model		
	p-value	*null-hypothesis (95%)*
Model 1	*0.588*	*Accept*
Model 2	*0.187*	*Accept*
Note: full result see appendix 3		

Figure 3.3: Summary for Breusch-Pagan Lagrange multiplier (LM)

Null-hypothesis: There is no panel effect (Random-effect model is not better than pooled OLS model)		
	p-value	*null-hypothesis (95%)*
Model 1	*0.0967*	*Accept*

Model 2	*<2e-16*	*Reject*
Note: full result see appendix 3		

The three tests suggest that the model for hypothesis 1 should use the Pooled OLS model, and the model for hypothesis 2 should use the random-effect model. F-test for individual effects indicated that model 1 should use the pooled OLS method, and model 2 should use the fixed-effect model. The Hausman test suggests both models should use the random effect model. Lastly, Breusch-Pagan Lagrange Multiplier suggests pooled OLS for the first model and random-effect for the second model. Based on the above-mentioned results, two-panel data regression models are theorised for the two hypotheses:

For Hypothesis 1:

$$ln(PercentageGrowth)_{it} = \alpha + \beta_1 ln(FundraisingEfficiency)_{it} + \beta_2 ln(size)_{it} + \epsilon_{it} \quad (1)$$

For Hypothesis 2:

$$ln(Expenses)_{it} = \alpha + \beta_1 ln(FundraisingEfficiency)_{it} + u_i + \epsilon_{it}, \quad (2)$$

Where:
u_i: Variance introduced by the NPO-specific effect
ϵ_{it}: Error from all other sources introduced for each NPO (i) at time period t.

The regression, data analysis and graphs are produced under the R environment. Main package for panel data regression is the plm package (Croissant, 2022). And the code used for this study is attached in *appendix 7*. Additional packages are needed to reproduce the result includes: tidyverse (Wickham et al., 2019), rstan (Stan Development Team, 2022), rethinking (Mcelreath, R., 2020), lmtest (Hothorn et al., 2022), prediction (Leeper, Ganz and Arel-Bundock, 2019), knitr (Xie et al., 2022), GGally (Schloerke et al., 2020), and stargazer (Marek, 2022).

3.5.Validity and Reliability

When performing a study, it is vital to ensure that the data and methods being used have a high sense of validity and reliability. Gathering data for the regression analysis ended up being a more challenging task than expected, with the lack of credible databases containing the financial statements of non-profit organisations. Using data that is found in a credible database, such as The Lund University Library, would add to the validity of the data. Information had to be gathered manually and entered into a spreadsheet, which potentially could affect the validity of the data. Although the validity of the data was potentially decreased by the data collection method, most of the financial statements that we received were audited by reputable accounting firms, such as KPMG. This adds to the validity of the data since it makes the chance of the financial statements being altered or manipulated lower.

Transparency is a key aspect for non-profit organisations, and they use this to establish trust and accountability from the public (Ortega-Rodríguez et al, 2020). It can therefore be assumed that NPOs have a high incentive of providing correct and honest financial statements to anyone who wants access to them, which adds to the validity of the data being used in the study. Another precaution that was made was to log the gathered data. This was done in order to account for the size difference between NPOs, making the reliability of the data analysis stronger. The reliability of the data analysis was also strengthened by choosing a sample size of 100 data points, in order to have a big enough sample size for a reliable panel regression analysis.

3.6.Limitations

With the methodology that was used to conduct this study, a few limitations have been apparent upon reflection. A limitation that is apparent with regards to the method is the scope

of the study. Since the scope is limited to humanitarian non-profit organisations from OECD countries, the study will not be able to draw conclusions from the other types of NPOs. Another limitation of the scope was that the financial statements that were analysed were from the last ten years. Therefore, a generalisation of the result, where all NPOs, as well as for all time periods, are drawn into the conclusion, will not accumulate into a precise conclusion. It will therefore be important that a precise description of the scope of the study as well as the significance of the results is clarified.

The use of performance measurements in this study is limited due to time and resource constraints. As explained, there are no commonly agreed-upon measures for the performance of NPOs. Due to the nature of NPOs, their progress towards societal goals needs to be highly specialised and can not be generalised. Thus, this study selects quantifiable values from the financial report to interpolate performance. The result of this selection would be that the study only incorporated some parts of the performance of NPOs. The contribution of a particular category of performance could also be limited when considering the overall goals of NPOs. Additionally, alternative performance measurements could produce different results. Hence, the result of the study reflects the performance of NPOs in terms of spending and the growth of spending on programs.

As explained, marketing capability is more than just fundraising efficiency, but due to time and resource constraints, only fundraising efficiency is investigated in this study. Marketing capabilities also require marketing knowledge which can be measured through extensive surveys and interviews (Vasfi, 2016). However, these measurements require a large amount of time and resources. Although marketing knowledge would paint a more complete picture of the capability of an NPO, fundraising efficiency still incorporates both the input and output

of the marketing process. This process is also viewed as a crucial part of the capabilities of an organisation (Ray et al., 2004). Hence, the assessment of marketing capability could be more complete, but the fundraising efficiency is the optimal representation given the constraints of this study.

The inference of regression is also limited. Due to a lack of previous studies in a similar regression setting, the models are exploratory, and it only incorporates the effect of fundraising efficiency. Both models set out to test a correlation between the two factors, but the use of control variables is limited, and the characteristics of the data are unclear. The effect of other organisational capabilities on performance, and the interrelationship of capabilities, may also be important, though they are not investigated due to the scope of this study. Therefore, should the regression of this study result in showing a correlation, there could be various causal routes and other effects that are beyond the scope of this study that contribute to this correlation.

4.Result

In this section, the results gathered from the panel data regression will be analysed and discussed based on the hypotheses and the literature that has been presented earlier in the thesis. The first part of the section will consist of presenting the results that arrived from the panel data regression, explained in the methodology section. It is followed by a presentation of the results and the two hypotheses will be deemed acceptable or not based on the statistical analysis. The statistical results will be provided with a context within the theme of the research question.

4.1.Panel data regression

Figure 4.1: Regression Result

	Dependent Variables:	
	percentage_Growth_sc_log *(1)*	*program_Expenses_log* *(2)*
efficiency_log	*0.024*** *t = 2.625* *p = 0.011*	*0.169** *t = 2.451* *p = 0.015*
size_log	*-0.002* *t = -0.539* *p = 0.591*	
constant	*0.106**** *t = 2.808* *p = 0.007*	*7.408**** *t = 27.485* *p = 0.000*
Observations	*100*	*100*
R-square	*0.070*	*0.145*
Adjusted R-square	*0.051*	*0.137*
F Statistic	*3.677*** *(df = 2; 97)* *(p = 0.029)*	*6.005*** *(p =)*
*Note: * p<0.1; ** p<0.05; *** P<0.01, full result see appendix 3*		

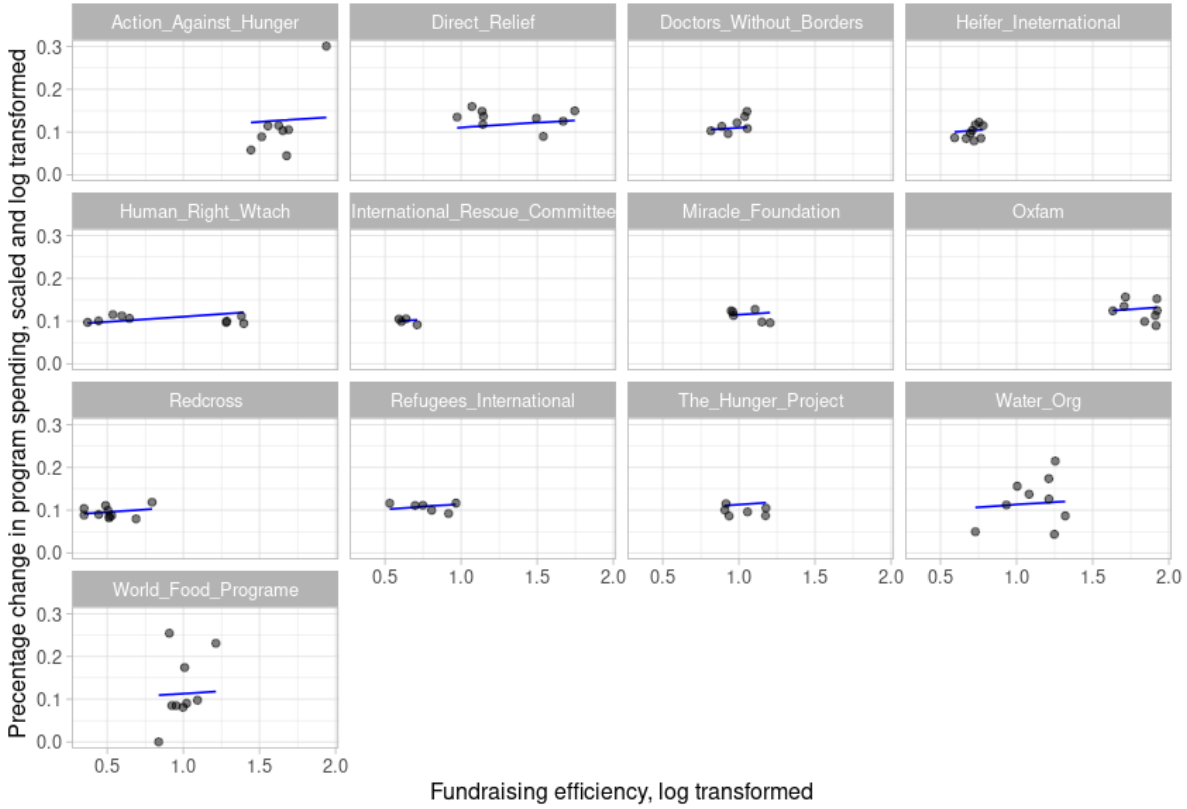
Figure 4.1 shows the result of the panel regression described in the previous section (*Equations 1 and 2*). The slope of fundraising efficiency, efficiency_log, is significant at 95% for both models. For the first model, it shows that holding the relative change of size constant, the relative change of percentage growth in program expenditure increases by 0.0244 when the relative change of fundraising efficiency increases by one unit. The second model suggests that the average effect of relative change in fundraising efficiency over the relative change of program expenditure is 0.169 when the relative change in fundraising efficiency changes across time and between NPOs by one unit. Additionally, both models

have a significant intercept, but the control variable for the first model, which is the size, is not significant.

Overall performance of the model is reported by the adjusted R-square and the F-statistics. F-Statistics indicates that the coefficients of both models are significantly different from 0 at a 95% significance level. The first model has an adjusted R-square of 5.1% meaning that 5.1% of the variations within the data can be explained by the model. The second model reports a better explaining power with an adjusted R-square of 13.7%. Significant constant terms also suggest a stable base level of growth and expenses when the fundraising efficiency is at 0.

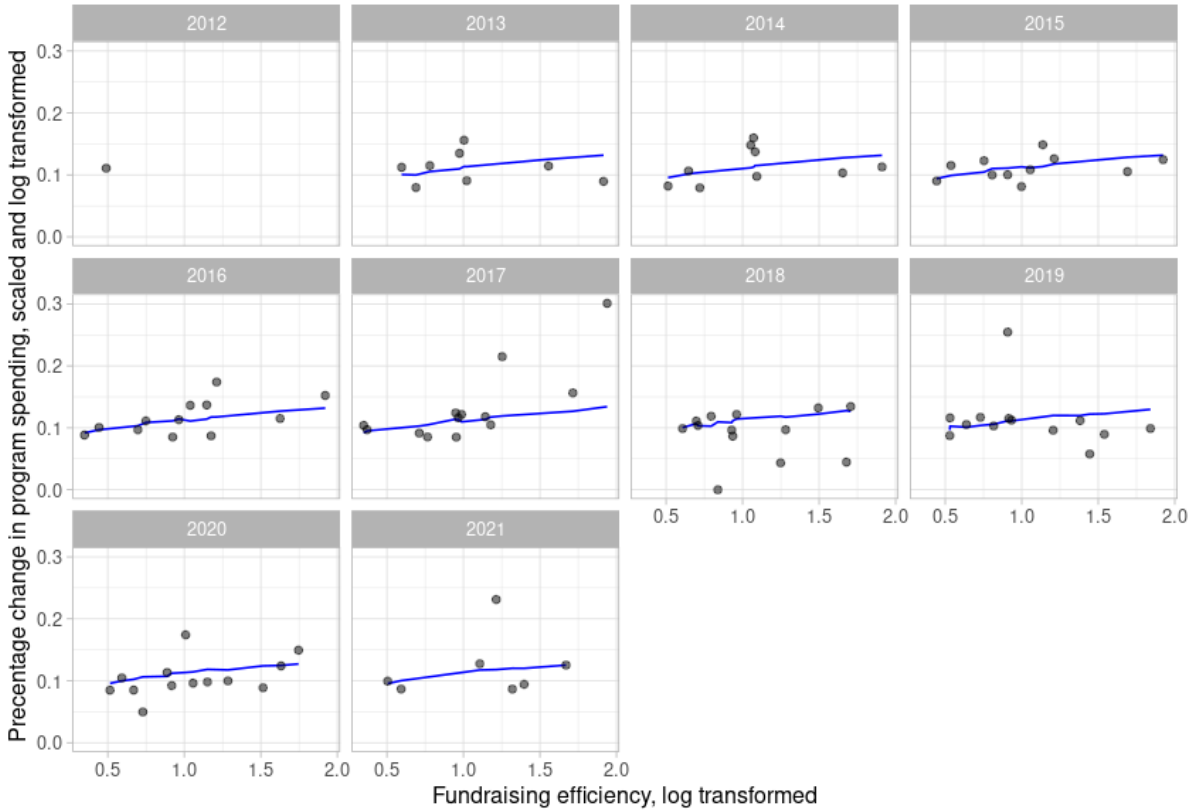
As shown in *Figures 4.2, 4.3, 4.4, and 4.5*, attempts are made to visualise the performance of the model. It is done by predicting the level of growth and expenses at each level of fundraising efficiency and comparing the result to the observed level of growth and expenses. Due to the multidimensional nature of the model, results are faceted into two dimensions. The representation can be improved by incorporating the prediction interval, but due to the limitation of the plm packages, it is not facilitated.

Figure 4.2: Fitted values against observations (NPO dimension)



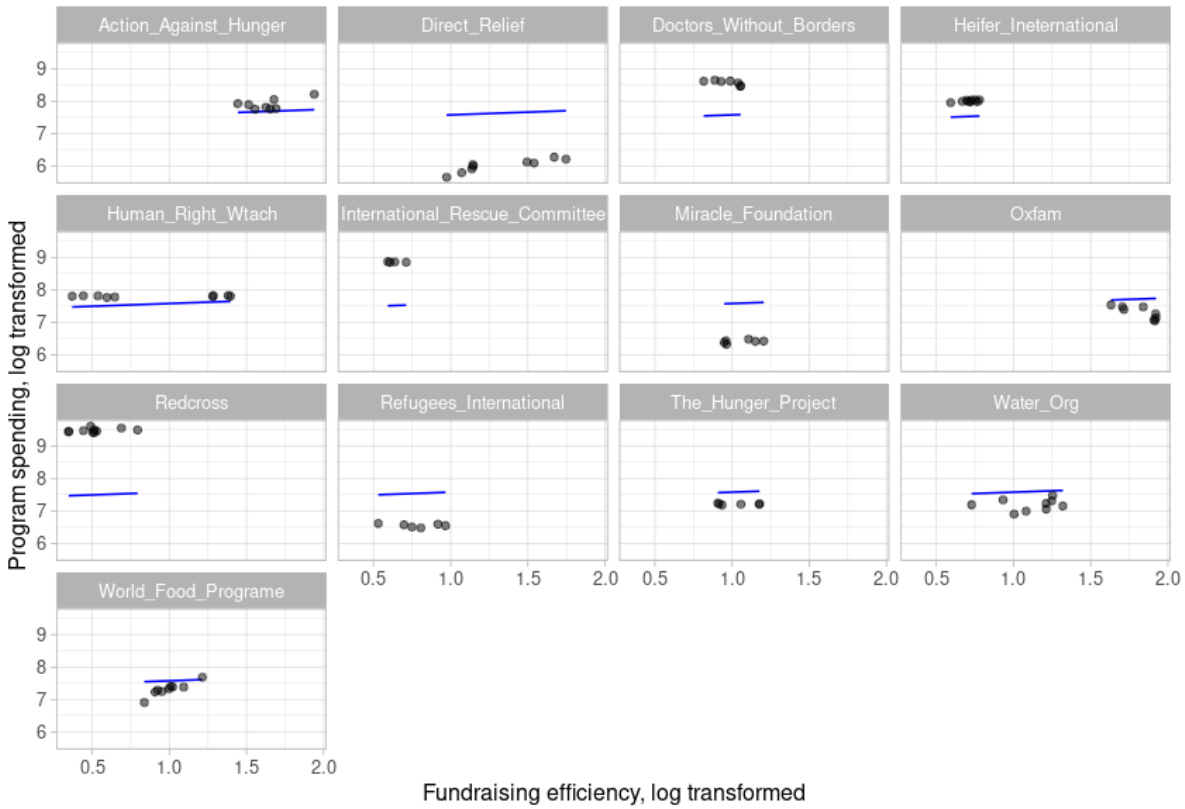
Blue lines are the fitted value, and the black dots are the observed precentage change in program spending

Figure 4.3: Fitted values against observations (time dimension)



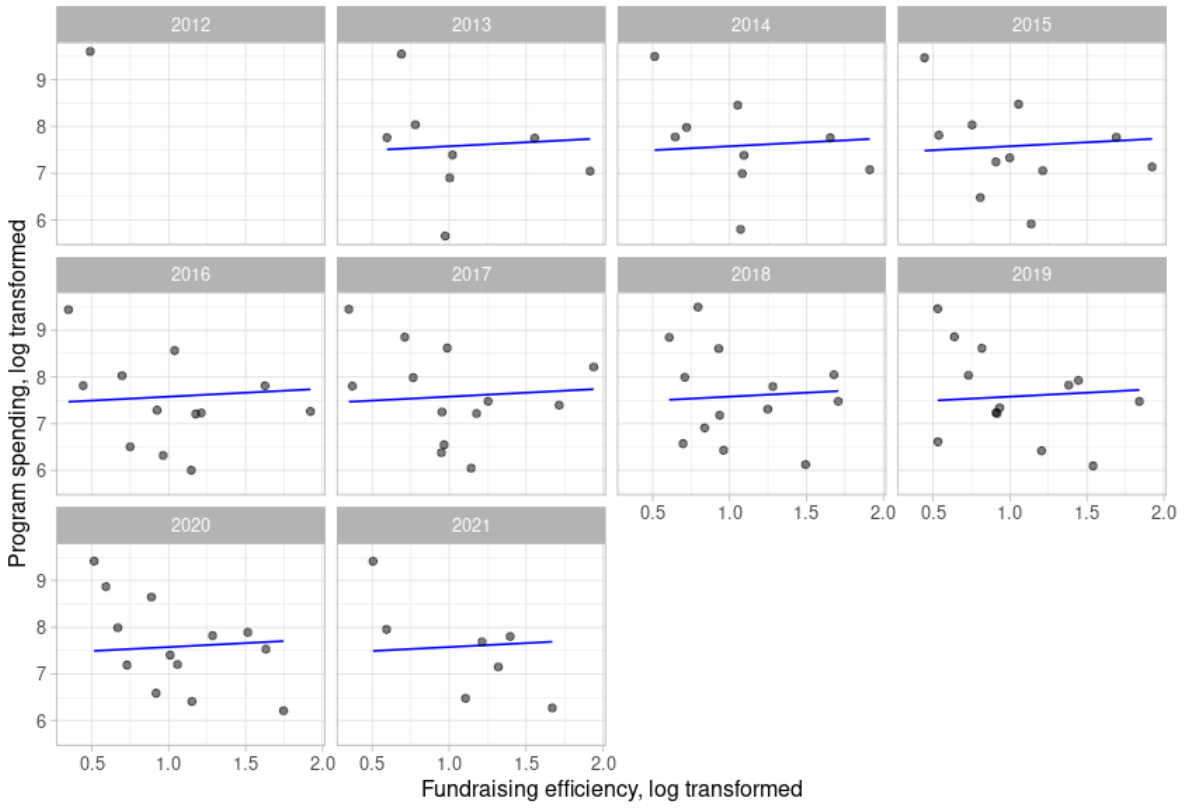
Blue lines are the fitted value, and the black dots are the observed precentage change in program spending

Figure 4.4: Fitted values against observations (NPO dimension)



Blue lines are the fitted value, and the black dots are the observed program spending

Figure 4.5: Fitted values against observations (time dimension)



Blue lines are the fitted value, and the black dots are the observed Program spending

The first model gives more solid predictions when compared to the second model. *Figure 4.2* shows that some NPOs such as Doctors Without Borders and Red Cross are more compliant with predictions. Refugees International and Oxfam have a negative trend. Action Against Hunger, World Food Programme, and Water.org have some deviations from prediction. *Figure 4.3* shows that the correlation is evident in most years, but 2019 has a slight negative trend compared to other years. High deviations from observations are shown for the second model. *Figure 4.4* shows that Action against hunger, World Food Program, and Water.org have the best fit. However, the predictions display considerable deviation for organisations such as Direct Relief, Red Cross, International Rescue Committee, and The Miracle Foundation. When the graph is faceted on time, *figure 4.5* shows little correlation among organisations, and this observation is consistent over time. This means that the correlation between fundraising efficiency and program expenses exists within an organisation over time, but not among organisations.

4.2.Diagnostics

As discussed in earlier sections, both models are significant. However, further diagnostics are needed to evaluate the model's adherence to the regression assumptions. Violation of the assumptions could affect the stability of coefficients or explaining power in general. Breusch-Pagan LM test and Pesaran CD test are used to investigate cross-sectional dependence (Torres-Reyna, 2010). The Breusch-Godfrey/Wooldridge test is used to test serial correlation, and the Breusch-Pagan test is used to test for heteroskedasticity (Torres-Reyna, 2010).

Figure 4.6: Summary for Breusch-Pagan LM test

Null-hypothesis: Residuals across entities are not correlated		
	p-value	*null-hypothesis (95%)*
Model 1	*0.06488*	*Accept*
Model 2	*7.982e-09*	*Reject*
Note: full result see appendix 3		

Figure 4.7: Summary for Pesaran CD test

Null-hypothesis: Residuals across entities are not correlated		
	p-value	*null-hypothesis (95%)*
Model 1	*0.6556*	*Accept*
Model 2	*0.5736*	*Accept*
Note: full result see appendix 3		

Figure 4.8: Summary for Breusch-Godfrey/Wooldridge test

Null-hypothesis: There is no serial correlation		
	p-value	*null-hypothesis (95%)*
Model 1	*0.3344*	*Accept*
Model 2	*5.631e-08*	*Reject*
Note: full result see appendix 3		

Figure 4.9: Summary for studentized Breusch-Pagan test

Null-hypothesis: There is no heteroskedasticity in residuals		
	p-value	*null-hypothesis (95%)*
Model 1	*0.0274*	*Reject*
Model 2	*0.0452*	*Reject*
Note: full result see appendix 3		

The first two tests (*Figure 4.6 and 4.7*) suggest that residuals across entities are not correlated for the first model. The second model shows no such correlation in the Pesaran CD test, but it failed the Breusch-Pagan LM test. Although the two tests are alternatives, the difference in results should be investigated (Ebrary.net, 2022). The Breusch-Godfrey/Wooldridge test, *figure 4.8*, suggests no serial correlation for the first model, but the second model shows a serial correlation of the errors. Lastly, as seen in *figure 4.9* and *appendix 4*, both models show heteroskedasticity among their residuals, albeit to a different extent.

As a result of the diagnosis, potential causes were investigated. The serial correlation of the error in the second model, and heteroskedasticity in both models, indicate that the samples in the data are, in some way, not independent and identically distributed random variables. Although heteroskedasticity could be compensated for in the first model, the cause is suspected to be inconsistent heterogeneity over time. Hence, a regression model using time as a category variable is suggested. The second model exhibits both serial correlation, and weak heteroskedasticity. As for the serial correlation, Verbeek., M., (2004), suggests that it points to the possibility of misspecification of the model. It can be caused by the correlation of a data point with a lagged version of itself, other missing variables, or functional misspecification. The correlation of fundraising efficiency with a lagged version of itself could be explained as fundraising efficiency might not be improving the performance of an organisation directly and instantly, but rather over a longer period of time. Hence, a lagged model is used to investigate as an attempt to address the model and a clustering analysis is applied to investigate the other possible causes.

4.3.Supplementary Statistics

As explained in the previous section, supplementary statistics are needed in order to legitimise the study. A simple linear regression that uses different years as intercepts is made to investigate the heteroskedasticity of the first model. A lagged model and K-mean clustering are used in an attempt to improve the second model. Equation (3) shows the regression model for the model with year as the categorical variable:

$$ln(P)_{it} = \alpha + \beta_1 ln(E)_{it} + \beta_2 ln(S)_{it} + \sum_{n=1}^{10} \beta_t T_{it} + \epsilon_{it} \qquad (3)$$

Where:
P: Percentage Growth
E: Fundraising Efficiency
S: Size
T: Dummy variables for year
ϵ_{it}: Error from all other sources introduced for each NPO (i) at time period t.

The result of this model is shown in *figure 4.10*. The model also shows that the slope for fundraising efficiency is significant and its R-square is similar to that of the first model. *Figure 4.11* suggests that the model does not exhibit heteroskedasticity. Therefore, the model provides similar results with a lower level of heteroskedasticity.

Figure 4.10: Supplementary Statistics: Regression with year as Categorical variables

	Dependent Variables:
	percentage_Growth_sc_log
	(3)
efficiency_log	*0.026***
size_log	*-0.003*
timeCat2013	*-0.018*
timeCat2014	*-0.016*
timeCat2015	*-0.018*
timeCat2016	*-0.013*
timeCat2017	*0.004*
timeCat2018	*-0.038*

timeCat2019	*-0.016*
timeCat2020	*-0.025*
timeCat2021	*-0.009*
Constant	*0.124****
Observations	*100*
R-square	*0.158*
Adjusted R-square	*0.052*
Residual Std. Error	*0.038 (df = 88)*
F statistics	*1.496 (df = 11; 88) (p = 0.148)*
*Note: * p<0.1; ** p<0.05; *** P<0.01, full result see appendix 3*	

Table 4.11: Summary for studentized Breusch-Pagan test

Null-hypothesis: There is no heteroskedasticity in residuals		
	p-value	*null-hypothesis (95%)*
Supplementary: model 3	*0.3241*	*Accept*
Note: full result see appendix 3		

Adding a lagged variable does not address the deficiencies of the second model. Equation (4) shows the regression formula in which a lagged variable is added. *Appendix 3* shows that the regression results for this model are similar to that of the second model. But more importantly, *figure 4.12* indicates that the problem of serial correlation persists in this model. This adds to the evidence that the model may be misspecified.

$$ln(Expenses)_{it} = \alpha + \beta_1 ln(E)_{it} + \beta_1 ln(E)_{it-1} + u_i + \epsilon_{it}, \qquad (4)$$

Where:
E: Fundraising Efficiency
u_i: Variance introduced by the NPO-specific effect
ϵ_{it}: Error from all other sources introduced for each NPO (i) at time period t.

Figure 4.12: Summary for Breusch-Godfrey/Wooldridge test

Null-hypothesis: There is no serial correlation		
	p-value	*null-hypothesis (95%)*
Model 4	*5.394e-06*	*Reject*
Note: full result see appendix 3		

The heteroscedasticity of residuals and the persistent serial correlation prompt an investigation into the variables. K-mean clustering is an unsupervised learning model for determining the existence of a group within samples. The method requires a theorised number of clusters, which can be investigated by hierarchical clustering. The resulting dendrogram, shown in *appendix 5*, suggests the presence of three groups when cut at a height of around 2.7. Using three groups as the initial group assignment for the K-mean clustering method generates the following result:

Table 4.13: Profile of each cluster obtained from K-mean clustering, 3 clusters

Group	*size_log*	*efficiency_log*	*program_Expenses_log*	*Precentage_Growth_sc_log*
1	*8.4895*	*1.2062*	*7.7381*	*0.1084*
2	*9.3601*	*0.5488*	*9.3350*	*0.0954*
3	*7.2294*	*1.0298*	*6.8971*	*0.1196*
Note: full result see appendix 5				

Table 4.13 and *appendix 5* suggest the profile of three potential clusters. The first group has a relatively small size, median efficiency, low expenses, and high expense growth. The second group is characterised by a large size and high program spending, but it has low efficiency and growth. The last group has the size, program expenses, and growth in program expenses in between the other two groups, and has the highest efficiency.

The supplementary statistics are done in light of the findings from the diagnostics of the panel data regression model. It shows that the interrelationship between fundraising efficiency and percentage change of program spending is reliable, but it also reveals the deficiencies of the second model. Reasons behind the failed diagnostics are investigated and inconsistencies among the results of the panel data regression models are suggested. Lastly, it served as a suggestion for future research that the growth of NPOs have a large year to year variation, hence an intercept model could generate better results. The clustering result suggests new potential control variables on size or a quadratic fit may be needed for a better model.

4.4.Analysis

The first model is used to investigate the interrelationship between the percentage growth of program spending and fundraising efficiency. It establishes a significant correlation between the two, but diagnostics suggest the existence of heteroskedasticity. The pooled OLS method was used to investigate the first hypothesis. The reason for the use of this specific statistical method is based on the outcome of the three previous tests that showed there is no significant heterogeneity across groups or time. However, when evaluating the model, a major concern came to light. Heteroskedasticity is evident as the variance of a dependent variable grows with an independent variable. With the suspicion that this heteroskedasticity is caused by inconsistent heterogeneity over the time dimension, a third model, a simple linear regression model with years as categorical variables, is suggested. As shown in the supplementary statistics section, the third model still suggests a significant relationship between fundraising efficiency and percentage growth in program spending without the issue of heteroskedasticity. As a result, it can be concluded that there is enough evidence to accept the

first hypothesis that there is an interrelation between fundraising efficiency and growth in program expenses. And it suggested that the theoretical foundation is correct.

The second model is used to investigate the interrelationship between the program expenses and fundraising efficiency. The result suggested a significant correlation, but serial correlation and heteroskedasticity do exist within the model. A random-effect model is used for this panel data regression as heterogeneity between NPOs and years is suggested. Comparing the method used for the first hypothesis, the random effect model controls account for unobserved heterogeneity. The model has a better face value than the first model in terms of adjusted R-square, but the prediction shows a high discrepancy from the observations. Additionally, further diagnostics suggest that a problem of serial correlation exists. As shown in the previous section, the model with a lagged version of fundraising efficiency still shows the serial correlation. Hence, based on the potential of model misspecification and poor predictive performance, the second hypothesis should be rejected. It means that there is no significant interrelation between fundraising efficiency and program expenses.

This first model and its supplementary model suggest an interrelationship exists between the fundraising efficiency and the percentage change in program spending. Despite the heteroskedasticity, *figure 4.2 and figure 4.3* show a good predictive performance of the model. Through the investigation of heteroskedasticity, it is shown that using time as a categorical variable generates a better model. This means that NPOs are likely to have a large year to year variation in terms of the percentage growth in program expenses. It could be a result of a specific worldwide incident, such as a natural disaster or disease, or the performance of NPOs in general.

In order to explain the deficiencies of the second model, sources of patterns within the data are investigated through an exploratory method, through the use of K-mean clustering. The clustering suggests three distinct groups of NPOs with their characteristics in terms of size, fundraising efficiency, and program spending. It suggested that size could be the factor that separates the two suggested models, though it is not significant to the first model. Such a result is, however, expected as a percentage change of program expenses already compensated for the effect of the size of an organisation. The financial measurement of size is the total assets, which is not used in the second model due to its high correlation with the dependent variable. Another measure of size could be used to investigate if the model can be improved, but it would be inaccurate to suggest that the addition of size would remedy the second model. The lack of similar previous research means that other variables such as second degree lagged variables, other capabilities, and the use of quadratic fit need to be investigated as well.

5.Discussion

The discussion section will build upon the previous analysis section, providing more insight and reflections on the results. The section will start with explaining how the theory that has been presented in this thesis connects to the findings of the analysis. Following this, linearly improvement of efficiency will be discussed with a focus on diminishing marginal returns. The section will then investigate what implications the results are having for NPOs and it will end with discussing the possible correlation that the results have with Customer satisfaction.

The result conducted needs to be further analysed in order to fully understand their implications. From analysing the results, an effect can be observed between fundraising efficiency and program expenditure. Since the fundraising efficiency, as the independent variable, only explains 5% of the total variance for hypothesis 1, it means that the other effect has to come from unexplored variables. For this research, that means that direct conclusions about program expenditure from fundraising efficiencies cannot be inferred. The implications that our results show will be used to base a discussion on what importance fundraising efficiency has, and what could be added to our model in order to further explain what makes NPOs effective.

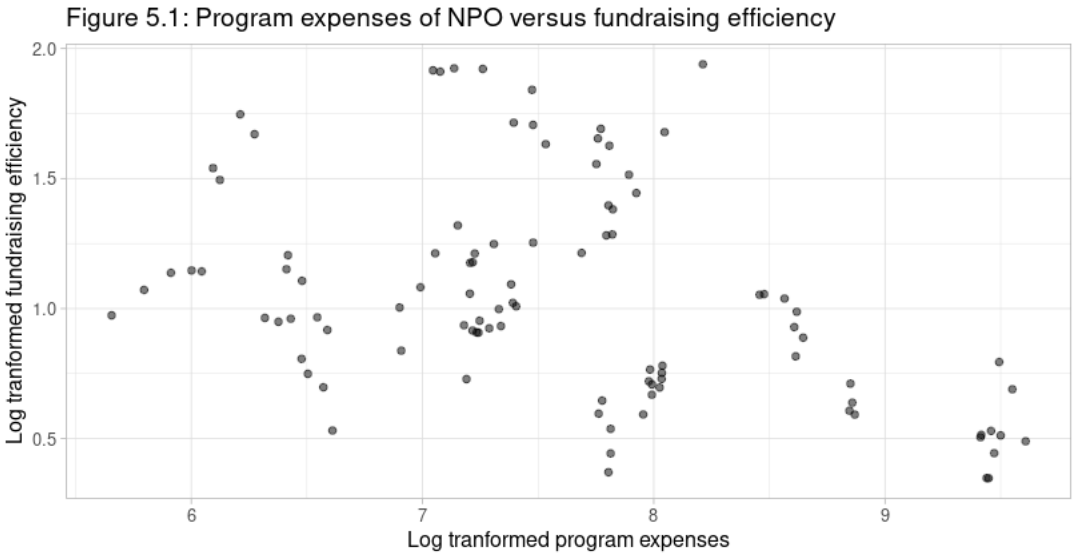
5.1.Theory relation of the results

If the significance of the hypotheses had not been apparent, it would suggest that fundraising efficiency did not have any impact on program expenditure and expenditure growth. Since the first hypothesis did show significance, it means that the fundraising efficiency of NPOs, as a term for their marketing capabilities, has a positive impact on the percentage change of program spending of NPOs. The rejection of the second hypothesis does, however, suggest that there is no direct correlation between fundraising efficiency and program spending. Even though there is only enough evidence to support the first hypothesis, the finding of the statistical test still fits with the marketing capabilities theory that has been presented as well as with the theory on NPOs, showing that the marketing capabilities theory is strongly related to theories on NPOs. This became evident since marketing capabilities were argued by Morgana, Slotegraafa & Vorhiesb, (2009), to be of importance for entities in order to reach their targeted goals. It was further established by Vasfi, (2016), who argued that resources

and capabilities were going to be targeted towards marketing, as it is their main source of income.

Another impact of the valid hypothesis is the validation of our theorised performance measurements. As argued by Morgana, Slotegraafa & Vorhiesb, (2009), the fundraising efficiency of NPOs should be apparent in the performance of these organisations. This theory makes relevant measurements for marketing capabilities as well as performance measurements critical. Epstein & Buhovac, (2009), argued that fundraising efficiency should be calculated using public contribution over fundraising expenses; better values here would therefore contribute to better performance. Considering that effective performance measurements were argued by Epstein & Buhovac, (2009), to be the growth of program spending, it implies that both should be intertwined. This was shown through the regression analysis. That could imply that marketing capabilities research has implications for fundraising for non-profit organisations as well. However, the program spending as a performance metric proves to be problematic due to its correlation with total assets and the related modelling difficulties.

5.2.Linearly improvement of efficiency



Through the investigation into the poor performance of the second model, non-linearity of the characteristics of NPOs was detected. Specifically apparent in *figure 5.1*, it can be seen that with the growth of program expenses there is also an increase in efficiency. However, after a certain point, it drastically decreases with the biggest NPOs showing the lowest efficiency in marketing. There are many possible reasons for this, many of which are outside of the scope of our research. An important note as a result of the supplementary statistics is that the efficiency of NPOs cannot be constantly linearly improved by an increase of fundraising efficiency. As the size of NPOs grows, moving from the second to the third group, both fundraising efficiency and growth in program spending decreases. This result of the efficiency of NPOs not being constantly improved to a certain degree by an increase in marketing capabilities is similar to the theory of diminishing marginal returns.

The theory called diminishing marginal returns is an economic principle that states that applying an additional factor of production causes a lesser rise in output after a certain stage, and possibly results in no form of rise in output (Harris, 2007). This theory can be applied to the performance output of NPOs with regard to its connection with the increase in marketing

spending. The regression does imply that an increase in marketing spending will result in an increase in program spending, insinuating that there is a correlation between this factor and the output. It does also however imply that the largest NPOs have a decrease in growth of program expenses at a certain point. Using the law of diminishing marginal returns, it can therefore be hypothesised that this positive correlation may diminish and also perhaps stop at a certain point in the life cycle of a humanitarian NPO if the organisation grows large enough.

5.3.Implication to NPOs

When investigating the results, it could be relevant to address the types of implications that can be addressed to the internal stakeholders and especially managers of humanitarian non-profit organisations. Although it has been established that there might not be a direct causality between fundraising effectiveness and the performance of NPOs, it is still implied that there is a positive correlation between these two factors. What this implies is that internal stakeholders and managers of NPOs should strive to achieve high fundraising efficiency, by increasing their focus and resources towards marketing capabilities. This does however not imply that they should increase their marketing spending, but rather to work towards a marketing strategy that manages to allocate the marketing budget in a way that yields the highest amount of donations received.

With the results showing correlation, but with lack of other capabilities and interrelationship of capabilities taken into account, another implication can be given to the stakeholders and managers of NPOs is that other capabilities than marketing capabilities can also affect the performance. This should therefore be taken into account regarding the allocation of funds

and focus for NPOs, that increasing marketing capabilities alone might not be enough in order to increase the performance.

An important notion for understanding the results is that there are many different categories of non-profit organisations. Amongst humanitarian NPOs, there also exist other types of NPOs, that for example promote culture, religion and animal rights (Bottiglieri et al., 2011). There are also major differences within humanitarian NPOs, where some organisations work toward solving famine, while others work towards providing shelter for the homeless. All of these non-profit organisations, within every category, are essentially competing for the same pool of donations (Nageswarakurukkal, Gonçalves & Moshtari, 2019). This can be explained by one person choosing to donate to a specific NPO will result in other NPOs not receiving that donation, as most people that choose to donate to these organisations mostly choose a few or even only one to donate to.

Since the non-profit organisations are competing for the same donations, factors that are outside the organisations' control, such as media coverage of a specific world issue, will have a crucial impact on how these donations are distributed among the categories of NPOs (Nageswarakurukkal, Gonçalves & Moshtari, 2019). This phenomenon of external factors, such as media coverage, could have impacted the results and may have interfered with the analysis of how fundraising efficiency affects performance. These types of external factors could therefore either strengthen or weaken the fundraising efficiency for NPOs, making the potential output of increased focus on marketing capabilities more unpredictable. The media coverage could therefore have affected the results of the analysis since the effectiveness of marketing expenditure could have been affected by what issues were the most prominent in the media.

Another factor that needs to be discussed is how customer satisfaction is connected with the performance of NPOs. In the article by Boateng, Akamavi & Ndoros, (2015), a statistical analysis is used to separate different variables into groups. An interesting outcome of this study was that a correlation was found between program expenditure by NPOs and customer satisfaction. In the article, a positive correlation between these two factors was discovered and they were deemed to be crucial factors to determine non-profit organisations' performance. Since our statistical analysis suggests a positive correlation between fundraising effectiveness and performance of NPOs, it can therefore be theorised that there could be a notable connection between marketing capabilities and customer satisfaction, based on this study by Boateng, Akamavi and Ndoros (2015). This connection can be used to further analyse the capabilities of NPOs in order to better their performance, however, this concept would then need to be further studied. We can therefore not draw any conclusions from our study regarding the correlation between these factors, but rather assume that this connection exists based on previous studies.

A last founding of interest is the connection between the results and the theorised outcome of theory. Contemporary research in marketing capabilities suggests that effective marketing capabilities should add to both profitabilities as well as reaping benefits in a multinational environment. Even though NPOs do not aim for profitability it is shown that effective marketing capabilities increase the chances for NPOs of reaching their goal of providing as much societal profit as possible. With regards to the competitive advantage of NPOs in the multinational environment, more research is needed, but since all NPOs studied were humanitarian and work multinationally, it can be argued that outperforming the competition

with marketing capabilities shows evidence of the theory's relevance for studying marketing capabilities in NPOs.

6.Conclusion

This ending section of the paper will go through the key findings and ideas that have been found and presented in this thesis paper. The research aim and objectives of the study will be explained and summarised, with a focus on what this study was set out to explore. Lastly, this section will go through the implications for future research.

6.1.Key findings

The key findings can be concluded from the results of the panel data regression. There is a significant positive correlation between fundraising efficiency, representing marketing capability, and performance of humanitarian NPOs. This conclusion was found using the percentage growth of program expenses as a performance measurement for the non-profit organisations. It validates the marketing capability theory in the context of humanitarian NPOs, and the result suggests that NPOs with better fundraising efficiency were able to achieve higher growth.

However, using program expenses as performance measurements created a model that, albeit showing a significant correlation, has several deficiencies identified by the regression diagnostics. As a result, it is concluded that there is not enough evidence to support the correlation between the fundraising efficiency and the program expenses, leading to the rejection of the second hypothesis. It suggests that program expenses as an independent

variable are problematic in this setting due to their nonlinear relationship with fundraising efficiency. Additionally, to NPOs, it means that fundraising efficiencies are not strongly related to its program expenses.

Another key finding that was conducted in the study was the existence of diminishing marginal returns with this correlation between fundraising efficiency and the performance of NPOs. The clustering method revealed that the NPOs that were of the largest size, meaning the ones with the highest amount of total assets, have the least efficient marketing. The NPOs that were in the middle range of size were the ones with the highest rate of fundraising efficiency, meaning that the fundraising efficiency has a positive correlation with the size of NPOs up until a certain peak where it will start to diminish.

6.2.Research aim and objectives

This study was set out to analyse the marketing capabilities of non-profit organisations, which was derived from their fundraising, as well as the performance measurements of NPOs. An overarching goal of this paper was to explore how humanitarian NPOs can use capabilities, with a special focus on marketing capabilities, to better reach their charitable goals. These factors have been analysed with the intent of exploring a possible connection between fundraising efficiency, which was calculated by the amount of donations received over marketing expenditure, and the performance, which was calculated by the amount of program expenses and the percentage annual growth of program expenses. This paper, therefore, explored the interrelationship between fundraising efficiency and performance in

humanitarian non-profit organisations, and it suggested some insights into how NPOs should use their capabilities based on this interrelationship.

6.3.Implications for further studies

From our research, a plethora of effects have been discovered and would provide for interesting further research. The first identified research opportunity is proof of the link between marketing capabilities and program expenditure. Through the research in this thesis, a part of marketing capabilities have been studied and an effect on program expenditure has been noted. Through further research, additional factors could be studied in order to further prove this connection. One way to do this would be to analyse humanitarian NPOs in different categories and do a qualitative study to compare other marketing capabilities among them. This would lead to a better understanding of the capabilities of humanitarian NPOs and also what direct effect marketing capabilities have on their performance.

The second topic for further research would be an improvement in how the research was conducted. Since it was found that different sizes of NPOs grow more or less effectively compared to each other, studying subclasses for different humanitarian NPOs to get a more accurate finding of the differences between classes. Showing different effects between the classes would be of help to understand at what stage an NPO is in, as well as help managers and internal stakeholders to accurately assess the progress of their non-profit organisation. Another improvement to our paper would be to gather more data, increasing the variables to show what capabilities that have the biggest impact on program expenditure.

Thirdly, research on the effect of marketing capabilities on other measures of social wealth could be studied. Previously literature suggested that the performance measurements of NPOs

are heavily interrelated showing that program expenses and customer satisfaction are correlated. This would suggest that effective marketing capabilities might also be able to affect other performance measurements, rather than solely the fiscal ones. It would therefore be of interest for further research to look at what implications marketing capabilities have for all other performance measurements, and what that research can imply for the internal stakeholders and managers of NPOs.

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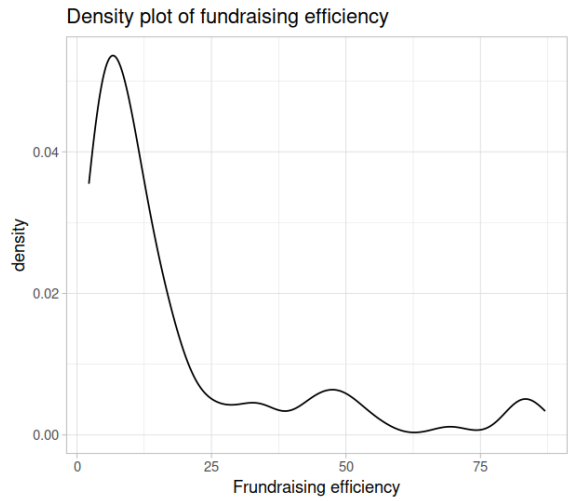
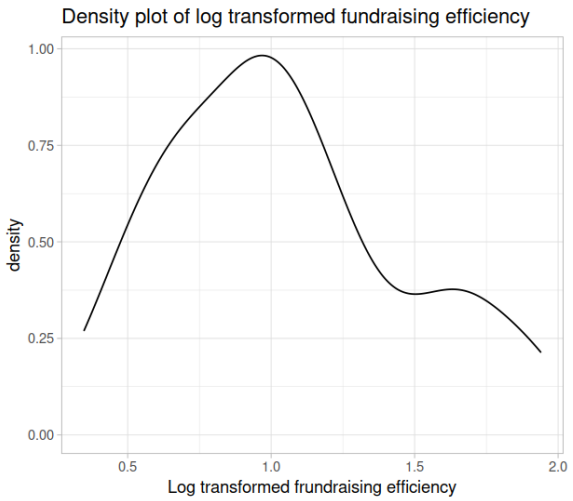
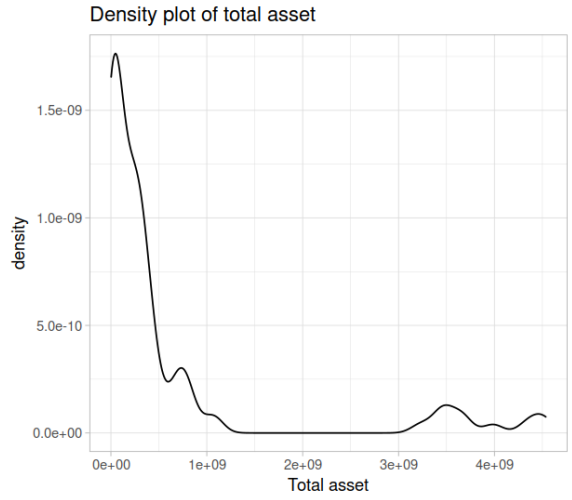
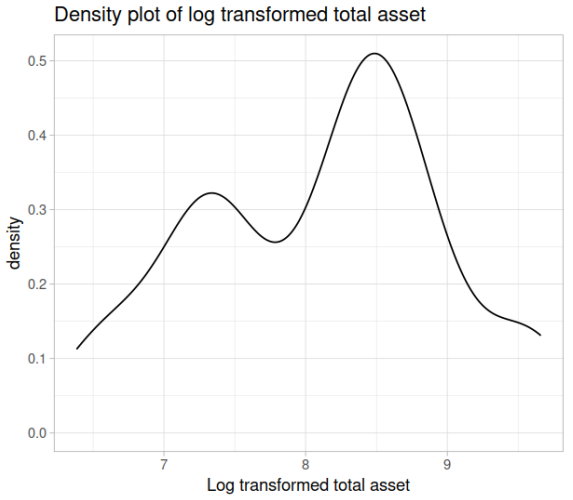
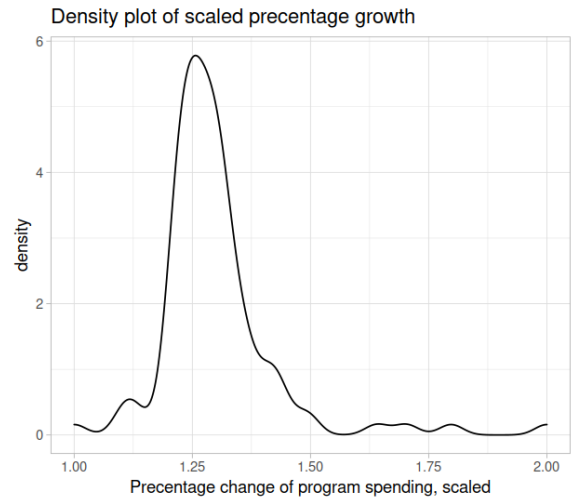
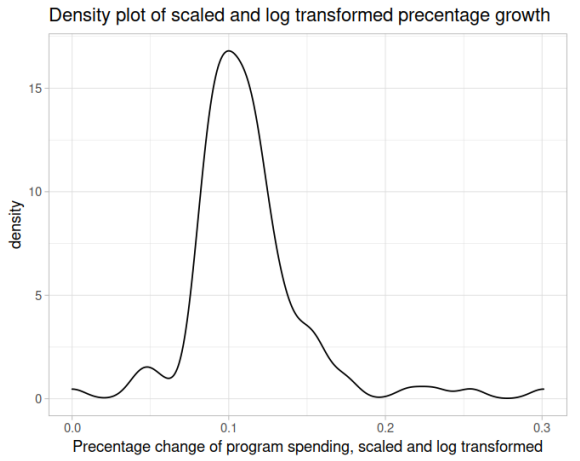
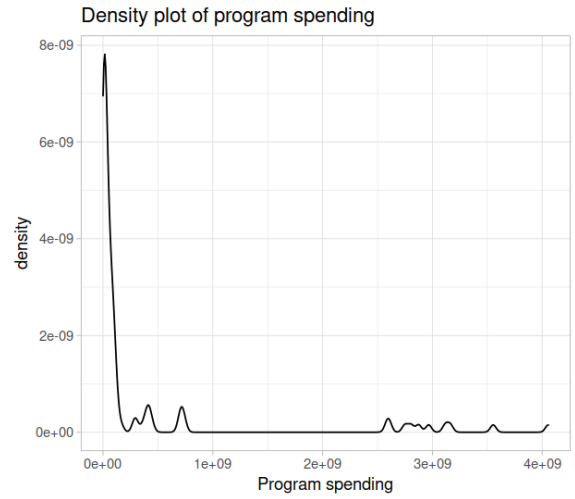
9. Appendix

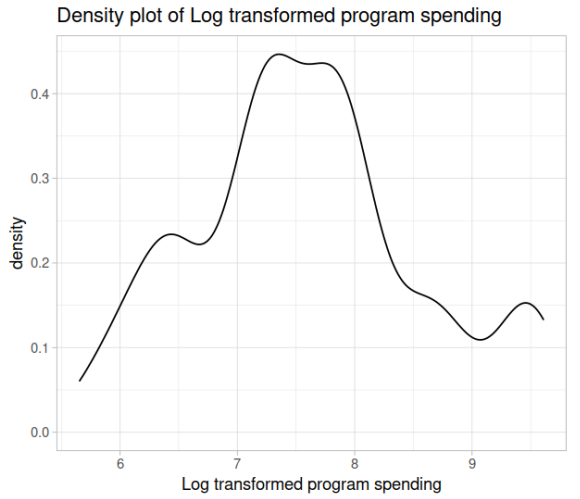
Appendix 1- Skewness

Variables before log transformation	Variables after log transformation
	
	



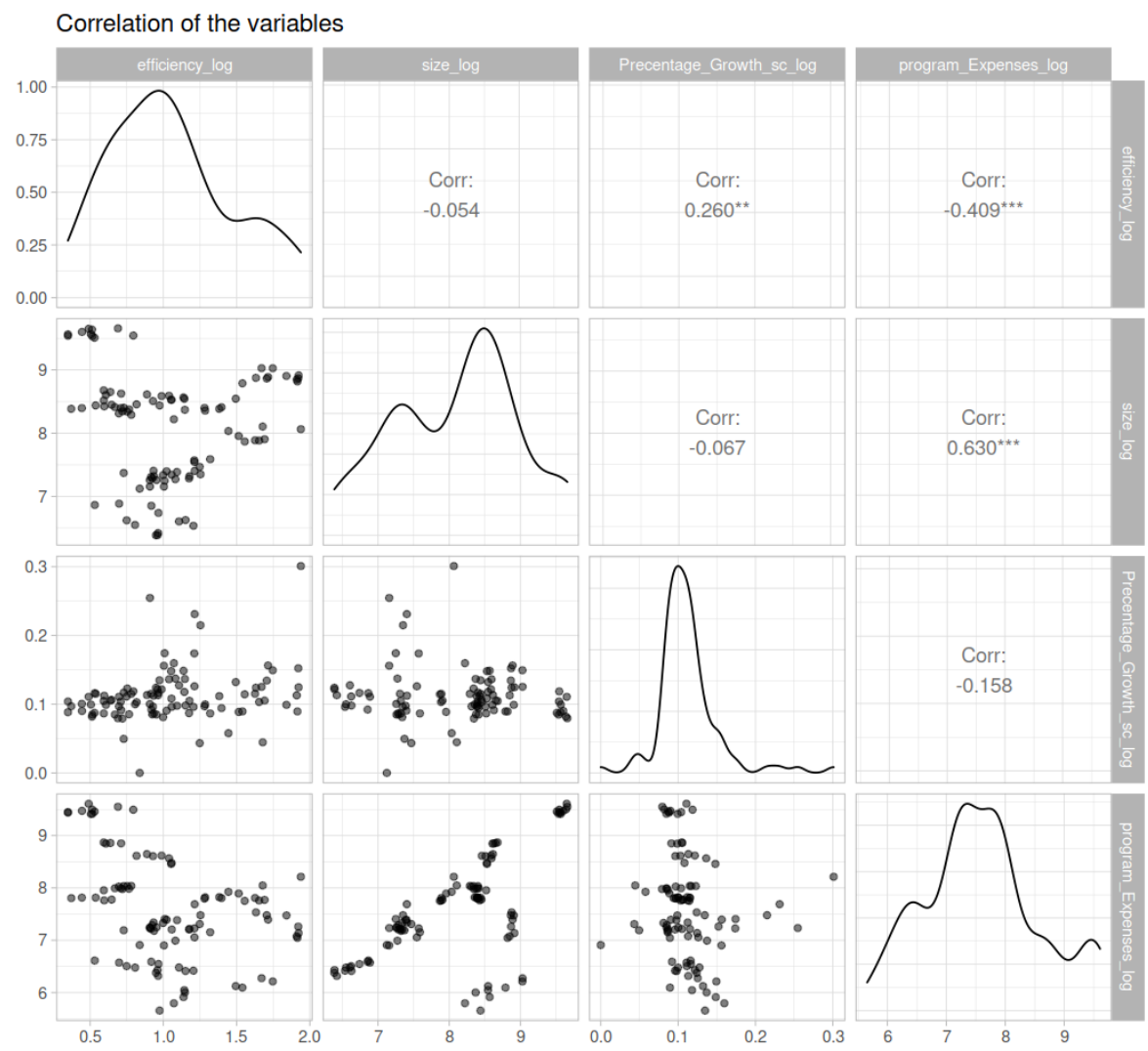






Note: In general, log transformation has improved the skewness of the data. But the distribution of percentage growth stayed relatively the same.

Appendix 2 - Correlation between variables



Note: Correlation between size_log and program_Expenses_log is 0.630, and the correlation between size_log and Precentage_Growth_sc_log is -0.067.

Appendix 3 - Results and Diagnostics

Model evaluation

F test for individual effects
F test for individual effects data: Precentage_Growth_sc_log ~ efficiency_log + size_log F = 0.44016, df1 = 12, df2 = 85, p-value = 0.9424 alternative hypothesis: significant effects
F test for individual effects

data: program_Expenses_log ~ efficiency_log
F = 404.95, df1 = 12, df2 = 86, p-value < 2.2e-16
alternative hypothesis: significant effects

Hausman test

Hausman Test

data: Precentage_Growth_sc_log ~ efficiency_log + size_log
chisq = 1.0625, df = 2, p-value = 0.5879
alternative hypothesis: one model is inconsistent

Hausman Test

data: program_Expenses_log ~ efficiency_log
chisq = 1.7446, df = 1, p-value = 0.1866
alternative hypothesis: one model is inconsistent

Breusch-Pagan Lagrange multiplier (LM)

Lagrange Multiplier Test - (Breusch-Pagan) for unbalanced panels

data: Precentage_Growth_sc_log ~ efficiency_log + size_log
chisq = 2.7593, df = 1, p-value = 0.09669
alternative hypothesis: significant effects

Lagrange Multiplier Test - (Breusch-Pagan) for unbalanced panels

data: program_Expenses_log ~ efficiency_log
chisq = 289.29, df = 1, p-value < 2.2e-16
alternative hypothesis: significant effects

Raw regression output

Model 1: Pooled OLS model

Pooling Model

Call:
plm(formula = Precentage_Growth_sc_log ~ efficiency_log + size_log,
data = npo0, model = "pooling", index = c("npo_Name", "year"))

Unbalanced Panel: n = 13, T = 4-10, N = 100

Residuals:
Min. 1st Qu. Median 3rd Qu. Max.
-0.1095551 -0.0195872 -0.0013384 0.0118109 0.1668371

Coefficients:
Estimate Std. Error t-value Pr(>|t|)
(Intercept) 0.1060768 0.0377788 2.8078 0.00603 **
efficiency_log 0.0244152 0.0093012 2.6249 0.01007 *
size_log -0.0023850 0.0044230 -0.5392 0.59097

```
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    0.15225
Residual Sum of Squares: 0.14152
R-Squared:      0.07048
Adj. R-Squared: 0.051315
F-statistic: 3.67749 on 2 and 97 DF, p-value: 0.028876
```

Model 2: Random effect model

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = program_Expenses_log ~ efficiency_log, data = npo0,
    model = "random", index = c("npo_Name", "year"))

Unbalanced Panel: n = 13, T = 4-10, N = 100

Effects:
                 var std.dev share
idiosyncratic 0.01582 0.12579 0.018
individual    0.85097 0.92248 0.982
theta:
   Min. 1st Qu.  Median    Mean 3rd Qu.    Max.
 0.9320  0.9485  0.9546  0.9512  0.9546  0.9569

Residuals:
      Min.  1st Qu.   Median    Mean  3rd Qu.    Max.
-0.39635 -0.07509  0.00987  0.00009  0.08186  0.31994

Coefficients:
              Estimate Std. Error z-value Pr(>|z|)
(Intercept)   7.407895   0.269523 27.4852  < 2e-16 ***
efficiency_log 0.169451   0.069147  2.4506  0.01426 *
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:    1.8667
Residual Sum of Squares: 1.5952
R-Squared:      0.14549
Adj. R-Squared: 0.13677
Chisq: 6.00536 on 1 DF, p-value: 0.014262
```

Model 3: Supplementary statistic, Categorical Model

```
Call:
lm(formula = Precentage_Growth_sc_log ~ efficiency_log + size_log +
    timeCat, data = npo0)

Residuals:
      Min       1Q   Median       3Q      Max
-0.087908 -0.019414 -0.004635  0.014613  0.145446

Coefficients:
              Estimate Std. Error t value Pr(>|t|)
(Intercept)   0.124031   0.058317   2.127  0.03623 *
efficiency_log  0.025575   0.009397   2.722  0.00783 **
```

```
size_log          -0.002678   0.004526  -0.592  0.55568
timeCat2013       -0.017695   0.041310  -0.428  0.66946
timeCat2014       -0.015505   0.041064  -0.378  0.70665
timeCat2015       -0.017934   0.040796  -0.440  0.66131
timeCat2016       -0.012511   0.040763  -0.307  0.75963
timeCat2017        0.003546   0.040589   0.087  0.93057
timeCat2018       -0.038490   0.040636  -0.947  0.34614
timeCat2019       -0.016219   0.040579  -0.400  0.69036
timeCat2020       -0.024799   0.040575  -0.611  0.54266
timeCat2021       -0.009149   0.041749  -0.219  0.82705
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Residual standard error: 0.03818 on 88 degrees of freedom
Multiple R-squared:  0.1575,    Adjusted R-squared:  0.05221
F-statistic: 1.496 on 11 and 88 DF,  p-value: 0.1474
```

Model 4: Supplementary statistic, Lagged model

```
Oneway (individual) effect Random Effect Model
   (Swamy-Arora's transformation)

Call:
plm(formula = program_Expenses_log ~ efficiency_log + efficiency_log_lag,
        data = npo2, model = "random", index = c("npo_Name", "year"))

Unbalanced Panel: n = 13, T = 3-9, N = 87

Effects:
            var std.dev share
idiosyncratic 0.01395 0.11810 0.022
individual          0.61519 0.78434 0.978
theta:
   Min. 1st Qu.  Median      Mean 3rd Qu.      Max.
 0.9134  0.9386  0.9468  0.9424  0.9468  0.9499

Residuals:
           Min.  1st Qu.   Median      Mean  3rd Qu.     Max.
-0.40158 -0.06796  0.00547  0.00008  0.08352  0.33918

Coefficients:
                    Estimate Std. Error z-value Pr(>|z|)
(Intercept)         7.423564   0.243665 30.4662   <2e-16 ***
efficiency_log      0.093551   0.082721  1.1309   0.2581
efficiency_log_lag 0.072674   0.087571  0.8299   0.4066
---
Signif. codes:  0 ‘***’ 0.001 ‘**’ 0.01 ‘*’ 0.05 ‘.’ 0.1 ‘ ’ 1

Total Sum of Squares:       1.6394
Residual Sum of Squares: 1.2837
R-Squared:          0.21696
Adj. R-Squared: 0.19831
Chisq: 4.10756 on 2 DF, p-value: 0.12825
```

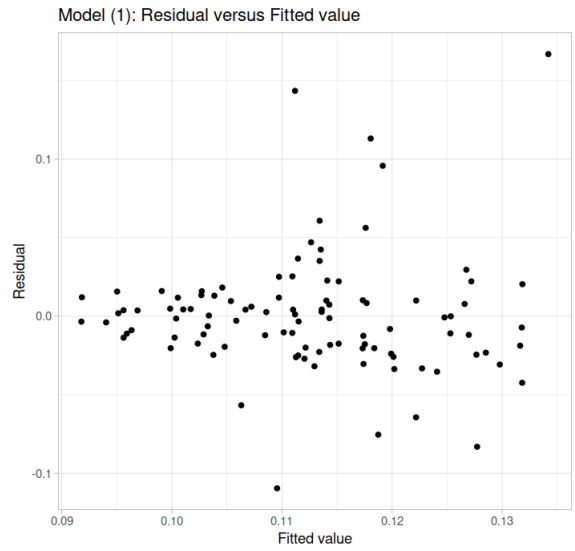
Diagnostics

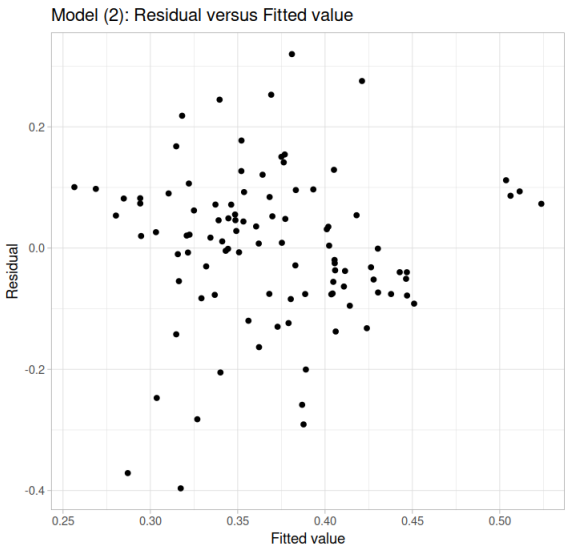
Cross-sectional dependence/contemporaneous correlation
Breusch-Pagan LM test for cross-sectional dependence in panels data: Precentage_Growth_sc_log ~ efficiency_log + size_log chisq = 97.722, df = 78, p-value = 0.06488 alternative hypothesis: cross-sectional dependence
Pesaran CD test for cross-sectional dependence in panels data: Precentage_Growth_sc_log ~ efficiency_log + size_log z = -0.44596, p-value = 0.6556 alternative hypothesis: cross-sectional dependence
Breusch-Pagan LM test for cross-sectional dependence in panels data: program_Expenses_log ~ efficiency_log chisq = 170.27, df = 78, p-value = 7.982e-09 alternative hypothesis: cross-sectional dependence
Pesaran CD test for cross-sectional dependence in panels data: program_Expenses_log ~ efficiency_log z = 0.56283, p-value = 0.5736 alternative hypothesis: cross-sectional dependence
Serial correlation
Breusch-Godfrey/Wooldridge test for serial correlation in panel models data: Precentage_Growth_sc_log ~ efficiency_log + size_log chisq = 4.569, df = 4, p-value = 0.3344 alternative hypothesis: serial correlation in idiosyncratic errors
Breusch-Godfrey/Wooldridge test for serial correlation in panel models data: program_Expenses_log ~ efficiency_log chisq = 39.447, df = 4, p-value = 5.631e-08 alternative hypothesis: serial correlation in idiosyncratic errors
Breusch-Godfrey/Wooldridge test for serial correlation in panel models data: program_Expenses_log ~ efficiency_log + efficiency_log_lag chisq = 27.181, df = 3, p-value = 5.394e-06 alternative hypothesis: serial correlation in idiosyncratic errors
Heteroskedasticity
studentized Breusch-Pagan test data: reg1Ols BP = 7.1943, df = 2, p-value = 0.0274
studentized Breusch-Pagan test data: reg2Ran

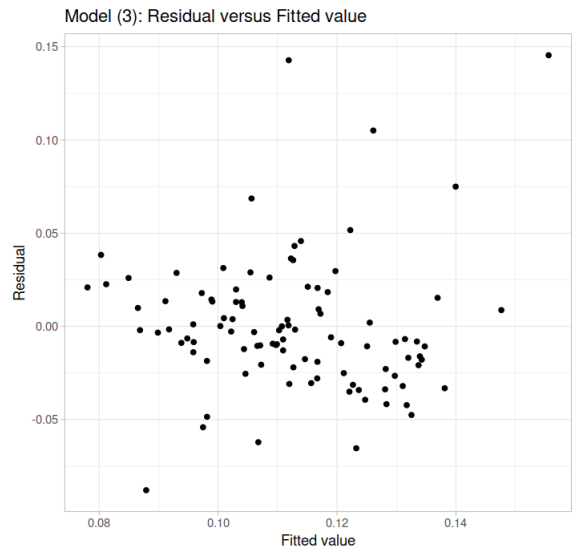
BP = 4.0124, df = 1, p-value = 0.04517
studentized Breusch-Pagan test data: reg1lmCat BP = 12.546, df = 11, p-value = 0.3241
Note: reg1Ols: Precentage_Growth_sc_log ~ efficiency_log + size_log reg2Ran: program_Expenses_log ~ efficiency_log reg1lmCat: Precentage_Growth_sc_log ~ efficiency_log + size_log + timeCat

Appendix 4 - Residual Plots

Residual Plots



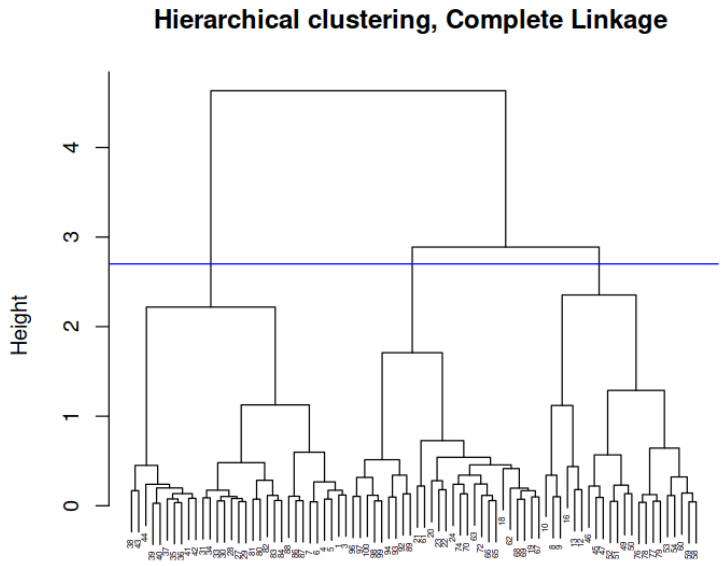




Note: Model (1) shows heteroskedasticity. Model (2) shows weak heteroskedasticity. And model (3) shows no heteroskedasticity.

Appendix 5 - Clustering results

Hierarchical clustering



Note: Hierarchical Clustering with complete linkage generated a more balanced result compared to other clustering methods. When cutting from a height of 2.7, as shown by the blue line, three groups are obtained. To perform a K-mean cluster an initial number of groups is needed. Thus, Hierarchical clustering provides a possible starting number of groups to be used in K-mean clustering.

Call:
hclust(d = dist(npo1cluster), method = "complete")

Cluster method : complete
Distance : euclidean
Number of objects: 80

Table: Number of observations in each cluster obtained from complete linkage with 3 clusters

CG.complete	Freq
1	22
2	27
3	31

K-mean clustering

K-means clustering with 3 clusters of sizes 37, 13, 30

Cluster means:

	size_log	efficiency_log	program_Expenses_log	Precentage_Growth_sc_log
1	8.489525	1.2061877	7.738097	0.10837678
2	9.360139	0.5488037	9.334962	0.09542063
3	7.229377	1.0298127	6.897150	0.11962489

Clustering vector:

```
 52  77  68  96  16  53  41  51   4  35  81  59  33  72  21  66  60  28  23  27  63  88  38
  1   1   3   3   3   1   2   1   1   2   1   1   1   3   3   3   1   1   3   1   3   2   2
 43  76  94  39  93  29 100  42  22  46  13  31  37  49  19  12  34  58  86  54  82  98  36
  2   1   3   2   3   1   3   2   3   1   3   1   2   1   3   3   1   1   2   1   1   3   2
 80  92   1  45  97  99  67  20  83  62  78  74  18   7  84  89  61  79  50  87  10   6   3
  1   3   1   1   3   3   3   3   1   3   1   3   3   1   1   3   3   1   1   2   1   1   1
  5  44  40  47  69  24  65   8  30   9  70
  1   2   2   1   3   3   3   1   1   1   3

Within cluster sum of squares by cluster:
[1] 25.719454  3.282636 17.806484
 (between_SS / total_SS =  69.6 %)

Available components:

[1] "cluster"      "centers"      "totss"        "withinss"     "tot.withinss" "betweenss"
[7] "size"         "iter"     "ifault"
```

Appendix 6 - Data

x	year	npo_Name	marketing_Expenses_2021USD	donation_Received_2021USD	size_Total_Asset_2021USD	program_Expenses_2021USD
1	2020	Doctors_Without_Borders	73207517.87	565736248.90	410076909.60	442631699.64
2	2019	Doctors_Without_Borders	67405791.45	441856189.56	285438426.45	410723033.72
3	2018	Doctors_Without_Borders	50199366.33	426163364.86	322470751.93	404858316.46
4	2017	Doctors_Without_Borders	42284918.78	411277037.97	386054976.54	415310669.16
5	2016	Doctors_Without_Borders	36915592.77	403550649.06	391076141.59	367600060.07
6	2015	Doctors_Without_Borders	33785197.67	383881327.53	336375971.18	300157909.50
7	2014	Doctors_Without_Borders	33650259.97	380249380.19	338026309.15	286887000.16
8	2021	Direct_Relief	3652000.00	171000000.00	1066890000.00	1878533.00
9	2020	Direct_Relief	3211082.31	179242677.36	1063017962.48	1628684.61
10	2019	Direct_Relief	2888210.08	100159945.90	614844281.64	1241801.03
11	2018	Direct_Relief	3244858.87	101327651.44	350823522.65	1329335.70
12	2017	Direct_Relief	2250714.09	31284483.64	349366983.82	1109887.25
13	2016	Direct_Relief	2335914.35	32741187.18	234134487.54	1003171.91
14	2015	Direct_Relief	2664915.75	36584000.00	368419171.95	816920.72
15	2014	Direct_Relief	1950408.84	23006583.20	166018251.43	625193.02
16	2013	Direct_Relief	1778493.42	16749709.12	274247407.49	452373.58
17	2021	Water_Org	1700000.00	35491605.00	38720379.00	14205842.00
18	2020	Water_Org	3664423.89	19634585.24	23473429.43	15492995.77
19	2019	Water_Org	2967702.10	25418341.99	25460627.51	21821681.01

20	2018	Water_Org	1834472.92	32483397.28	29321467.38	20354877.75
21	2017	Water_Org	1658188.18	29727503.53	22408149.26	30083304.29
22	2016	Water_Org	1113200.36	18116526.43	37234757.06	16815852.28
23	2015	Water_Org	1486225.00	24240621.28	35052486.29	11350065.96
24	2014	Water_Org	1487987.97	17975685.58	18696700.45	9797693.40
25	2013	Water_Org	1415139.89	14280936.92	14312991.68	7956693.42
26	2021	Heifer_Ineternational	38569797.00	151109245.00	328892856.00	90023297.00
27	2020	Heifer_Ineternational	26876231.26	125397424.30	258000687.97	98130754.96
28	2019	Heifer_Ineternational	25591334.65	137322770.75	252292388.51	108137024.21
29	2018	Heifer_Ineternational	25566217.14	130731649.60	249162490.29	98256776.14
30	2017	Heifer_Ineternational	23959712.62	139646066.33	237320871.62	96386288.05
31	2016	Heifer_Ineternational	26239858.83	130450162.26	205190341.00	105953259.07
32	2015	Heifer_Ineternational	25730995.13	145780338.18	219235369.38	108364583.80
33	2014	Heifer_Ineternational	26804646.16	140820179.01	221440234.74	95241204.06
34	2013	Heifer_Ineternational	23727195.93	143064383.56	194741594.61	108975076.63
35	2021	Redcross	165392000.00	529405000.00	3668500000.00	2587997000.00
36	2020	Redcross	180813144.74	591425452.85	3420372216.26	2606305790.37
37	2019	Redcross	187601168.50	635406217.62	3231715238.87	2874378468.51
38	2018	Redcross	214201691.28	1335064647.09	3496556108.57	3117206531.98
39	2017	Redcross	209594985.83	467277428.85	3473992671.77	2804991123.65
40	2016	Redcross	191592395.33	427216042.38	3653245859.50	2749651188.67
41	2015	Redcross	206813924.97	575054749.93	3985531840.99	2965536766.87
42	2014	Redcross	209691842.90	682643095.56	4339937818.21	3162671497.53
43	2013	Redcross	220305201.90	1078495159.47	4535024455.42	3553344941.01
44	2012	Redcross	203468695.46	628463343.01	4458798121.72	4055141722.52
45	2020	Oxfam	7961575.49	341314911.33	749636431.01	34089719.84
46	2019	Oxfam	6140427.90	425759262.08	802339460.78	29765500.92
47	2018	Oxfam	8540096.26	434014711.49	731630965.67	30042672.06
48	2017	Oxfam	8433056.47	437319495.75	772715691.43	24785762.28
49	2016	Oxfam	5739088.67	478811637.35	737241214.79	18238102.36
50	2015	Oxfam	5204878.85	436492849.94	819710249.89	13703524.97
51	2014	Oxfam	4871024.76	396834945.05	705077375.70	11926461.64
52	2013	Oxfam	4794227.37	394897656.00	658356622.37	11091272.37
53	2020	Action_Against_Hunger	2979765.03	97457983.49	90215688.34	78134592.64

54	2019	Action_Against_Hunger	3425225.31	95250922.53	108105812.47	84038918.55
55	2018	Action_Against_Hunger	2618598.95	124856707.98	127283011.00	111381511.59
56	2017	Action_Against_Hunger	2083794.23	181177310.56	115731988.15	163001157.12
57	2016	Action_Against_Hunger	1788576.54	75621697.95	77309893.40	64261085.18
58	2015	Action_Against_Hunger	1368147.85	67184610.19	80203871.45	58995943.74
59	2014	Action_Against_Hunger	1548418.59	69817271.09	76479677.70	57347050.57
60	2013	Action_Against_Hunger	1842352.85	66228242.85	73755379.51	56456178.73
61	2021	World_Food_Programe	3765787.00	61621232.00	25343754.00	48735640.00
62	2020	World_Food_Programe	3098441.06	31619396.63	17720573.93	25397651.92
63	2019	World_Food_Programe	2597500.34	21027697.75	14338781.27	17113690.84
64	2018	World_Food_Programe	1429519.50	9850344.80	13272379.22	8089361.94
65	2017	World_Food_Programe	2619919.64	23529890.35	18147223.59	17642594.92
66	2016	World_Food_Programe	2870654.71	24115095.78	19327549.56	19437287.86
67	2015	World_Food_Programe	2688095.14	26769219.33	21803937.10	21385304.10
68	2014	World_Food_Programe	2379319.09	29480960.78	24364731.63	24161731.15
69	2013	World_Food_Programe	2514049.92	26439763.64	25010383.01	24588286.85
70	2020	The_Hunger_Project	1935455.52	22073595.42	22130337.46	16022781.43
71	2019	The_Hunger_Project	2397799.43	19745767.03	20326179.61	16461777.84
72	2018	The_Hunger_Project	2107319.48	18181270.14	20956646.38	15108016.50
73	2017	The_Hunger_Project	1371054.10	20665174.60	20858841.03	16485010.44
74	2016	The_Hunger_Project	1396162.12	20916551.63	19250299.55	16061839.68
75	2015	The_Hunger_Project	2355122.44	19043020.36	18016747.70	17466240.81
76	2021	Human_Right_Wtach	3321705.00	82805833.00	256604927.00	63712606.00
77	2020	Human_Right_Wtach	3305036.04	63728159.28	226937921.51	66201619.23
78	2019	Human_Right_Wtach	2816366.25	67815397.38	242870637.05	66537437.02
79	2018	Human_Right_Wtach	3481483.22	66535764.22	251037502.90	62305357.44
80	2017	Human_Right_Wtach	18390662.20	43184624.77	242750671.82	63713400.13
81	2016	Human_Right_Wtach	17452889.66	48432994.99	249082542.03	65102313.53
82	2015	Human_Right_Wtach	16138999.59	55654496.08	274695070.52	65115524.33
83	2014	Human_Right_Wtach	14479094.70	64139103.28	282057842.80	59785195.55
84	2013	Human_Right_Wtach	13354562.86	52695839.96	265227178.49	57779904.76
85	2020	International_Rescue_Committe e	49353507.99	193056508.46	477324715.58	739918378.84
86	2019	International_Rescue_Committe e	42586525.14	185170832.46	448408128.58	722032382.04
87	2018	International_Rescue_Committe e	39662383.69	160630765.52	402993774.37	701694525.77

88	2017	International_Rescue_Committee	33373800.75	171745182.45	422595890.18	708750529.69
89	2020	Refugees_International	283846.27	2348852.79	7125886.87	3875691.54
90	2019	Refugees_International	716623.74	2434908.42	7322095.86	4080558.59
91	2018	Refugees_International	447432.26	2229576.31	7689705.83	3725550.13
92	2017	Refugees_International	338186.37	3129920.84	5483762.07	3504895.77
93	2016	Refugees_International	386499.55	2169203.00	4186666.41	3194584.73
94	2015	Refugees_International	342130.14	2192129.29	3541619.30	2999789.68
95	2021	Miracle_Foundation	324091.00	4143290.00	4021765.00	3012460.00
96	2020	Miracle_Foundation	263274.20	3729813.97	4228632.10	2579831.90
97	2019	Miracle_Foundation	273746.14	4391446.58	3436062.73	2619764.47
98	2018	Miracle_Foundation	372506.99	3404325.28	2448459.14	2692708.42
99	2017	Miracle_Foundation	322650.26	2871907.86	2433089.36	2381991.74
100	2016	Miracle_Foundation	336734.08	3100923.48	2634163.99	2080060.04

Appendix 7 - Codes

```
#Author: Weikang Ke, Jacob Sandnes, Frans Bergkvist
#Date: May 25rd, 2022
#Version: 1.0
#Description: Investigate the interrelationship between the performance of NPOs and marketing
capability

# Library ------------------------------------------------------------------------
library(tidyverse)
library(rstan)
library(rethinking)
library(knitr)
library(plm) #panel data method
library(lmtest)
library(stargazer)
library(prediction)
library(GGally)

# Data preparation ---------------------------------------------------------------
setwd("~/Dropbox/Thesis/Stat") #Set Working Directory
npo <- read.csv(
  file = "NpoDataFinal.csv",
  header = TRUE,
  sep = ",",
```

```
  dec = "."
) # read data

# dataframe without the lag variables
npo0 <- subset(npo, select= -c(marketing_Expenses_2021USD_Lag, donation_Received_2021USD_Lag))

# Create new variables
## log of size
npo0$size_log <- log(npo0$size_Total_Asset_2021USD, 10)
## log of efficiency
npo0$efficiency_log <-
  log(npo0$donation_Received_2021USD/npo0$marketing_Expenses_2021USD, 10)
## log of program expenses
npo0$program_Expenses_log <- log(npo0$program_Expenses_2021USD, 10)
## scale percentage growth to [1,2]
npo0$Precentage_Growth_sc <- (npo0$Precentage_Growth-
min(npo0$Precentage_Growth))/max(npo0$Precentage_Growth-min(npo0$Precentage_Growth))+1
## take the log of the scaled percentage growth
npo0$Precentage_Growth_sc_log <- log(npo0$Precentage_Growth_sc, 10)
## categorical variables of time
npo0$timeCat <- factor(npo0$year)

# Exploration ----------------------------------------------------------------
## density plot of efficiency
ggplot(aes(x = donation_Received_2021USD/marketing_Expenses_2021USD),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Frundraising efficiency") +
  ggtitle("Density plot of fundraising efficiency")
## density of efficiency_log
ggplot(aes(x = efficiency_log),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Log transformed frundraising efficiency") +
  ggtitle("Density plot of log transformed fundraising efficiency")
## density plot of size
ggplot(aes(x = size_Total_Asset_2021USD),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Total asset") +
  ggtitle("Density plot of total asset")
## density plot of size_log
ggplot(aes(x = size_log),
        data = npo0) +
  geom_density() +
```

```
  theme_light() +
  xlab("Log transformed total asset") +
  ggtitle("Density plot of log transformed total asset")
## density plot of scaled percentage change
ggplot(aes(x = Precentage_Growth_sc),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Precentage change of program spending, scaled") +
  ggtitle("Density plot of scaled precentage growth")
## density plot of scaled percentage change_log
ggplot(aes(x = Precentage_Growth_sc_log),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Precentage change of program spending, scaled and log transformed") +
  ggtitle("Density plot of scaled and log transformed precentage growth")
## density plot of program spending
ggplot(aes(x = program_Expenses_2021USD),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Program spending") +
  ggtitle("Density plot of program spending")
## density plot of program spending_log
ggplot(aes(x = program_Expenses_log),
        data = npo0) +
  geom_density() +
  theme_light() +
  xlab("Log transformed program spending") +
  ggtitle("Density plot of Log transformed program spending")

# correlations ------------------------------------------------------------------
## dataframe to compare correlations
npoCorr <- subset(npo0,
                  select= c(efficiency_log,
                                  size_log,
                                  Precentage_Growth_sc_log,
                                  program_Expenses_log))
## Correlation table
ggpairs(npoCorr,
        lower = list(continuous = wrap("points", alpha = 0.5))) +
  theme_light() +
  ggtitle("Correlation of the variables")

# Models ------------------------------------------------------------------
## OLS Models
reg1Ols <- plm(Precentage_Growth_sc_log ~ efficiency_log + size_log ,
```

```
                data = npo0,
                index = c("npo_Name", "year"),
                model = "pooling")
reg2Ols <- plm(program_Expenses_log ~ efficiency_log,
                data = npo0,
                index = c("npo_Name", "year"),
                model = "pooling")
## Fix-effect Models
reg1Fix <- plm(Precentage_Growth_sc_log ~ efficiency_log + size_log,
                data = npo0,
                index = c("npo_Name", "year"),
                model = "within")
reg2Fix <- plm(program_Expenses_log ~ efficiency_log,
                data = npo0,
                index = c("npo_Name", "year"),
                model = "within")
## Random-effect Models
reg1Ran <- plm(Precentage_Growth_sc_log ~ efficiency_log + size_log,
                data = npo0,
                index = c("npo_Name", "year"),
                model = "random")
reg2Ran <- plm(program_Expenses_log ~ efficiency_log,
                data = npo0,
                index = c("npo_Name", "year"),
                model = "random")
## Regression with time as categorical variable
reg1lmCat <- lm(Precentage_Growth_sc_log ~ efficiency_log + size_log + timeCat,
                data = npo0)
## Lag model
### New dataframe
npo2 <- drop_na(npo)
### Create lagged variables
npo2$efficiency_log <-
  log(npo2$donation_Received_2021USD/npo2$marketing_Expenses_2021USD, 10)
npo2$efficiency_log_lag <-
  log(npo2$donation_Received_2021USD_Lag/npo2$marketing_Expenses_2021USD_Lag, 10)
npo2$program_Expenses_log <- log(npo2$program_Expenses_2021USD, 10)
### Model
reg2RanLag <- plm(program_Expenses_log ~ efficiency_log + efficiency_log_lag,
                data = npo2,
                index = c("npo_Name", "year"),
                model = "random")

# Picking Model Structure ----
## OLS or fix: F test for individual effects
fixOls1 <- pFtest(reg1Fix, reg1Ols) #p-value = 0.9424, OLS is a better choice
fixOls2 <- pFtest(reg2Fix, reg2Ols) #p-value < 2.2e-16, fixed is a better choice
(fixOls1)
```

```
(fixOls2)
## Fixed or Random: Hausman test
fixRan1 <- phtest(reg1Fix, reg1Ran) #p-value = 0.5879, use random effect
fixRan2 <- phtest(reg2Fix, reg2Ran) #p-value = 0.1866, use random effect
(fixRan1)
(fixRan2)
## random or OLS: Breusch-Pagan Lagrange multiplier (LM)
ranOls1 <- plmtest(reg1Ols, type=c("bp")) #p-value = 0.09669, OLS is better
ranOls2 <- plmtest(reg2Ols, type=c("bp")) # p-value < 2.2e-16, use random effect
(ranOls1)
(ranOls2)

# Regression results ------------------------------------------------------------
summary(reg1Ols)
summary(reg2Ran)
summary(reg1lmCat)
summary(reg2RanLag)
star_1 <- stargazer(reg1Ols, reg2Ran,
                    title=" Regression Results ",
                    align=TRUE,
                    type = "text",
                    style = "all",
                    notes=" "
)

star_2 <- stargazer(reg1lmCat,
                    title=" Model 3: Time as categorical variable",
                    align=TRUE,
                    type = "text",
                    style = "all",
                    notes=" "
)

star_3 <- stargazer(reg2RanLag,
                    title=" Model 4: Lagged model",
                    align=TRUE,
                    type = "text",
                    style = "all",
                    notes=" "
)

# Prediction graphs -------------------------------------------------------------
## Prediction for the first model
pred1 <- prediction(reg1Ols, data = npo0, type = "plm")
ggplot(aes(x=efficiency_log, y=fitted), data=pred1) +
  geom_line(color='blue') +
  geom_point(aes(x=efficiency_log, y=Precentage_Growth_sc_log), alpha = 0.5) +
  xlab("Fundraising efficiency, log transformed") +
```

```
  ylab("Precentage change in program spending, scaled and log transformed") +
  labs(title = "Figure 4.3: Fitted values against observations (time dimension)",
       caption = "Blue lines are the fitted value, and the black dots are the observed precentage
change in program spending") +
  facet_wrap("year") +
  theme_light()

ggplot(aes(x=efficiency_log, y=fitted), data=pred1) +
  geom_line(color='blue') +
  geom_point(aes(x=efficiency_log, y=Precentage_Growth_sc_log), alpha = 0.5) +
  xlab("Fundraising efficiency, log transformed") +
  ylab("Precentage change in program spending, scaled and log transformed") +
  labs(title = "Figure 4.2: Fitted values against observations (NPO dimension)",
       caption = "Blue lines are the fitted value, and the black dots are the observed precentage
change in program spending") +
  facet_wrap("npo_Name") +
  theme_light()
## Prediction for the second model
pred2 <- prediction(reg2Ran, data = npo0, type = "plm") # prediction package
ggplot(aes(x=efficiency_log, y=fitted), data=pred2) +
  geom_line(color='blue') +
  geom_point(aes(x=efficiency_log, y=program_Expenses_log), alpha = 0.5) +
  xlab("Fundraising efficiency, log transformed") +
  ylab("Program spending, log transformed") +
  labs(title = "Figure 4.4: Fitted values against observations (NPO dimension)",
       caption = "Blue lines are the fitted value, and the black dots are the observed program
spending") +
  facet_wrap("npo_Name") +
  theme_light()

ggplot(aes(x=efficiency_log, y=fitted), data=pred2) +
  geom_line(color='blue') +
  geom_point(aes(x=efficiency_log, y=program_Expenses_log), alpha = 0.5) +
  xlab("Fundraising efficiency, log transformed") +
  ylab("Program spending, log transformed") +
  labs(title = "Figure 4.5: Fitted values against observations (time dimension)",
       caption = "Blue lines are the fitted value, and the black dots are the observed Program
spending") +
  facet_wrap("year") +
  theme_light()
## Marginal Diminishing return
ggplot(aes(x=program_Expenses_log, y=efficiency_log), data=npo0) +
  geom_point(alpha = 0.5) +
  xlab("Log tranformed program expenses") +
  ylab("Log tranformed fundraising efficiency") +
  labs(title = "Figure 5.1: Program expenses of NPO versus fundraising efficiency") +
  theme_light()
```

```
# diagnostics ------------------------------------------------------------------
## cross-sectional dependence/contemporaneous correlation
### null: residuals across entities are not correlated
xDepCor1Lm <- pcdtest(reg1Ols, test = c("lm")) #p-value = 0.06488, accept null
xDepcor1Cd <- pcdtest(reg1Ols, test = c("cd")) #p-value = 0.6556, accept null
xDepCor2Lm <- pcdtest(reg2Ran, test = c("lm")) #p-value = 7.982e-09, reject null
xDepCor2Cd <- pcdtest(reg2Ran, test = c("cd")) #p-value = 0.5736, accept null
(xDepCor1Lm)
(xDepcor1Cd)
(xDepCor2Lm)
(xDepCor2Cd)
## Testing for serial correlation
### null: there is not serial correlation
serialCor1 <- pbgtest(reg1Ols) # p-value = 0.3344, accept null
serialCor2 <- pbgtest(reg2Ran) # p-value = 5.631e-08, reject null
serialCor3 <- pbgtest(reg2RanLag) # p-value = 5.394e-06, reject null
(serialCor1)
(serialCor2)
(serialCor3)
## Testing for heteroskedasticity
### null: there is no heteroskedasticity
heterosk1 <- bptest(reg1Ols, studentize=T)
# p-value = 8.965e-07, heteroskedasticity
heterosk2 <- bptest(reg2Ran, studentize=T)
# p-value = 0.045,  heteroskedasticity (close)
heterosk3 <- bptest(reg1lmCat, studentize=T)
# p-value = 0.3241, no heteroskedasticity
(heterosk1)
(heterosk2)
(heterosk3)
## Residual plots
### Model 1
res1Ols <- residuals(reg1Ols)
fit1Ols <- predict(reg1Ols)
reg1OlsResid <- as.data.frame(cbind (fit1Ols, res1Ols))
ggplot(aes(x = fit1Ols, y =res1Ols), data = reg1OlsResid) +
  geom_point() +
  theme_light() +
  xlab("Fitted value") +
  ylab("Residual") +
  ggtitle("Model (1): Residual versus Fitted value")
qqnorm(res1Ols, main = "Model (1): Normal Q-Q plot")
qqline(res1Ols , col = "red", lwd = 2)
### Model 2
res2Ran <- residuals(reg2Ran)
fit2Ran <- predict(reg2Ran)
reg2RanResid <- as.data.frame(cbind (fit2Ran, res2Ran))
ggplot(aes(x = fit2Ran, y =res2Ran), data = reg2RanResid) +
```

```
  geom_point() +
  theme_light() +
  xlab("Fitted value") +
  ylab("Residual") +
  ggtitle("Model (2): Residual versus Fitted value")
qqnorm(res2Ran,  main = "Model (2): Normal Q-Q plot")
qqline(res2Ran , col = "red ", lwd = 3)
### Model 3
res1lmCat <- residuals(reg1lmCat)
fit1lmCat <- predict(reg1lmCat)
reg1LmCatResid <- as.data.frame(cbind (fit1lmCat, res1lmCat))
ggplot(aes(x = fit1lmCat, y = res1lmCat), data = reg1LmCatResid) +
  geom_point() +
  theme_light() +
  xlab("Fitted value") +
  ylab("Residual") +
  ggtitle("Model (3): Residual versus Fitted value")
qqnorm(res1lmCat, main = "Model (3): Normal Q-Q plot")
qqline(res1lmCat , col = "red", lwd = 2)

# Clustering method ------------------------------------------------------------
set.seed(002220)#fix seed for reproducing the result
## new data frame
npo1 <- subset(npo0, select= c(size_log, efficiency_log, program_Expenses_log,
Precentage_Growth_sc_log))
npo1cluster<- npo1[sample(nrow(npo1), 80),] #random sample 200 data
## Hierarchical clustering
CA.single <- hclust(dist(npo1cluster), method= "single")
CA.complete <- hclust(dist(npo1cluster), method= "complete")
CA.average <- hclust(dist(npo1cluster), method= "average")
## Denomagram
plot(
  CA.complete ,
  main = "Hierarchical clustering, Complete Linkage " ,
  xlab = " " ,
  sub = " " ,
  cex = .4
) # most balanced tree
abline(h=2.7, col = "blue") #tree groups
## The  clustering solution
CG.complete  <- cutree(CA.complete , 3)
table(CG.complete) %>%
  knitr::kable(
        caption = "Number of observations in each cluster obtained from complete linkage with 3
clusters"
  )
## K-cluster Procedure
CA.kmeans <- kmeans(npo1cluster , 3 , nstart = 2500)
```

```
(CA.kmeans)
profileK <- aggregate(npo1cluster , list ( CA.kmeans$cluster ) , mean)
profileK %>%
  knitr::kable(
        caption = "Profile of each cluster obtained from K-mean clustering, 3 clusters",
        digits = 4
  )

## Graph
# fviz_cluster(CA.kmeans, data = npo1cluster,
#                geom = "point",
#                ellipse.type = "convex",
#                ggtheme = theme_bw()
# )
```