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**Auteur** : Bertrand, Guilhem

**Promoteur(s)** : Defourny, Jacques

**Faculté** : HEC-Ecole de gestion de l'Université de Liège

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**Macro and microeconomic causes of the vulnerability of  
nonprofit organizations:**

**Focus on an approach to assess financial vulnerability of  
nonprofit organizations based on financial capacity and  
financial sustainability.**

Jury

Thesis presented by :

Guilhem Bertrand

Supervisor :

Jacques Defourny

Readers :

Fanny Dethier

Jérôme Schoenmaeckers

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## Executive summary

In this work, we review the macro and microeconomic causes of NPOs' vulnerability before presenting an approach to assess the financial vulnerability of a nonprofit and especially to assess its hazard rate of dissolution. To achieve this, we use a survival analysis which calculates, in our case, the hazard rate of dissolution, the vulnerability, after a certain period of time of existence of an NPO. This survival analysis is based on an explanative variable constituted by a financial capacity and a sustainability measure and an interaction variable between financial capacity and financial sustainability. This interaction variable shows that the effect of financial capacity or financial sustainability on hazard rate of dissolution depends on, respectively, the level of financial sustainability or financial capacity. So, we show how these two aspects of the financial state of an NPO are linked and why they should be considered together when assessing the vulnerability of an NPO. This indicates that we should study the effect of a financial change, such as revenue diversification for instance, on both financial capacity and financial sustainability in order to understand its overall effect on financial vulnerability.

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## Introduction

The ability to assess with good indicators the financial state of an organization is particularly important to know if the organization is vulnerable and may eventually dissolve due to exogenous financial shock. In this work we will focus on nonprofit organizations (NPO).

The covid crisis has impacted the Belgian economy severely. The National Bank of Belgium estimates that in 2020 the activity will fall by 9%. The NPOs should not be spared. For instance, some sport clubs rely truly on sponsorship of local businesses. If these businesses are impacted by the crisis, the sponsorship expenses are likely to be the first to be cut. These NPOs would suffer brutally from this external loss of revenue. Also, the NPOs that get substantial revenues from donation could suffer financially if the individuals who have experienced loss of revenue choose to balance their budget by reducing the donation they used to make.

In a first part of this work, we will review the main macro and microeconomic causes of NPOs' vulnerability. We will begin with macroeconomics reasons so that we will be able to understand the characteristics of NPOs better and what could structurally affect their existence. Indeed, NPOs seem to exist because there are empty spaces in the economy between for-profit private sector and public sector where some other behaviors can take a strong place. Then we will zoom on the individual realities of NPOs to see which ones are more at risk and so are likely to be the first to dissolve. In this section on microeconomic causes of NPOs vulnerability, we will focus on three main reasons usually stated that explain why some NPOs should be more vulnerable.

Then in a second part, we will develop an approach to assess the financial vulnerability of an NPO based on financial capacity and financial sustainability. In this part, we will begin by explaining what financial capacity and financial sustainability mean before wondering on how the two notions are linked together. Afterward, we will implement a method to test if the link we hypothesize can be empirically verified. Finally, we will think about the implications of this link between financial capacity and financial sustainability, on the study of some

microeconomic reasons of NPOs' vulnerability and on the financial decision-making process of NPOs' managers. This should also enable us to identify easily which NPOs are at risk and so, which ones are likely to be the first hit by the economic crisis that comes along with the covid crisis.

## Conceptual background

In this part, we will review the important concepts on which NPOs' theories are based. The first part will be dedicated to better grasp the essence of NPOs and the sector NPOs are embodied in. Then we will go over the main opportunities and threats NPOs experience at a macroeconomic level. This part will answer questions such as why NPOs exist, why classical for-profit enterprises or public sector are not necessarily efficient in the production of some goods or services. By thinking about these questions, we can understand better how institutional changes could affect the space occupied by NPOs in the economy and so identify structural causes of NPOs' vulnerability. Finally, we will see which factor leads individual NPO to be the one at risk in its area. Thus, after examining the situation from a macroeconomic perspective, we will look at the microeconomic causes of vulnerability.

## Definition of nonprofit organizations and their sector

First and foremost, nonprofit organizations are part of the social economy. Social economy is a segment of the economy which is neither public sector nor private sector as we know most of the for-profit enterprises.

The Walloon decree on the social economy (20th November 2008) states that “*social economy is understood to mean economic activities producing goods or services, carried out by companies, mainly cooperatives and/or companies with a social purpose, associations, mutual societies or foundations*”. The decree also identifies a set of principles that are constitutive of the social economic players. These are the following: purpose of service to the community or members rather than profit; management autonomy; democratic decision-making process; primacy of persons and labor over capital in the distribution of income.

Nonprofits, in particular, perform certain tasks of interest. Indeed, they can deliver efficiently public services by receiving government grants. They can promote social inclusion, for example, they may employ workers that would not find a job in a classical enterprise. They may gather members of the civil society that need a structure to organize itself to defend a



particular cause. They also foster a democratic culture in the decision-making process within a socially responsible business. (Osborne; 2008)

In Wallonia, the social economy represents 153.612 employments (Observatoire de l'économie social; Mars 2020). The nonprofit organizations are a significant part of the social economy as they constitute 94,2% of the enterprises of the social economy in 2018 (op. cit.). They also represent 88,6% of jobs in the social economy (op. cit.).

In Belgium, the law of 27th June 1921 recognizes the NPO (ASBL) as “*one that does not engage in industrial or commercial operations and does not seek material gain for its members.*” This law has been replaced recently by a law which came into effect in May 2019. The article 1:2 of the Code des sociétés et associations says that « *An association is formed by an agreement between two or more persons, called members. It pursues a disinterested aim in the exercise of one or more specific activities that constitute its object. It may not distribute or procure directly or indirectly any patrimonial advantage to its founders, members, directors or any other person except for the disinterested purpose determined by the articles of association. Any transaction violating this prohibition is null and void.* »

There is a change in conception of the nonprofit in Belgium. Today, what discriminates NPOs from traditional enterprises is the distribution of the benefits that is impossible in NPOs but an NPO can now pursue the commercial activities it wants, as long as it is to fund its mission and not enrich its founders or members. From now on, NPOs can be in a market competition with capitalist enterprises for selling all sorts of goods or services.

Historically, NPOs would use non-market resources as source of funding with redistribution logic, for example direct subsidies or subsidization of the donation through tax laws, or logic of reciprocity, for example philanthropy or donation. Now they can use the market logic as much as they want with market resources as selling goods or services. This can have an impact on the viability of the nonprofits. Indeed, the NPOs can aim at having more market resources but, we will see that this could have an impact on other sources of revenue.

When a group of people creates an NPO for a kind of activities, the fact that they will not be able to capitalize on it to enrich themselves indicates that the main objective is a mission and the search for financial resources should underpin this mission but is not a goal to aim at. But we will see that some other motivations may play a role in the decision to create an NPO.

## Macroeconomic reasons of NPOs existence

Nonprofits still exist in a capitalist world where traditional capitalist enterprises tend to compete in every part of the economy to grow and specially to grow faster than their competitors. Indeed, every capitalist enterprise must continuously search for growing opportunities with new products, cost reducing process or new target public for instance. If an enterprise stops trying to grow, some other will overtake it and investors will turn to this faster growing company or buyers to the new innovative or cheaper product of the growing company. The enterprise that stops trying to grow will not stay long in the economy. So, in the rush for being the biggest company and gaining the whole market, which should be the ideal to aim for while being an unattainable ideal, some other organizations that do not focus on having the support of the shareholders by trying to gain the whole market, still exist and seem to take a bigger place in the economy. We will see why such organizations exist and grow in this context, what the economic reasons of their existence are.

The working of the economy requires some conditions for the competition to be pure and perfect and so for the market to be Pareto efficient. A situation is Pareto efficient when we cannot increase the satisfaction of an individual without reducing the satisfaction of another one. When the allocation of goods and services by the market is not efficient according to the Pareto principle, we speak of market failure. The first theorem of welfare economics gives the conditions for the market to be Pareto efficient. These are the following:

- Complete market with no transaction cost, each actor has perfect information,
- Actors are price-taker, no monopolist and easy entry and exit from a market.

We will review some of these conditions in the following section to see when nonprofits have an advantage where these conditions are not satisfied.

### Perfect information

A first condition for the competition to be pure and perfect is the perfect information assumption. Buyer and seller should have the same information on the good or services that is traded. When this is not the case, we are in a situation of asymmetrical information. In a transaction, a party disposes of more or better information than the other one. We can observe

case of asymmetrical information in many transactions. We will develop two distinct situations of asymmetrical information: pre-contractual opportunism and post-contractual opportunism.

### *Pre-contractual opportunism*

For example, owners of an enterprise may want to sell their enterprise and they know better than any possible buyer if the enterprise is as profitable and reliable as they suggest. They may try to cover up some difficulties the enterprise is facing in order to get a better price. It may be difficult for a potential buyer to see these deficiencies before actually lead this enterprise. Finally, the deal could fail because the buyer could expect that the sellers try to rib him off.

This known effect of the asymmetry of information is called adverse selection. Adverse selection is common in risk managing contract when a party offer a protection and the other can either accept or not the offer, but he is the only one to know his own risk. If he knows that his risk is greater than what the other party assumes when making the offer, it will be interesting for him to accept the offer. In this case the issue is a pre-contractual opportunism problem. The nonperfect information prevents the economic agents to make suitable contracts.

The nonprofits could be more trusted when the contract is drafted with asymmetrical information because NPOs would have less incentive to make excessive profit thanks to the impossibility to distribute the profit. Indeed, under imperfect information a strategy for the economic agent to assess if an offer seems correct, is to search for trust signal. The non-distribution of profits could be one and the presence of volunteers can reinforce this trust signal. So, NPOs could have an advantage in the case of adverse selection thanks to a greater trust.

### *Post-contractual opportunism*

But some opportunistic behavior can appear after the contract has been drawn up. The contract failure theory is another form of asymmetry of information. In this situation a

consumer of a good is unable to evaluate the quality of a good or service he pays for. It may be because he does not have sufficient knowledge on the good or the services, for instance, the majority of people trust doctors when they receive medical care, they do not have the ability to assess the quality of the service they receive. Another form of contract failure we can observe is when the person paying for a good or service is not the person receiving that good or service. It could be the case when people pay for their parents' retirement home but cannot observe the quality of the services their parents get. We are in a case of what is called moral hazard if there could be incentive to have a behavior that does not correspond to the spirit of the contract.

Contract failure is an explanation of the existence of the nonprofits. There is more trust in the nonprofit for offering these goods and services because they have less incentive to cheat with lower quality than the quality announced or expected. The nonprofit is preferred for the production of trustworthy goods or services. That also explains why governments may prefer nonprofits when financing a social project for instance.

The contract theory also proposes some remedies for this post-contractual opportunism for any kind of organizations, for-profit or not. For instance, incentive contracts that depend on the performance or procedural contract which specifies the means to be put in place. These remedies can be added the trust advantage of nonprofits.

### Atomicity of the agents

Another reason that could lead to non-pareto allocation, if not met, is that the economic agents are price-takers. We can call it the atomicity of economic agents. This means that no economic agent is capable of influencing the market price. It is the case when there is a greater number of buyers and sellers and no one can influence the price. On the contrary, a company that has a too big share of the market could buy goods underpriced to producers and resell them at higher price for instance. This enterprise would attribute itself a part of the value created by the producer. There are, in these cases, power imbalances. This situation exists in some extent for milk producers who only have a few possibilities to sell their production and

must accept, sometimes, prices below the cost. This lack of atomicity of economic agents restricts the competition that underpins the efficiency of the market.

Cooperatives exist for this milk situation such as Fairbel where producers are cooperators and so are distributed equitably the cooperative's earnings. But with the new law of May 2019 that allows NPOs to have commercial activities we could now imagine NPOs that would buy milk to producers and distributed it without making excessive profit even with their importance in the distribution process because it is impossible for the NPOs to distribute profit. This would ensure a fair price for the producers as the NPO would have no incentive to make maximum possible margin while making the distribution efficient. This would not solve the non-atomicity of agents but prevent or diminish the harmful effects of this characteristic. Indeed, there are less incentives for nonprofits to negotiate unfair prices. But we will see that this smaller incentive to make important profits does not prevent some nonprofits or members of nonprofits to have an opportunistic behavior.

### Excess demand for collective or quasi-collective goods

We can also highlight the problem of the production of the public or collective goods. These goods have special characteristics, they are non-rival and non-excludable. Quasi-collective good have some of these characteristics. The non-rivalry means that the consumption of an individual of the good does not affect the consumption of the other individual. For example, scientific knowledge is a non-rival good because when someone "consumes" knowledge and learn, it does not diminish the knowledge available for other people. Non-excludability means that we cannot prevent an individual that would not have paid for a good or a service to take advantage of it. A classic example for this type of goods is the national security. It is not possible to prevent an individual in a country to profit from national security. We cannot make individuals pay their personal part for this type of goods. As these types of goods are usually funded with donations, gifts or subsidies and the for-profits enterprises are less trusted for the production of these goods because it is difficult to assess the results as the effect are indirect on the welfare, they might struggle to get these funding. So, in the production of this type of goods the competition is mainly between nonprofits or the state and not between nonprofits and for-profits.

Burton A. Weisbrod in 1975 theorized the place and the role of nonprofit organizations in economy with public and private sectors. He suggested that the more a society is homogeneous, meaning that its citizens desire the same type and level of public goods, the more the government can take actions alone to address this public goods demand. So, in this kind of society, nonprofits could be less developed because the need for nonprofit is smaller. This indicates a possible link between social needs and the public provision of the goods satisfying these needs. The bigger the gap is between the social needs and the public provision, the bigger the nonprofit sector should be.

This could imply that the austerity measures that we know today and the neoliberalism in a larger period of time create a greater need for NPOs. Indeed, neoliberalism and austerity measures are known to diminish the spending of the public authorities, even for a philosophical reason, the state is inefficient, or to decrease the public debt because this level of debt could be dangerous. So, the gap between social needs and public provision enlarges. If this gap is large enough, this could create eventually a form of censitary suffrage because people with more money could “vote”, by giving to their preferred nonprofits, what are the social needs that deserve being address or not.

We could also recognize some goods as essential ones and so not let the market decides with prices who can access these goods. For example, basic food can be considered to be something that everyone should be able to benefit. The elements considered as essential and accessible to everybody depend on how the society measures who deserves what and so can be very different from one place to another. But in these cases, the nonprofits will certainly be better than classical enterprises as classical enterprises have another possibility than delivering the goods or services of the best quality possible which is making profit. The nonprofit does not have this alternative option, so the nonprofit should be more trusted because the nonprofit does not have the same incentive to deviate from its mission. The government can subsidize, or people can donate with more trust to a nonprofit because it should offer the maximum quality goods or services possible.

It is obvious that if the market capitalism worked so well that everybody would have enough to eat, all the nonprofits that have this mission of addressing hunger would disappear very quickly. But as long as some collective problems exist and there is a demand for addressing these problems, nonprofit will tackle these problems if the state does not tackle them or does it with not enough extent. There is a market failure for these goods and insufficient government procurement that lead to the economic reason of nonprofits existence (Weisbrod 1977).

## Externalities

We could, for some reasons, refuse or be unable to utilize price to discriminate who can benefit from something and who cannot. This non-excludability can be observed for technical or efficiency reasons as we saw earlier. But we could refuse to utilize price to discriminate access for goods that have collective positive externality. For instance, education or social integration have positive externality on the whole society. The knowledge transmits itself, once someone is educated, they will transmit their knowledge to other people by having contacts with them. Henceforth these goods could be underproduced relative to the socially optimal level if there is no other subsidization as government ones or donations for example. Indeed, the value of education is greater for the society that an individual would pay for educating himself.

We could also argue that classical enterprises could be more pushed to have greater level of negative externalities as the major compass for action are profits and if producing more negative externalities makes more profit then this classical enterprise will have to produce those negative externalities. If the enterprise does not do it then another one could do it and make more profit and, on the long run, win the competition. Nonprofits could desire more to act with respect to nature or to the rest of the economy as they are more embodied in the civil society and less incentivize to produce negative externalities to make profits. Henceforth, in this case, a new or greater tax on negative externalities, as pollution for instance, could affect classical enterprises more than nonprofits in the short run as they may produce more of them.

## About trust signal of nonprofits

Much of the recognized advantage of nonprofits is the trust about a smaller incentive to adopt an opportunistic behavior (Hansmann, 1987). Indeed, for-profit enterprises and even more enterprises listed on the stock exchange are under more pressure for profitability. This results in higher incentive for opportunistic behavior when, for instance, the information is asymmetrical. But the impossibility of nonprofit to distribute profits does not prevent manager or other stakeholders to try to get personal benefits from the activity and this would go against the mission of the NPO. We can ultimately find people excessively paid or who have benefit in kind. And these extra expenses prevent the NPO from using this money for its mission. We can take back the example of a milk intermediary between producers and consumers. If there exist only a few intermediaries and they benefit from power imbalance, these kinds of NPOs could easily increase their revenues progressively and people in the nonprofit could, for example, increase their wages or employ family or friends even if it is not necessary. Therefore, the non-distribution of profit criterion of the NPOs cannot totally prevent opportunistic behavior in case of, among other, excessive market power of an NPO or incomplete information.

Ben-Ner and Van Hoomissen (1991) recognize that the non-distribution constraint is not enough to ensure that the mission is achieved, the demand-side stakeholder must have an eye on the activities of the nonprofit or should be able to control it to some extent in order to avoid opportunistic behavior.

Though, for stakeholders to exercise their influence, the effort they must consent for information on the NPO should not exceed the benefice they get by exercising this influence.

This explains the utility of a platform such as Donorinfo ([donorinfo.be](http://donorinfo.be)). This website provides information on Belgian nonprofits that wish to be recognized as transparent. Donorinfo analyzes the accounts of NPOs then makes this information clearer for people who are not accountants and ensure that there are no hidden practice or unnecessary expenses. Henceforth, this will reduce the cost of collecting information for the donors and so, leading to a possibly greater use of influence they can have to prevent opportunistic behavior.



When donors want to support a particular mission, it can be said that there is a demand for a social mission and that certain non-profit organizations constitute an offer to meet that mission. Therefore, we could observe incomplete information in some of these situations and in the presence of this incomplete information, donors could doubt on the efficiency of a nonprofit to work for the mission and choose not to give money because they know some nonprofits have opportunistic behavior but they cannot discriminate which ones. This would lead to an inefficient allocation. So, Donorinfo can prevent this asymmetrical information issue and drive a more efficient allocation of donations.

## Comparative advantage

In this section, we will review some reasons of a smaller need for input or a greater efficiency in production for NPOs. Indeed, in some contexts, nonprofits have cost advantage in the production of goods and services.

### *Comparative advantage against the state*

First, nonprofits have, in some circumstances, better resources than a government to address an issue. Indeed, they are more embodied in the civil society and may have important knowledge in some specific fields and it would be too costly for the state to collect this information. So, there are situations where the state can collaborate with nonprofit to tackle some social problems more efficiently.

Another explanation on the collaboration of the state and nonprofits is that the management of the state being centralized and bureaucratic, it is difficult for the state to supply goods and services that are specialized and heterogeneous. For this reason, it can be efficient to outsource the production of these goods.

### *Comparative advantage against the for-profit enterprises*

Nonprofits, thanks to their mission with a social value, attract motivated workers that may get satisfaction by nonmonetary advantage in addition to their wage. Especially, they can

be satisfied with the fact that they contribute to a socially valued mission. Therefore, they may accept slightly lower wages (Preston, 1989). Additionally, nonprofit workers value more the social service of their organization, feel more at the right place and are more motivated than workers in for-profit organizations (De Cooman and al., 2011). This can lead to more efficient workers and so, cost reduction. It would be difficult for a for-profit enterprise to develop such intrinsic motivation of the worker. This result in an important comparative advantage for nonprofits. However, all the products that the demand requires, do not have the possibility to be socially valued. For instance, it is unlikely that we see one day a nonprofit that produces weapons and especially that the workers are motivated by the “mission” of this NPO. So, the comparative advantage is possible only in some bounded parts of the economy that are socially valued.

## Nonprofit entrepreneurship

Nonprofit entrepreneurs seem to value the collective benefit of the services produced. We can explain the desire to create an NPO to maximize non-monetary profit (James, 1986), for instance, social groups which want to defend some ideology against others at a collective level. The non-monetary profit to maximize could be, henceforth, the diffusion of ideas or the power of influence for instance. These NPOs operate in sectors that are perceived socially as vital by the founder of the NPOs, their accessibility may respond to a need for equity. For example, education can be seen as a vital element in a society and so, some people could join together in order to achieve this mission of education for as many people as possible. Rose-Ackerman (1997) suggests that nonprofit entrepreneurs are ideological entrepreneurs who “can use the nonprofit form to reify their beliefs without being accountable to profit-seeking investors” (p.120).

## Nonprofits competition

Even if, as we said, NPOs are not moved by the desire for profit, they might be in competition with other NPOs that have the same mission. They might be in competition for donations, subsidies, voluntary work or commercial revenues for instance. Chang and Tuckman (1990) identified that nonprofits have reasons to accumulate surpluses which is not

necessarily obvious *prima facie*. Usually, we consider that NPOs should use all their resources for their mission. A temporary surplus could be a security margin, but it should not accumulate over years. However, the authors observe an accumulation. It would exist an incentive to increase NPOs' decision makers' own satisfaction when the distribution of surplus is prohibited by growing the NPO with more staff, equipment or higher salaries. The decision makers of the NPO would have a demand for equity (Tuckman and Chang, 1992).

A greater equity balance can have several positive impacts for an NPO. For instance, it can hedge against uncertainty and risk. The NPO would be more prepared to undergo a period of turbulence with unexpected expenses or losses of revenue. It can also facilitate growth in a decisive period with easier access to credit thanks to a greater solvability. So, in a situation where NPOs are competing, the NPO that accumulates surplus should have a longer lifetime thanks to the hedge against the risk and its greater ability to seize opportunities than an NPO that would use all its resources at any time for its mission. In the long run, we would then observe a majority of nonprofits that have a tendency to accumulate surplus and so, grow.

If these problems that we reviewed, were addressed at a macroeconomic level and solutions were found in the market capitalist enterprises or in the public sector, then nonprofits could structurally become vulnerable and eventually disappear. But these solutions do not seem to be found in a near future.

## Microeconomic reasons of vulnerability and dissolution of an NPO

In this section, we will investigate about the reasons that lead an NPO to be the one at risk of dissolution compared to the others. For this, we will first define what we call financial vulnerability and dissolution before looking at the possible reasons of this financial vulnerability and dissolution. We will keep overhead costs and their effect on NPO as well as revenue diversification and the search for commercial revenue with commercial activities as the main determinants of vulnerability.

## Definition of the financial vulnerability and dissolution of a nonprofit

Before looking at the reasons of dissolution, we should specify what organizational dissolution means.

Tuckman and Chang (1991) define a nonprofit organization as financially vulnerable “if it is likely to cut services offerings immediately when a financial shock occurs” (p.445). The financial resources are temporarily insufficient to pursue the objective of the nonprofit. A financially healthy nonprofit is the opposite, a normal shock should not prevent the NPO to carry on its mission.

Freeman, Carroll and Hannan (1983) characterize the dissolution of an organization when this organization “ceases to carry out the routine actions that sustain its structure, maintain flows of resources, and retain the allegiance of its members” (p.694).

The dissolution of an NPO consists in a chronic lack of financial capacity to pursue the objective of the organization. There is no further will to get out of the financial vulnerability as defined by Tuckman and Chang. The members cease to collaborate in this organization to achieve the goals of the nonprofit because the efforts to get out of the financial vulnerability appear greater than how the mission is valued by its members. So, the nonprofit dissolves.

## Overhead costs

One reason of dissolution investigated is the effect of the overhead costs. Overhead costs are any expense incurred to support the business without being directly related to a specific mission or activity. Overhead costs should make direct costs more efficient to the main activities or mission of the NPO. For instance, above a certain size, information technology system, fundraising processes or skills training are essential overhead costs for the NPO to be efficient. Indeed, the larger the organization is, the less easy it is to coordinate actions and therefore the more important structural tools are for the decision to continue to be the best possible. Growing makes the organization of activities less efficient, so nonprofits, as any other organizations, have to counteract this lower efficiency with tools that make management easier.

Bowman's work (2006) revealed a relationship between the change in the overhead cost ratio – overhead costs on the total of expenses for instance – and change in the donors' giving. Donors would prefer an NPO that spends relatively less on overhead costs, even though overhead costs may be optimal at a higher level for the organization.

Indeed, Steinberg (1994) indicated that an organization should invest in fund-raising costs as long as the revenue of an additional amount invested in fund-raising is greater than this amount. It requires a balance of costs and returns at the margin. From then on, if a donor looks at the overhead cost ratio which is a mean measure, he will miss the importance of the overhead costs at the margin. Therefore, an “overhead aversion” of the donors could lead to an underinvestment in the infrastructure of the organization leading to inefficient organization.

The nonprofit starvation cycle (A. Goggins Gregory & D. Howard, 2009) is linked with these overhead costs and can explain quite clearly the “starvation” process that unfolds in some nonprofits. Funders or donors would have unrealistic view on how much overhead cost is necessary to the long-term working of the nonprofit. They accept to give money for specific missions but quite not to pay wages to people organizing the efficiency of the mission. Then the nonprofits can try to conform to this view that they must invest very little in overhead costs. Maybe funders or donors could prefer giving to another nonprofit that has smaller overhead costs, the overhead aversion. And so, nonprofits underinvest in overhead costs or underreport these spending. Finally, this leads funders to believe that the need for overhead costs is minor and so reinforce their requirements about low overhead costs. The authors of this analysis suggest that the best way to address this problem is to change the funders' unrealistic expectation on overhead costs.

## The Cycle That Starves Nonprofits

Three forces intertwine to deprive organizations of much-needed overhead funding.

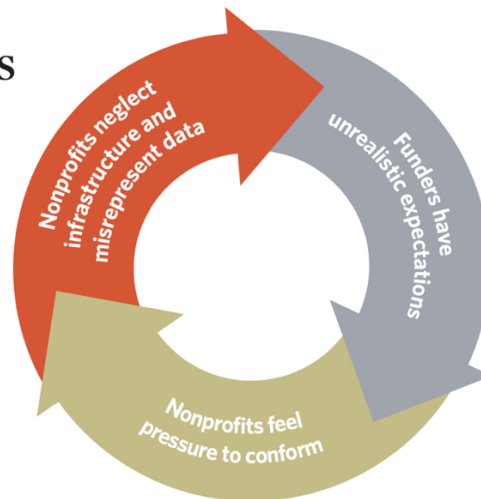


Figure 1: Nonprofits starvation cycle (Source: A. Goggins Gregory & D. Howard, *Stanford Social Innovation Review*, 2009)

An article of Jiahuan Lu and al. (2019 b) focuses particularly on the spending on employee compensation and fundraising costs. Indeed, fundraising drives costs that are not related directly to the production of a good or a service. In the same way, an NPO can hire and pay, for example, a manager that would not contribute directly to the production of a good or a service but would make the NPO more efficient in this production and so lead to an indirect increase of production.

In their work, Jiahuan Lu and al. use longitudinal data based on U.S. public charities from 2005 to 2015. They employed a Cox proportional-hazard model to appreciate how overhead costs influence the survival length of time of a public charity. So, they focused on employee compensation and fundraising costs by using ratio of these spending to total expenses.

The authors identified that these expenses exert a positive influence on the viability of a nonprofit at first. So, spending in overhead costs to a certain amount decreases the probability of dissolution. Then when reaching a certain amount these spending become detrimental to the NPO. The amount not to go beyond is specific to each non-profit. Actually, when the overhead cost exceeds this amount, the probability of dissolution increases. We can say that the overhead costs are non-linear and have a U-shaped relationship with the likelihood of nonprofit dissolution.

Steinberg's theory (1994) exposed above can explain this U-shaped relationship of the overhead cost on the efficiency of an NPO as fundraising costs are part of the overhead costs.

Indeed, at some point where additional revenue is smaller than the extra amount of overhead costs spent, any increase in overhead cost is a waste of money.

However, it is not easy to determine which overhead expenses have a positive return and to calculate the return of overhead costs because the effects of overhead cost are indirect on the mission or activity. Henceforth, for some small organizations, it may be too costly to find this specific knowledge on the return of overhead costs and it may be rational to accept a level of overhead that is close but not optimal, as there is also a cost in finding information on the perfect level of overhead.

Finally, we could establish a link between overhead costs and externalities. Indeed, overhead costs exert a positive externality on the other direct costs. So, an NPO should try to equal the actual cost of the overhead cost to the benefit of these positive externalities on the other direct costs. But, as at the level of the economy, to measure correctly these externalities is maybe the major problem.

However, this is the same for a classical enterprise. The difference lies in where the classic enterprises and the nonprofits find their financial resources. A classic enterprise depends on itself and finds its financial resources with commercial activities and so is free to make its economic calculus independently from any other stakeholder (we could nuance this with the influence of the shareholders). But a nonprofit depends on its funders and donors and these have an influence on the nonprofit. The nonprofit and the funders might have a slightly different agenda. The funders give funds for a mission or an activity while the nonprofit's first objective is to survive before acting for a mission. It is because the founders are extern to the nonprofit that the investment in the overhead costs that generates positive externality is not optimal. We can imagine a farmer planting apple trees to produce apples and a beekeeper nearby whose bees take advantage of the apple trees. The apple tree exerts a positive externality on the beekeeper. In a situation where the farmer is also the beekeeper, he may decide to plant more trees because he would internalize the positive externality of the apple trees for the honey production. So, if the funders were also the people running the NPO they would probably accept a higher amount of overhead costs.

## Commercial activities

Another studied policy of the nonprofits is whether it is interesting to seek for more commercial revenues with commercial activities. This may be of great interest to us because of the new law on NPOs in Belgium and the new ability of NPOs to have as many commercial activities as they wish.

The effect of commercial activities is not straightforward in regard to the vulnerability of a nonprofit. Some authors highlight that there could be issues of mission drift or goal displacement where financial goal would override social objective. (Dart 2004). This situation can eventually lead to an identity crisis (Kreutzer and Jäger, 2011) where managerialism aspect of the commercial nonprofit can conflict with the volunteering aspect. But this managerialism can also improve organizational efficiency and capacity (Ecer, Magro and Steinbereithner, 2016)

Weisbrod and Arrow studied the effects of a larger use of commercial revenue on nonprofit organizations' behavior in the book *'To profit or not to profit, the commercial transformation of the nonprofit sector'* (1998). They make the observation that as the government gives less subsidies and the social needs for the services of the nonprofits increase, NPOs have to find new resources to compensate the shortage of subsidies and the greater demand for their output. Therefore, commercial activities are likely to be a major opportunity to fill the gap. Once they enter this area of commercial activities they begin competing against traditional for-profit organizations and a commercial behavior can emerge. For example, nonprofit organizations could search ways to attract new paying consumers to increase the revenue by advertising for a product. But, in a the same time, they can still offer prices below marginal cost to the people who are the beneficiaries of their mission. Indeed, they are more disposed to move away from profit maximizing behavior in the interest of their mission.

However, the authors differentiate the sources of revenue between those that are constrained and those that are unconstrained: *"The conceptual distinction is between revenue that is unconstrained, facilitating advancement of the nonprofit's mission, and revenue that is constrained, forcing the nonprofit to choose between forgoing the funds or distorting its social mission."* (Weisbrod and Arrow, 1998, p.16) So, commercial sources of revenue are constrained because the product must satisfy the buyers



otherwise, they will stop buying and the NPO will lose this revenue. Yet, donations and subsidizations may be as well constrained by the objectives to be followed when receiving subsidies as by the donors, who could react by stopping giving money if the NPO does not fulfil its mission the way the donors wished. Unconstrained revenues can represent finally a small part of the nonprofit revenues.

Jiahuan Lu and al. (2019 b) also noted that commercial nonprofits – that is to say, NPOs for which more than 50% of the revenues comes from commercial activities - are less likely to dissolve. Their method was the same for the overhead costs, they used a survival analysis and the estimation of the model showed a greater survival time for nonprofit having at least 50% of their revenues coming from commercial activities.

## Revenue diversification

Finally, we can review the effect of revenue diversification on the vulnerability of NPOs. This revenue diversification policy will be, to a certain extent, our red thread for the second part of this work.

The revenue diversification is about the number of the different sources of revenue and their relative importance in the total of revenue.

There are some important sources of revenue for a nonprofit. We can cite donation, government grants, commercial revenue among other things.

The smaller the percentage of revenue that depends on a particular source is, the smaller the impact will be on the total revenue of an important fall in this source of revenue.

An organization with an important revenue diversification will have numerous small sources of revenue and so the fall in one should not impact dangerously the total revenue of the organization. We can relate this to the modern portfolio theory in finance theory.

The authors who worked on commercial activities we quoted earlier, Jiahuan Lu and al. (2019b), in the same work, also identified a negative relationship between the revenue diversification and the probability for a nonprofit to dissolve.

But a meta-analysis conducted by ChiaKo Hung and Mark A. Hager (2018) showed that the effect of revenue diversification is small, and different researches sometimes found opposite results of the effect of revenue diversification on financial health.

Their work suggests that the effect of the revenue diversification on the financial health could be more complex than it may appear. The authors of the meta-analysis suggest studying under what conditions, revenue diversification contributes to financial health.

Among other things, the search for revenue diversification could lower the capacity with increasing administrative costs (Frumkin & Keating, 2011; Kingma, 1993; Wicker & Breuer, 2013) or the crowding out of private donations (Brooks, 2001) for example.

Another meta-analysis by Jiahuan Lu and al.(2019 a) that studies the effect of revenue diversification on financial vulnerability and financial capacity concluded that revenue diversification had a small impact on financial vulnerability but had a slightly negative impact on financial capacity.

Here we have a distinction of the effect on financial vulnerability and on financial capacity that we will develop further in the next sections. They also call for more discussion of the assumptions and effectiveness of revenue diversification.

## An approach on assessing financial vulnerability based on financial capacity and financial sustainability

From this point, most of the work will be to construct a proper way to assess the financial vulnerability, the risk of dissolution of NPOs and to see if, empirically, the approach we will develop, works and is grounded. Thus, from now on, most of what is developed is fairly new production. Thus, this part may require more attention than the first part of the work because the first part can only be a reminder for economists. In addition, the development is not perfectly linear so the end should also help to understand the beginning better.

It might be interesting to keep the problem of revenue diversification in mind, as the development of this section should provide an approach that allows a comprehensive understanding of the mixed and unclear results of empirical work on the effect of revenue diversification. As a reminder, revenue diversification sometime had small positive impact on NPOs' vulnerability while also reducing slightly the financial capacity. But different works sometimes showed opposite results for unclear reasons.

In order to achieve this goal, we will begin by highlighting an existing distinction between financial capacity and financial sustainability.

Then we will try to show theoretically why financial capacity and financial sustainability could "trade-off" so that different associations of financial capacity and financial sustainability lead to the same probability of dissolution for an NPO. This would mean that looking only at financial capacity, for instance, is insufficient to assess the risk of dissolution.

Then, with the use of a survival analysis method, the Cox proportional-hazard model, we will see if the intuitions of the approach developed are actually empirically correct.

Finally, we will show the implications of this approach for the analysis of financial vulnerability and the study of NPOs' dissolution. Especially, we will use this approach to explain the differences in the results of the studies on revenue diversification. Also, NPOs' managers could find interesting tools to take better financial decisions.

## Difference between financial capacity and financial sustainability

A study of the financial vulnerability of ordinary nonprofits (Bowman, 2011) distinguishes financial issues into capacity and sustainability.

Financial capacity is described as the resources that allow organization to react to unexpected threats or seize opportunities. Financial capacity is a static measure. It gives information on the resources of the organization at a certain time. For instance, assets or revenue are a possible appreciation of the financial capacity.

Financial sustainability “is measured by the rate of change in capacity in each period” (Bowman, 2011, p.38). It is the fluctuation overtime of the financial capacity. So, it is a dynamic measure, it depends on a length of time. Percentage growth in total revenue or variance of revenue are possible appreciation of the financial sustainability.

This difference highlighted by Bowman, is the foundation of the approach we will develop.

From this point, we will consider that a more vulnerable NPO is an NPO that is more at risk of dissolution. This means that the NPO has a greater hazard rate of dissolution. So, the vulnerability of an NPO relates to its hazard rate of dissolution. We will develop further what hazard rate of dissolution precisely refers to in the next parts.

## Theoretical construction

We could relate the capacity and sustainability with the parameters of a normal distribution. Financial capacity then would be the mean or the expected value and sustainability the inverse of standard deviation.

The higher the expected value of capacity is, the smaller the probability of the value of the capacity is, at a certain period, to be below the bankruptcy threshold, let us say less than zero.

But the higher the sustainability is or the smaller the standard deviation is, the smaller the probability is that capacity, at each period, takes value far from the expected value of capacity and so below the bankruptcy threshold.

We could imagine two different nonprofits to apprehend the difference and the complementarity of the financial capacity and the financial sustainability in understanding financial vulnerability and ultimately dissolution of a nonprofit. The first nonprofit with High Capacity and Low Sustainability and the second one with a Low Capacity and a High Sustainability.

To illustrate this, we can generate values automatically with the two kinds of nonprofit specified. At each period of time, values are generated with a normal distribution. The two nonprofits have different parameters for their normal distribution, so different financial capacity and financial sustainability.

We hypothesize that the observations at each period are independent from previous periods, we consider that the financial variation is caused by external and random factors (independence between time period).

The first nonprofit we could consider, with High Capacity and Low Sustainability has a mean (capacity) of 5.2 and a standard deviation (inverse sustainability) of 3.15.

The second one has a mean of 2.15 (capacity) and a standard deviation of 1.3 (inverse sustainability). These numbers are not linked to real world, they just serve to illustrate our idea. We should observe that the first nonprofit has, on average, a greater capacity (expected value) than the second one but, also, the difference between the expected value of capacity and the observed one at each observation, should be greater for the first nonprofit (standard deviation).

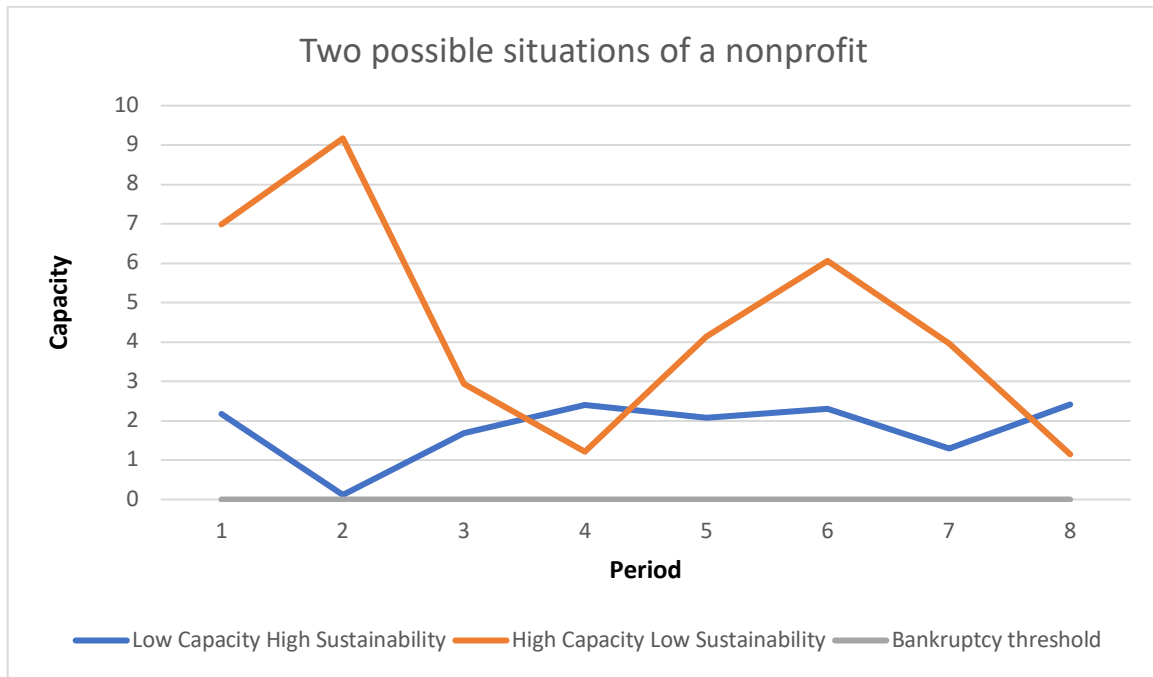


Figure 2: 8 Normal distribution independent draw, 8 periods. Source: Own creation based on Excel auto-generated values.

On this graph, are represented for each period, 1 to 8, values drawn with Excel from a normal distribution of the parameters stated before for each kind of nonprofit. We observe different behaviors for the two nonprofits: one that varies a lot between periods but with average higher capacity and one that is steadier but with smaller average capacity. We can represent the two normal distributions in their probability density function:

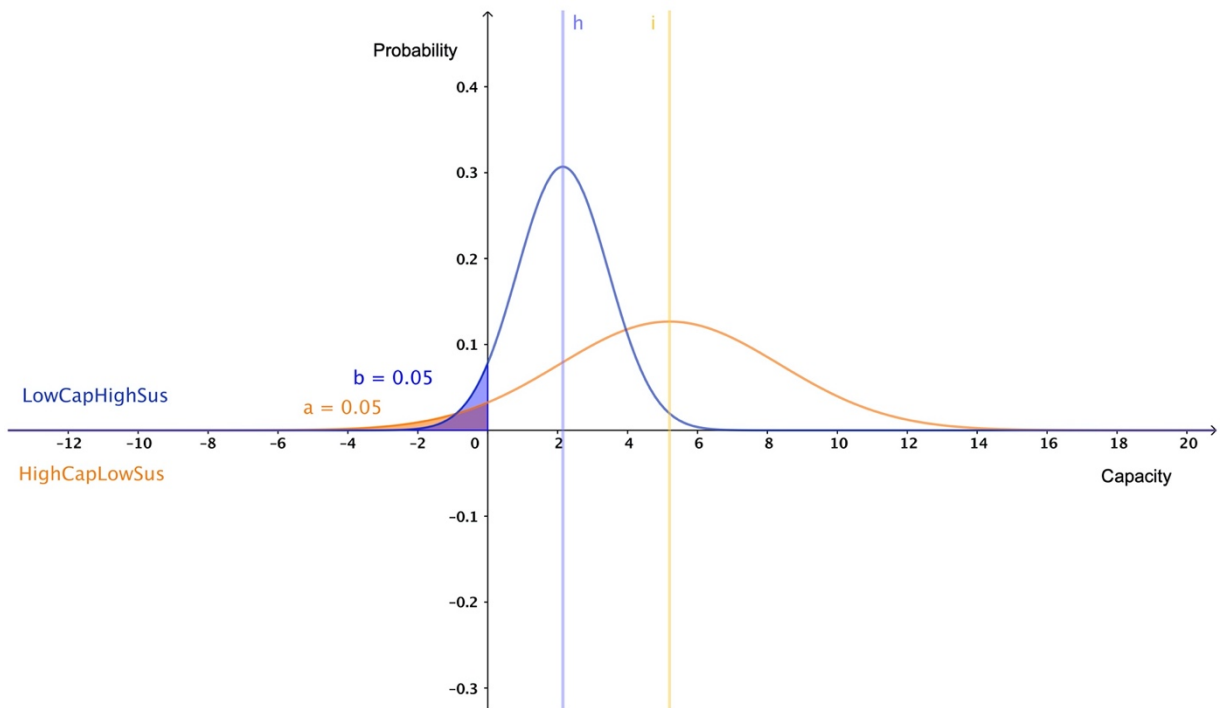


Figure 3: Normal distribution, probability density function. (Source: Own creation with Geogebra)

It is the distribution of the values capacity can possibly take at each period associated with the probability that the NPO takes this capacity. We can observe that the first imaginative nonprofit with an expected capacity of 5.2 (yellow) takes more often values far from this average value. We can calculate the probability to go bankrupt by computing the air below the curve and before 0 for each nonprofit. With the parameters mentioned before, the probability to have an observation, at a period, below 0, the threshold of bankruptcy, is equal for both nonprofits and is 0,05. So, at each period, both nonprofits, even if they have different capacities, have the same probability to go bankrupt which is 5%.

We can see that there are two important components in the probability to go bankrupt: financial capacity and financial sustainability. Then if we think of the revenue diversification, most of the works have studied the effect of the revenue diversification on the viability of the nonprofit. But if we consider that the viability of the nonprofit is composed by two distinct notions exposed before, then the revenue diversification effect should be studied separately, on the capacity and on the sustainability. Indeed, revenue diversification could have a positive impact on the sustainability (variability of the revenue), this would lower the standard deviation of revenues. But in the same time, the search for revenue diversification could lower the capacity with increasing administrative costs (Frumkin & Keating, 2011; Kingma, 1993; Wicker & Breuer, 2013) or the crowding out of private donations (Brooks, 2001) for example.

## Empirical examination

In this section, we will try to bring this relationship between financial capacity and financial sustainability out with real-world data. Using an appropriate methodology, we will test whether the hypotheses we can make with the approach outlined above can be empirically verified. To achieve this, we will first present our main method which will be a multivariate survival analysis, especially the Cox proportional hazards model. We will describe how it works, the assumptions needed and what mean the principal terms used in survival analysis. Secondly, we will present our dataset. Then, we will present the variables we will retain for our model and give the hypotheses on the coefficient of the major variables. These hypotheses are based on the approach we specified previously. Following, we will give the complete formulation of our model before looking at some descriptive statistics on the dataset and univariate analysis of the survival function. Then, in the central part, we will analyze the results of the regression of the model and see which adaption of the model seems preferable. Next, we will give an illustration of the results in the form of a contour plot and we will appreciate the implications of the results on the study of vulnerability of NPOs, especially with the case of the revenue diversification issue. Finally, we will discuss the results.

### Method: Survival Analysis

An interesting tool to study the determinants that increase probability that an NPO will cease its activities is a survival analysis. A survival analysis, also called duration analysis or time to event analysis, estimates the expected duration of time before an event. In our case, the event would be the end of the activities of an NPO.

In a survival analysis, we are interested even in the survival time, the time an NPO stays in the sample, or the hazard rate, which is the risk of dissolution of an NPO at a certain period. These are what we want to estimate so that we understand what lengthen or shorten the survival time or what decrease or increase the hazard rate of an event to happen.

We can shape survival function of the NPOs. A survival function is a function that gives the probability that an NPO still exists after a particular period of time. So, on the x-axis we will find the time of existence of NPOs and on the y-axis, the probability that after some



time of existence, an NPO still exists. As we can easily imagine, the function will be strictly decreasing because dissolved NPOs cannot reappear and so the total of NPOs that survive after 5 years of existence should be higher than the total of NPOs that survive after 10 years of existence.

Mathematically we can formulate this way:

The variable that depends on the duration of existence of NPOs is assumed to have a continuous probability distribution  $f(t)$ .

The probability that the duration time will be less than  $t$  which is the cumulative distribution function of the random variable  $T$ :

$$F(t) = Prob(T \leq t) = \int_0^t f(s)ds$$

Survival function is the probability that the duration will be at least  $t$ :

$$S(t) = 1 - F(t) = Prob(T \geq t)$$

And the hazard rate is the probability that an NPO will dissolve after time  $t$ , given that it has lasted until time  $t$ :

$$\lambda(t) = \frac{f(t)}{S(t)}$$

The Kaplan-Meier estimator is an estimator of this survival function.

$$\hat{S}(t) = \prod_{i: t_i \leq t} \left(1 - \frac{d_i}{n_i}\right),$$

with  $t_i$  a time when at least one dissolution happened,  $d_i$  the number of events (dissolution) that happens at time  $t_i$ , and  $n_i$  the NPOs known to still exist (have not yet dissolved or not been censored) up to time  $t_i$ .

We can translate this with some more simple words. At time  $t_1$ , period 1 for example, the first year, we have a number of NPOs which dissolves. This number of NPOs on the total number of existing NPOs is the probability that at the first period a random NPOs dissolves. If we want to know the probability that a random NPO still exists at period 1, then we just have to subtract the probability of dissolution to 1. Then, at  $t_2$ , period 2 or year 2 for example, another amount of NPOs dissolves. Henceforth, the probability for an NPO to still exist at the end of period 2 is the probability to exist at the end of period 1 multiplied by 1 minus the probability to dissolve during period 2. We can iterate this until any  $t_i$  to have the probability that an NPO still exists after  $i$  periods.

Then, if we want to analyze the effect of several variables on the duration of NPOs or on the hazard rate, the Cox proportional hazard model (Cox, 1972) is the most commonly used approach to analyze such survival time data. One advantage of this method against other multivariate methods, for instance a logit model, is that it considers the NPOs that could still dissolve after the time of the observation, it solves the problem of right censored data. The subjects are tracked until an event happens (dissolution) or we lose them from the sample. The situation of nonprofit in the future could be that they may continue to exist or dissolve, but we do not know yet. The observations are censored by this time constraint.

The Cox PH model links the probability of an event to occur, at a given time, with a set of covariates (covariate replaces the word independent or explanative variable in the classical regression).

Mathematically, the Cox model is written as:

$$h(t) = h_0(t) \times \exp\{b_1x_1 + b_2x_2 + \dots + b_px_p\}$$

“Where the hazard function  $h(t)$  is dependent on (or determined by) a set of  $p$  covariates ( $x_1, x_2, \dots, x_p$ ), whose impact is measured by the size of the respective coefficients ( $b_1, b_2, \dots, b_p$ ). The term  $h_0$  is called the baseline hazard and is the value of the hazard if all the  $x_i$  are equal to zero (the quantity  $\exp(0)$  equals 1). The ‘ $t$ ’ in  $h(t)$  reminds us that the hazard may vary over

time.” (Bradburn and al., 2003, p.432). We could apply logarithm to the expression of  $h(t)$ . This would give us a multiple linear regression with and intercept  $\log(h_0(t))$ .

An important assumption for this model to hold is that the hazard of an event in any group is a constant multiple, over time, of the hazard in any other. This means that the effect of a covariate (independent variable) on the hazard rate of the event to happen should be proportional over time within its values. For example, if, for an NPO, a variable has a value of 10 and for another NPO a value of 15, then the effect of this variable on the probability to dissolve should stay proportional over time. As  $h(t)$  depends on time, the effect of the covariates should not be small in the first years of existence and later more important. This assumption is needed because the effect of covariates act in a multiplicative manner, their effects multiply themselves, on the hazard rate of dissolution at any time period.

About the interpretation of a coefficient  $b_i$ , if  $x_i$  increases and  $b_i$  is bigger than 0 then the probability of the event to happen during the period increases and so, the survival time decreases. Hazard ratios (HR) are  $\exp(b_i)$  so we can summarize this way:

- $b_i = 0$  then HR = 1, no effect,
- $b_i < 0$  then HR < 1, reduction in the hazard (good prognostic factor),
- $b_i > 0$  then HR > 1, increase in the hazard (bad prognostic factor).

With this model it becomes possible to study the effect of several variables on the probability of an NPO to dissolve.

## Data

To study the effect of some variables on the survival of the NPO using a Cox proportional hazards model, the Orbis database can provide valuable information. The database contains annual account information for Belgian NPOs but small NPOs are not obliged to transmit this information. So, it is not possible to focus on all NPOs, but it should be nevertheless interesting.

Table 1: Summary of Sample Selection

World region/Country/Region in country	Belgium	4,053,157
Standardised legal form	Nonprofit organisation	174,973
Status	Active, Active (rescue plan), Active (default of payment), Active (insolvency proceedings), In liquidation, Bankruptcy, Dissolved (liquidation), Dissolved (bankruptcy), Dissolved	149,379
National legal form	Non profit association - ASBL/VZW (Belgium)	141,396
Number of years with accounts	3 or more	8,536

Source data: Orbis

We will focus on NPOs for which we have at least 3 years available data. Indeed, we will need to measure some variations over time for NPOs. This will inevitably create a bias as an NPO will not be able to exist less than 3 years in our sample which is actually possible. But very new NPOs face maybe different problems from the long-established ones. Furthermore, as in Belgium small NPOs do not have to transmit their annual account and a vast majority of NPOs begin by being small ones, it is very likely that this will create a bias. Indeed, small NPOs can dissolve before being part of the sample. Our analysis will, therefore, focus on NPOs that have existed for, at least, a few years and NPOs that are large. Size is judged as follows: a large NPO is an NPO that meets more than one criterion:

- 50 average workers
- Annual turnover: € 9,000,000
- Balance sheet total: € 4,500,000

The database Orbis identify 166,454 NPOs that are active or inactive in Belgium but only 22,184 NPOs have ever transmitted at least once their annual accounts. This is about 13,3% of the total of NPOs. Therefore, we surely miss a part of the reality of the Belgian

NPOs. Small NPOs can suffer for different reasons but it is impossible with this method to better grasp the reality of these small NPOs.

## Variables of interest and hypotheses on their effect on hazard rate

In this section, we will present the variables we have constructed based on the dataset. We will also present the hypotheses about the coefficient of these variables based on the approach we developed earlier.

### *Dependent variable*

First, the dependent variable is the number of years of existence. It is not exactly what the model presents as dependent variable because the dependent variable is the hazard rate but the number of years of existence “nourishes” this hazard rate. Thus, what we need in the data is this number of years of existence.

Henceforth, for NPOs which dissolved, this time length is the date of dissolution minus the date of creation and for the NPOs that still exist, so these are the observations that are censored because they may dissolve in a near future or not, but we do not know yet, we take the 1<sup>st</sup> of January 2020 minus the date of creation. These results give a number of days since the creation, we just have to divide this number by 365,25 to have a number of years.

### *Capacity and Sustainability variables*

If we consider the fact that the probability of an NPO to dissolve is composed by two factors, then a tradeoff of these 2 factors can be made by any NPO, so we should have a model with both capacity and sustainability. Indeed, a low capacity with a high sustainability can be sufficient for an NPO to be viable or equivalently a high capacity with low sustainability. The last case high capacity and high sustainability should certainly be viable. So, if we just have a capacity measure then we could miss a huge part of the understanding of the probability to dissolve.

An interesting capacity measure is the equity ratio. It is a solvency ratio that measures the part of the organization’s assets that are owned outright by the NPO. It is a ratio of the

assets that are left when all the liabilities are paid off on the total assets. It is also a kind of inverse debt leverage ratio.

$$\text{Equity Ratio (ER)} = \frac{\text{Total Assets} - \text{Total Liabilities}}{\text{Total Assets}}$$

An equity ratio of 1 means that the NPO does not have any debt nor any unpaid bills. Contrariwise, an equity ratio of 0 means that the NPO assets are fully borrowed assets. For this variable we can take the average value of the available years for each NPO.

We can, therefore, formulate:

**Hypothesis 1: A greater average equity ratio should decrease the hazard rate of dissolution. ( $b_1 < 0$ )**

About the sustainability measure, return on assets can be a good approach to the asset variation over time. As a reminder: financial sustainability “is measured by the rate of change in capacity in each period” (Bowman, 2011, p.38). Return on assets (RoA) is a good measure because, as NPOs cannot distribute the excess of revenues, the excess of revenues at the end of a period will be the increase of assets for the next period. If we take this excess of revenues on the total of assets, we will have a measure of assets change.

$$\begin{aligned} \text{Return on Assets (ROA)} &= \frac{\text{Total Revenue} - \text{Total Expenses}}{\text{Total Assets}} \\ &= \frac{\text{Change in Total Net Assets}}{\text{Total Assets}} \end{aligned}$$

It is a relative measure of how the present assets make new assets. A higher ROA indicates more efficient assets.

For this variable, we could take the average value of the ROA but steady increase of the assets, for example a steady 5% increase each year, could give the same average value as an NPO that would have several years of huge asset growth, high ROA for instance 10%, followed by troublesome years. So, it could be preferable to measure the standard deviation of the return on assets. Indeed, this is a measure of dispersion. The more the values differ from one period to another the greater the value of the standard deviation will be. In this case, our

first example with a 5% ROA will have a really low standard deviation while the second case with some difficult years will have a greater standard deviation of the ROA.

We can use the standard deviation of the equity ratio as well, and we will try it. This can also show the variation of the capacity between periods, but this indicator could be more sensitive to change in the capital structure. For example, for an NPO that receives an important loan, the equity ratio could vary more than the return on assets. This would lead to a greater standard deviation while not indicating an external loss of revenue or an increase in expenses.

With the approach we have developed, a greater standard deviation of Return on Assets or Equity Ratio means that the financial sustainability is lower and so, we can formulate:

**Hypothesis 2: A greater standard deviation of the ROA should increase the hazard rate of dissolution. ( $b_2 > 0$ )**

**Hypothesis 3: A greater standard deviation of the Equity Ratio should increase the hazard rate of dissolution. ( $b_{2b} > 0$ )**

As we expect that both variables are necessary to understand the probability of dissolution the test for F-test joint significance should reject the hypothesis that they are not jointly significant.

**Hypothesis 4: Average of Equity Ratio and Standard deviation of Return on Assets are jointly significant.**

Furthermore, as we expect that capacity and sustainability work together to explain the probability of dissolution, the interaction of average of Equity Ratio and the inverse of standard deviation of Return on Assets should be statistically significant. We take inverse of standard deviation of Return on Assets because the interaction should be between financial capacity and financial sustainability, yet standard deviation of Return on Assets is an inverse measure of financial sustainability.

**Hypothesis 5: Interaction of average of Equity Ratio and inverse of Standard deviation of Return on Asset is significantly different from 0 ( $b_3 \neq 0$ )**

This interaction variable allows the effect, on hazard rate of dissolution, of average equity ratio to depend on the value of standard deviation of return on assets and the effect of standard deviation of return on assets to depend on the value of average equity ratio. This is a major hypothesis for this work. Indeed, that the effect of financial capacity on dissolution depends on the financial sustainability, and vice versa, is what we are trying to show.

### *Control variables*

Firstly, we will control for the effect of organizational size. For this the variable *total assets* is the usual proxy used for size. A greater size should reduce the probability to dissolve. We will take the logarithmic transformation of *total assets*,  $\log(\text{total assets})$  because the distribution of *total assets* is highly positive skew. The logarithmic form has a more normal distribution. (see figure 11 & 12 in appendices)

Then, we will control for sector based on NACE rev. 2 code. Indeed, some sectors might have really different characteristics with, for instance, more public support. The sector variables are dummy variables. The list of all the different sectors used lies in the appendix. The education sector is the base sector for our regression in order to avoid perfect multicollinearity. We choose educational NPOs as they are the biggest sector represented in our sample. So, when interpreting the regression with sectors dummies, the hazard rate is hazard rate for educational NPOs.

### Model

Here is the major model we will use. Some alternative models, for instance, as one with standard deviation of equity ratio rather than standard deviation of return on assets, will be studied. But our baseline model to which we will compare other model is the following:

$$\begin{aligned}
 h(t) = h_0(t) \times \exp\{ & b_1 \text{ average equity ratio} + b_2 \text{ standard deviation ROA} \\
 & + b_3 \text{ average equity ratio} * \frac{1}{\text{standard deviation ROA}} \\
 & + b_4 \ln(\text{total assets}) + b_5 \text{ sector dummies}\}
 \end{aligned}$$



## Descriptive statistics and univariate analysis

### *Descriptive statistics*

The average lifetime of the NPOs in the sample is about 36 years, so this shows us that we deal with quite robust nonprofits. Indeed, a quantity of new small NPOs is not part of our sample, so the remaining ones are those that are already strong enough. This will probably make hazard rate relatively small as the average NPO last 36 years. Furthermore, our sample only counts 11.62% inactive NPOs so the hazard rate should not be very high on average.

The smallest observation for year is 1.232 year yet we said we only keep observation for which we have at least 3 available annual accounts. This is possible if the NPO began in December then made one full year and dissolved at the beginning of the next period. For the other variables, it could be surprising to see standard deviation of standard deviation. But it is the standard deviation between NPOs of the standard deviation between years of one NPO. In the same way, we have mean values of NPOs of average value of the different years of an NPO.

*Table 2: Descriptive Statistics*

	Mean	Std. deviation	Min	Max	Median
Lifetime (years)	35.358	21.178	1.232	139.99	31.529
Avg. Equity Ratio (in %)	51.902	33.691	-90.506	100	57.517
Std. dev. Equity Ratio	9.490	10.032	0	87.691	6.399
Avg. RoA	-13.297	1986.101	-163696	77060.53	0.014
Std. dev. RoA	21.061	1378.526	0	108980	0.052
Avg total assets (in thousands of euro)	7,310,427	35,900,000	1	1,720,000,000	1,296,599
Ln (total assets)	14.10745	1.768	0	21.266	14.075

Source Data: Orbis

On the different sectors we can observe, the more important sectors are education which represents 17.57% of our sample, other services 16,64% that includes religion NPOs 3.12% and membership program 8.72%, then social work 16.18% and human health represents 13.77% of the sample. These four sectors represent 64.16% of the whole sample so they are particularly important.

*Table 3: Sector representation*

	NACE rev. 2 code	Total	Percentage
Residential care	0100-0199	544	6.37%
Human health	8600-8699	1175	13.77%
Social work	8800-8899	1381	16.18%
Art and entertainment	9000-9099	305	3.57%
Cultural activities	9100-9199	114	1.34%
Sport	9310-9319	262	3.07%
Amusement	9320-9329	38	0.45%
Education	8500-8599	1500	17,57%
Agriculture	0100-0199	31	0.36%
Forestry	0200-0299	14	0.16%
Manufacturing	1000-3599	59	0.69%
Construction	4100-4399	25	0.29%
Wholesale and retail	4500-4799	108	1.27%
Accommodations	5500-5599	86	1.01%
Food services	5600-5699	127	1.49%
Information and communication	5800-6399	124	1.45%
Finance and insurance	6400-6699	45	0.53%
Real estate	6800-6899	119	1.39%
Professional scientific and technical activities.	6900-7599	343	4.02%
Support services	7700-8299	531	6,22%
Public administration and social security	8400-8499	117	1.37%
Other services	9400-9699	1420	16.64%
of which: Religion	9491	266	3.12%

of which: Membership program	9499	744	8.72%
Other services without religion and membership organisation		410	4.80%

Source Data: Orbis

In the table 7 (appendix), we can observe that the percentage of dissolved NPOs differs slightly between sectors. The strongest sector seems to be the real estate sector with just 5% of inactive NPOs on the total of real estate NPOs. Other relatively stronger sectors are agriculture, art and entertainment, cultural activities and finally residential care. On the other hand, finance and insurance sector appears to be the most vulnerable sector with 22.22% of inactive NPOs. Other relatively weaker sectors are amusement sector, public administration and social security, construction.

### *Correlation*

The correlation between lifetime and the variables have the sign we could expect. Particularly the average equity ratio, standard deviation or equity ratio and logarithmic form of total assets have an interesting correlation with lifetime that could be a clue that our hypotheses are justified.

About possible important collinearity, we do not find important correlation between covariates (independent variables). Indeed, in our model average return on assets is not an independent variable we will use.

Table 4: Matrix of correlations

Variables	Lifetime (year)	Avg. ER	S.D. ER	Avg. RoA	S.D. RoA	Avg. Tot Assets	Ln(Tot Assets)
Lifetime (year)	1.000						
Avg. ER	0.260	1.000					
S.D. ER	-0.210	-0.403	1.000				
Avg. RoA	-0.013	-0.010	0.020	1.000			
S.D. RoA	-0.005	-0.008	0.050	0.666	1.000		
Avg. Tot Assets	0.085	-0.004	-0.083	-0.001	-0.002	1.000	
Ln(Tot Assets)	0.353	0.230	-0.305	0.007	-0.003	0.421	1.000

Source Data: Orbis

#### *Kaplan-Meier survival function*

The Kaplan-Meier survival function is the graphical form of the Kaplan-Meier estimator. It varies with time (t) (reminder: time is the time of existence of an NPO, lifetime in years for this work, it starts with creation date, so it is relative to each NPO), and gives the probability to still exist at time t of existence. We can observe that lifetime does not importantly increase the hazard rate of dissolution. Indeed, the Kaplan-Meier survival function is a relatively constant descending line as we can compare it to a straight line from the maximum hazard rate to the minimum.

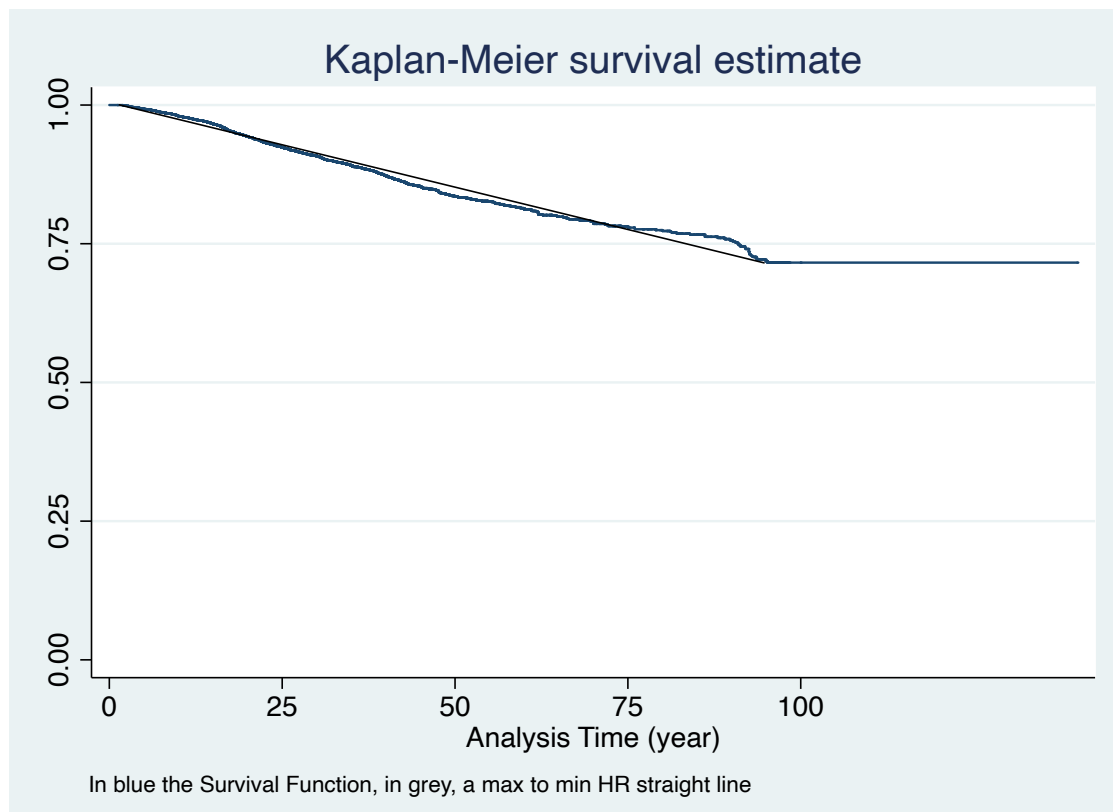


Figure 4: Kaplan Meier Survival Function (Source Data: Orbis)

Furthermore, the hazard rate of still existing is quite important, as we expected, due to our sample constituted with large NPOs that have already lasted for at least three periods.

We can observe impact of different variables on this survival function by decomposing the survival function by categorical variable. If we split NPOs by their place in quartile of average total assets, we can observe that bigger NPOs have a greater hazard rate of still existing after a certain time.

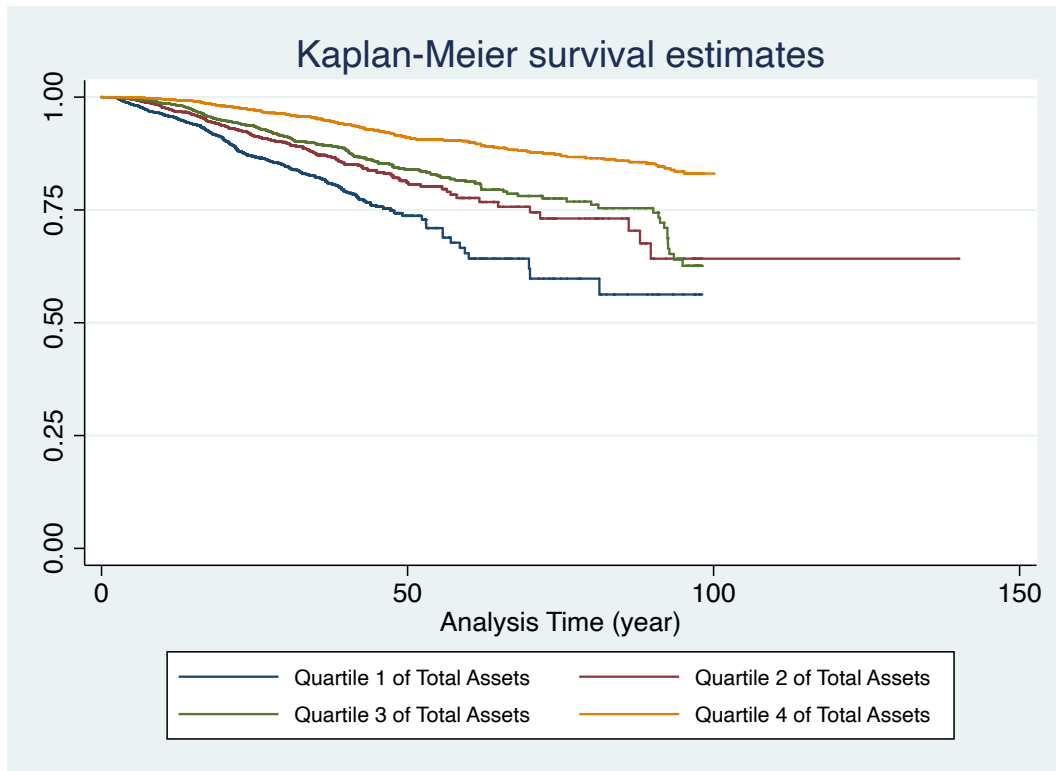


Figure 5: Kaplan-Meier survival function by Total Assets quartile (Source Data: Orbis)

We witness that NPOs with smallest average total assets have relatively smaller hazard rate of still existing. The relation respects order of the quartiles with NPOs belonging to quartile 2 having more chances of surviving than those of quartile 1 but less chance than those of quartile 3 and 4, and so on.

In the same way we can divide NPOs based on quartile of average equity ratio. We see that the first quartile that contains NPOs with the smallest value of equity ratio, so that they have a relatively lower financial capacity, are steadily more at risk than the other quartiles. Furthermore, high equity ratio does not seem to induce stronger NPOs as quartile 2, 3 and 4 have close hazard rates.

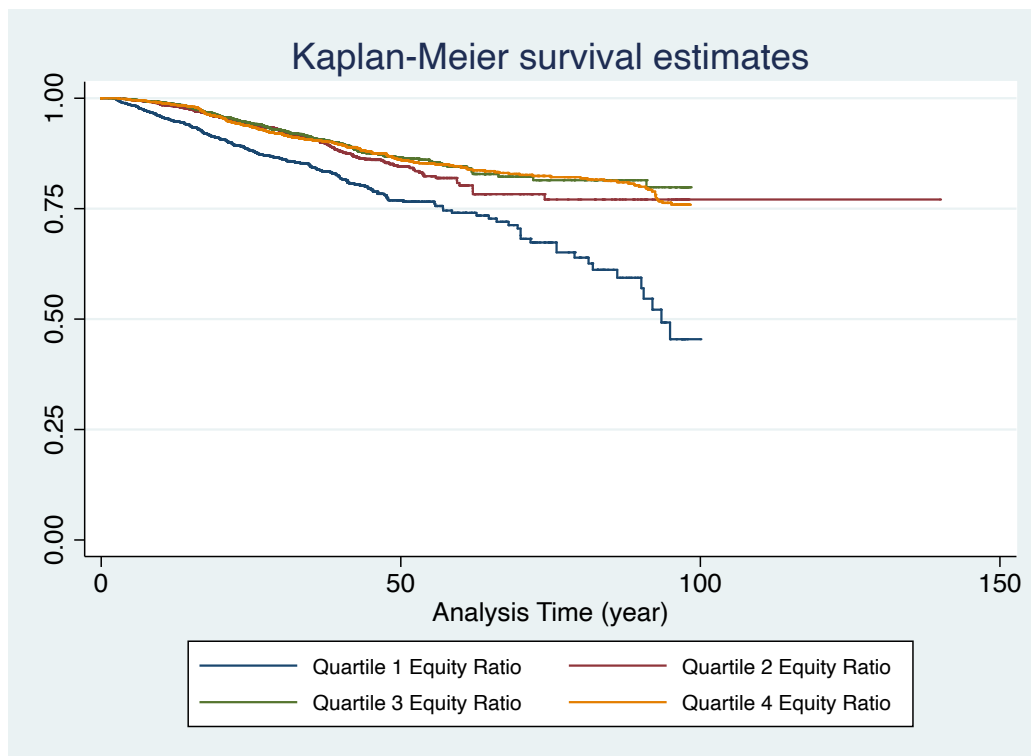


Figure 6: Kaplan-Meier survival function by Equity Ratio quartile (Source Data: Orbis)

About the standard deviation of the return on assets, the result of this division of NPOs in four quartiles is somewhat unexpected. First, as we expected, the quartile with the biggest standard deviation of return on assets, the quartile 4 that contains NPOs which have relatively less financial sustainability, are more at risk of dissolution as their survival function is below the other quartiles. But more surprisingly, quartile 2 and 3 are less at risk than quartile 1. So, a too small standard deviation of return on assets could be also detrimental to the NPO's chance of survival. These NPOs could have steady too small RoA that drives small standard deviation. This relation can, eventually, suggest a quadratic relation between standard deviation of return on assets and the hazard rate of dissolution. Therefore, we will test for the quadratic form of standard deviation of RoA as well.

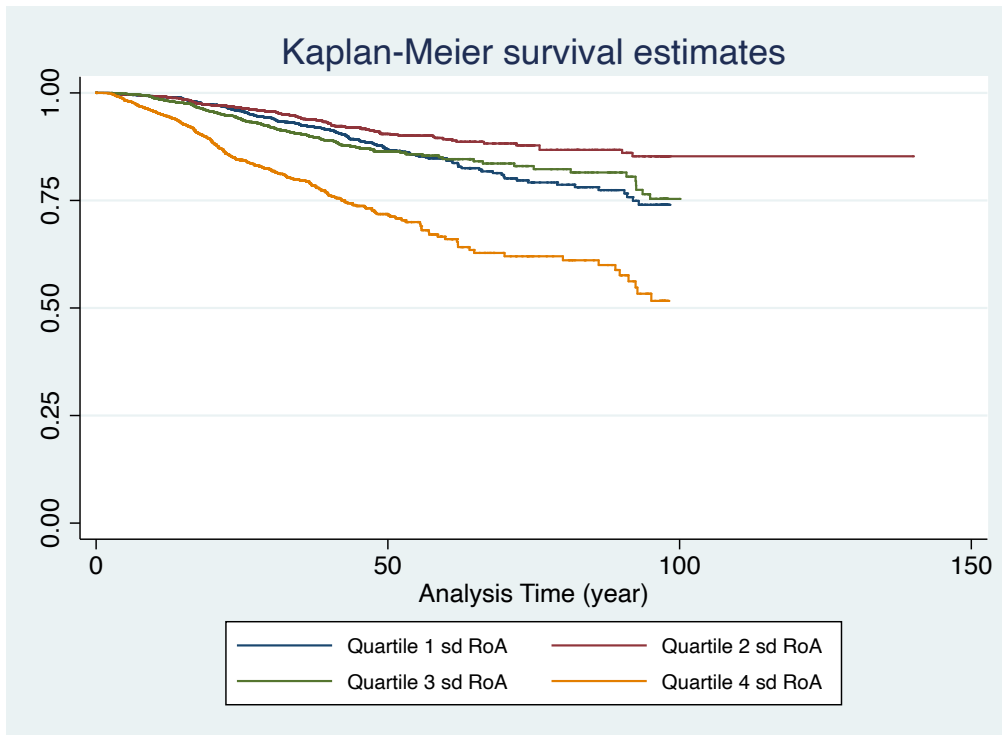


Figure 7: Kaplan-Meier survival function by Return on Assets. (Source Data: Orbis)

We can also check for different survival functions by sector. Here is the survival function for educational NPOs and the other NPOs.

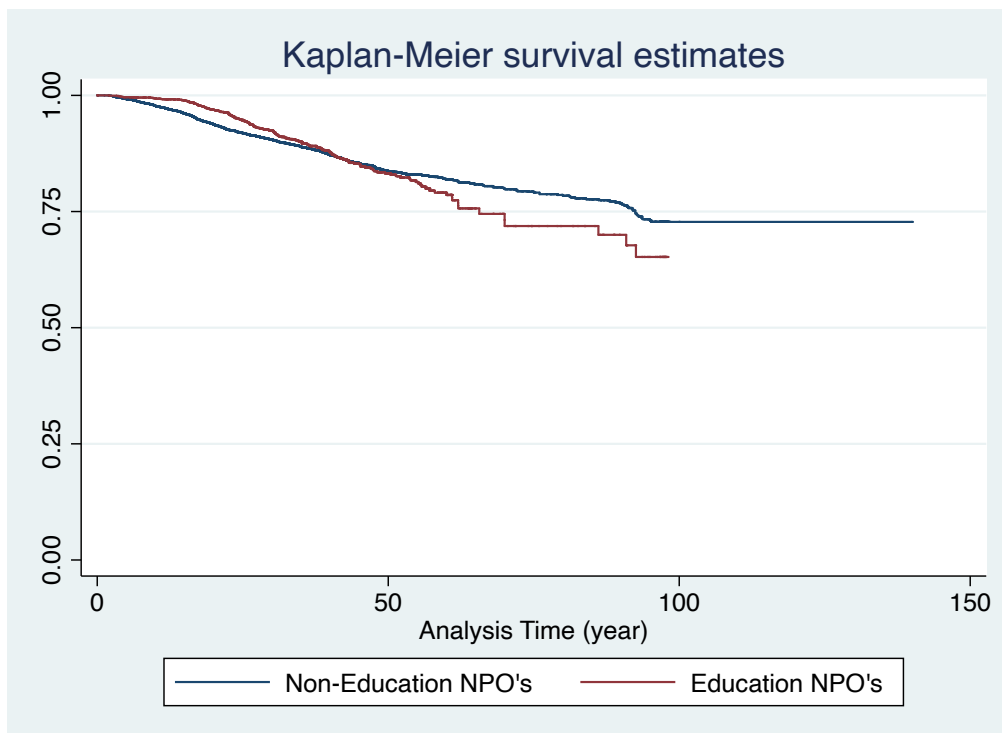


Figure 8: Kaplan-Meier survival function by sector (education). (Source Data: Orbis)



We can observe that the survival functions cross each other. It means that during, approximatively, the first 40 years of existence, educational NPOs are less vulnerable than the other NPOs but after this time they become more vulnerable.

This should concern us as this seems to violate the major assumption of the Cox proportional-hazard model which is that the hazard of an event in any group is a constant multiple of the hazard in any other over time. Here, the hazard between the group education and the group non-education NPOs does not keep the same proportion over time. We will test this assumption more precisely in the next section. Some other sectors dummies have the same crossing survival function.

## Results Cox proportional hazard estimation

Now, we will run several regression models and compare them in order to keep the best ones. Some models will not meet the assumption needed for the Cox proportional hazards model to give strong results, for some other models we will compare between two forms and, with some elements about the quality of the regression, choose the model that seems the best specified.

Firstly, we will regress several models each **with all the dummy variables for the sectors:**

The first (1) one has average equity ratio, standard deviation of return on assets, average total assets and dummy variable for sectors (the coefficients for dummy variables lies in table 11 in appendix)

The second (2) one has logarithm form of average total assets to replace the average total assets as we saw that logarithmic form could be better thanks to a normal distribution.

The third one (3) has the interaction variable between average equity ratio and standard deviation of return on assets.

The fourth one (4) has a squared form for standard deviation of return on assets.

Finally, the fifth (5) one is the same, but we dropped the 5 biggest observations of standard deviation of return on assets. Indeed, these have totally abnormal values and the simple drop of these 5 out of 8238 observations, changes drastically the beta coefficient of

standard deviation of return on assets and makes the squared of standard deviation of RoA statistically significant. These should be considered as outliers.

Table 5: Results regressions with sector dummies

	(1)	(2)	(3)	(4)	(5)
Avg Equity Ratio	-0.00861*** (0.000969)	-0.00599*** (0.000985)	-0.00618*** (0.000986)	-0.00615*** (0.000987)	-0.00599*** (0.000991)
S.D. RoA	0.0000292*** (0.00000810)	0.0000270** (0.00000861)	0.0000271** (0.00000862)	-0.000000796 (0.0000391)	0.158*** (0.0211)
Avg Total Assets	-2.59e-08*** (4.58e-09)				
Log(Total Assets)		-0.285*** (0.0225)	-0.289*** (0.0225)	-0.290*** (0.0226)	-0.260*** (0.0223)
Avg ER/S.D. RoA			0.00000372*** (0.000000865)	0.00000372*** (0.000000865)	0.00000380*** (0.000000861)
(S.D.RoA) <sup>2</sup>				3.04e-10 (3.95e-10)	-0.00172*** (0.000403)
N	8247	8247	8238	8238	8233
LR Chi <sup>2</sup>	250.68	342.09	350.35	351	398.42
P-H test (p-val.)	0.000	0.000	0.000	0.000	0.000

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$  Source Data: Orbis

To test the assumption of proportional hazard we can use the Schoenfeld Residuals Test. (This test is about checking whether the Schoenfeld residuals of the regression are independent of time. There is separate residual for each individual for each covariate, and the covariate value for individuals that failed minus its expected value is defined as Schoenfeld residuals.) In all the regression above, we can reject with an extremely small probability of being wrong (probability reported in the row P-H test in the table 5), that the Schoenfeld residuals are independent of time. So, the assumption of proportional hazard is violated. As we identified, with the Kaplan-Meier survival function by sector, that the presence of some sectors dummies may result in this problem of non-proportional hazard survival function, we will try to estimate these models above without the sector dummies. Furthermore, we will regress these models without the 5 outliers we identified earlier.

Table 6: Results regressions without sector dummies

	(1)	(2)	(3)	(4)
Avg. Equity Ratio	-0.00892*** (0.000936)	-0.00615*** (0.000973)	-0.00631*** (0.000975)	-0.00615*** (0.000975)
S.D. RoA	0.0449*** (0.00531)	0.0441*** (0.00562)	0.0443*** (0.00563)	0.166*** (0.0204)
Avg Total Assets	-2.28e-08*** (4.46e-09)			
Log(Total Assets)		-0.247*** (0.0216)	-0.251*** (0.0217)	-0.229*** (0.0214)
Avg. ER/S.D. RoA (interaction)			0.00000389*** (0.000000813)	0.00000390*** (0.000000812)
(S.D. RoA) <sup>2</sup>				-0.00188*** (0.000387)
N	8242	8242	8233	8233
LR Chi <sup>2</sup>	174.77	251.22	263.17	292.79
LR p-val.	0.000	0.000	0.000	0.000
PH test (p-val.)	0.0222	0.5324	0.6194	0.2383

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source Data: Orbis

Firstly, all the models are statistically significant. The P-value of the Likelihood Ratio test (LR p-val.) is close to 0 which means that we can reject the hypothesis that our variables, taken together, do not have an influence on the hazard rate of dissolution with very few chances of being wrong.

Also, we can note that all our covariates (independent variables) are statistically significant at 0.1% which is very strong. This means that for all our variables we can reject, with very small chances of being wrong, the hypothesis that each variable, independently, does not have an effect on the hazard rate of dissolution.

In addition, all the regressions seem to satisfy the proportional hazard assumption. Indeed, for the four regression results, we cannot reject, at 5% chance of being wrong, the hypothesis that the Schoenfeld Residuals are independent of time (PH test p-val).

The model with the largest Likelihood Ratio Chi<sup>2</sup> is the one (nbr. 4) containing the interaction variable between average equity ratio and standard deviation of the return on assets as well as the squared form of standard deviation of return on assets. It is a clue that the model could be the best specified model. But the other models give very close results for the coefficient. So, we can also verify the hypotheses with the other models.

If we take back our hypotheses:

**Hypothesis 1: A greater average equity ratio should decrease the hazard rate of dissolution. ( $b_1 < 0$ )**

The results of all four regressions indicate that the coefficient of the average equity ratio is smaller than 0 which indicates that the average equity ratio is a good prognostic factor as it reduces the hazard rate of dissolution of an NPO. As we expected, this measure of financial capacity does increase the expected survival time of an NPO.

**Hypothesis 2: A greater standard deviation of the Return on Assets should increase the hazard rate of dissolution. ( $b_2 > 0$ )**

The results of all four regressions indicate that the coefficient of standard deviation of return on assets is greater than 0 which means that the standard deviation, over years, of return on assets is a bad prognostic factor as it increases the hazard rate of dissolution of an NPO. Standard deviation of return on assets is an inverse measure of financial sustainability. Indeed, standard deviation of return on assets increases when the revenue changes more between the different periods. And so, as we expected, financial sustainability increases the expected survival time of an NPO because it reduces the hazard rate of dissolution.

**Hypothesis 4: Average of Equity Ratio and Standard deviation of Return on Assets are jointly significant.**

It is quite obvious that the variables will be jointly significant as they are already very significant independently. This hypothesis could be interesting in the case where variables were not significant independently but could be significant jointly.

If we want to test it, the test of joint significance, the test of parameter of average equity ratio equals 0 and parameter of standard deviation of return on assets equals 0 taken together, has a Chi<sup>2</sup> value of 104.36 with an associate p-value of 0.000. So, we can reject the hypothesis that average of equity ratio and standard deviation of return on assets are jointly insignificant.

**Hypothesis 5: Interaction of average of Equity Ratio and Standard deviation of Return on Asset is significant ( $b_3 \neq 0$ )**

The parameter of the interaction term of average equity ratio and standard deviation of return on assets is statistically significantly different from 0. Thus, the effect of average equity ratio on the hazard rate of dissolution of an NPO, depends on the value of standard deviation of return on assets, and vice versa. We will discuss the implications of this interaction later.

Moreover, we identified that the effect of standard deviation of return on assets exert a non-linear influence on the hazard rate of dissolution of an NPO. Between a certain range, having a smaller standard deviation of return on assets over years increases the survival time of an NPO but below a certain threshold a too small standard deviation of return on assets increases the hazard rate of dissolution.

Finally, we can try to use the standard deviation of equity ratio (S.D. ER) rather than the standard deviation of return on assets (S.D. RoA). The next table give us a comparison between the model with S.D. RoA (1) and the model with S.D. ER (2) in reduced model with just average total assets as the size proxy in the logarithmic form and then, a comparison between S.D. RoA (3) and S.D. ER (4) in the complete model previously used with an interaction variable and a squared form of either S.D. RoA or S.D. ER.

Table 7: Comparison regression results S.D. RoA Vs. S.D. ER

	(1)	(2)	(3)	(4)
Avg. Equity Ratio	-0.00615*** (0.000973)	-0.00260* (0.00113)	-0.00615*** (0.000975)	-0.00286* (0.00116)
S.D. RoA	0.0441*** (0.00562)		0.166*** (0.0204)	
Log(Total Assets)	-0.247*** (0.0216)	-0.220*** (0.0228)	-0.229*** (0.0214)	-0.216*** (0.0235)
S.D. Equity Ratio		0.0201*** (0.00300)		0.00998 (0.00726)
(S.D. RoA) <sup>2</sup>			-0.00188*** (0.000387)	
Avg. ER/ S.D. RoA			0.00000390*** (0.000000812)	
Avg. ER/ S.D. ER				-0.0000159 (0.0000398)
(S.D. Equity Ratio) <sup>2</sup>				0.000192 (0.000110)
N	8242	8208	8233	8168
LR Chi <sup>2</sup>	251.22	234.52	292.79	232.68
PH test (P-Val.)	0.5324	0.1458	0.2383	0.1878

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source Data: Orbis



The four models are statistically significant and their Schoenfeld Residuals test for proportional hazard assumption indicates no sign of non-proportional hazard.

We observe that standard deviation of equity ratio is also significant in the reduced model.

This satisfies our hypothesis 3.

**Hypothesis 3: A greater standard deviation of the Equity Ratio should increase the hazard rate of dissolution. ( $b_{2b} > 0$ )**

The standard deviation of equity ratio variable seems to reduce the effect of average equity ratio and makes average equity ratio less significant while still significant at 5%.

However, in the complete model neither standard deviation of average equity nor the interaction term nor the squared form of standard deviation of equity ratio are significant.

Additionally, the Likelihood Ratio  $\chi^2$  is smaller for both reduced and complete model with standard deviation of equity ratio; this can indicate poorer model specification.

Finally, the best model seems to be model (3) in the table 7 (or model (4) in table 6) with Average Equity Ratio as financial capacity measure, with Standard Deviation of Return on Assets as financial sustainability along with its squared form and the interaction between these two main variables.

### [An illustration of the results](#)

Ultimately, with the results of the regression (model (4) in tables 7 or model (3) in table 6), we can take, for each NPO, their estimated hazard rate and plot this hazard rate in a contour plot, a plane view of a three-dimensional graph. Exactly as the isoquant of a production function with two different inputs. Except that we take financial capacity and financial sustainability as  $x$  and  $y$  and  $f(x,y)$  equals the hazard rate of dissolution. So, we can draw approximate kind of “iso-hazard-rate-of-dissolution” curves. We use a centile form of the variable average equity ratio and standard deviation on return on assets especially for the ability of the computer to process this graph. So, this form gives a relative measure of financial capacity and financial sustainability. We inverse the y-axis by taking 101 minus the centile of

standard deviation of return on assets so that financial sustainability increases on the y-axis (as standard deviation of return on assets is an inverse measure of financial sustainability).

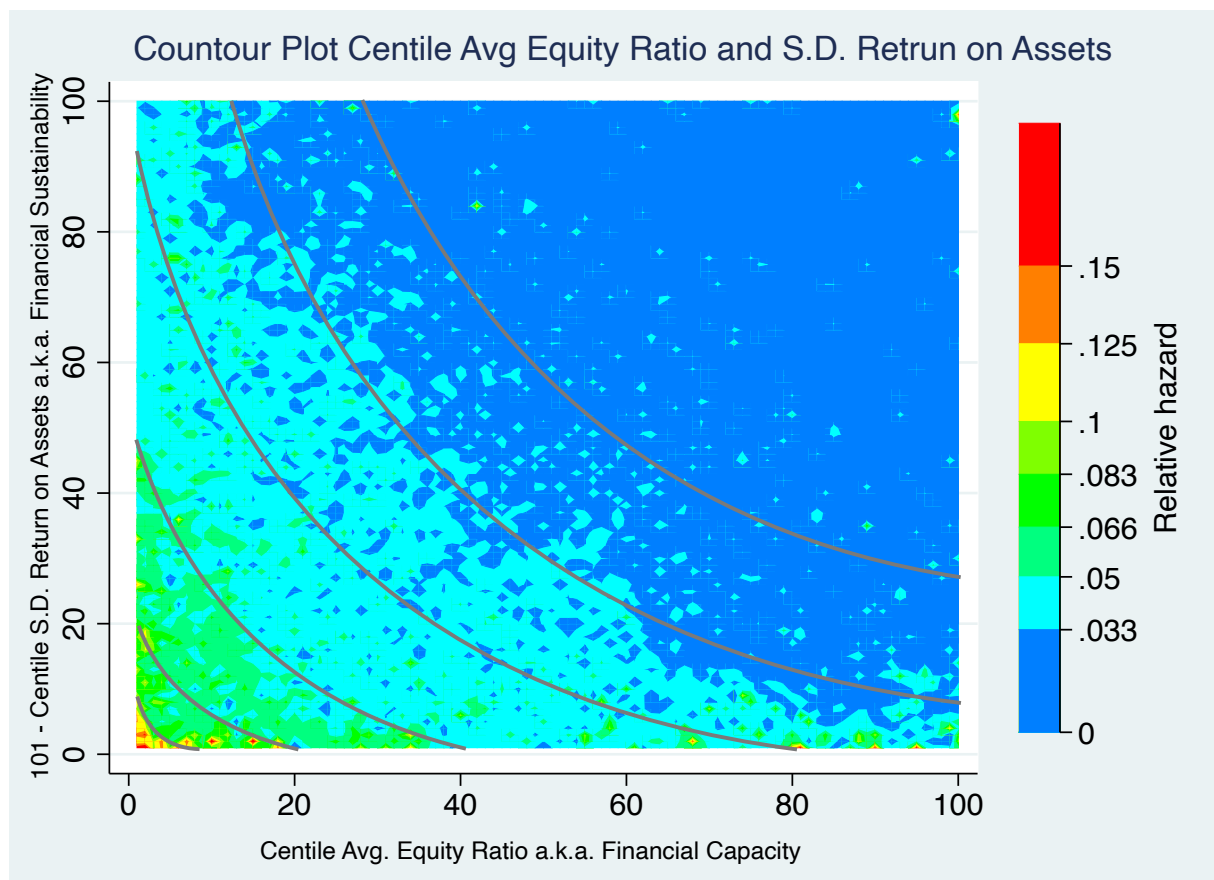


Figure 9: Hazard rate based on Financial Capacity and Financial Sustainability (source data: Orbis)

Henceforth, we can see that the effect of an increase in either financial capacity or financial sustainability depends on the level of, respectively, financial sustainability or financial capacity.

### Implications of this approach

The implications of this perspective of a trade-off between financial capacity and financial sustainability are numerous. We can take the case of revenue diversification to illustrate these implications.

As we reviewed, the literature on revenue diversification showed unclear effect on the nonprofits finance. Revenue diversification could have a negative effect in financial capacity, with, for instance, additional costs for finding revenue sources, but a small positive effect of NPO vulnerability. The main advantage of revenue diversification is probably a greater financial sustainability.

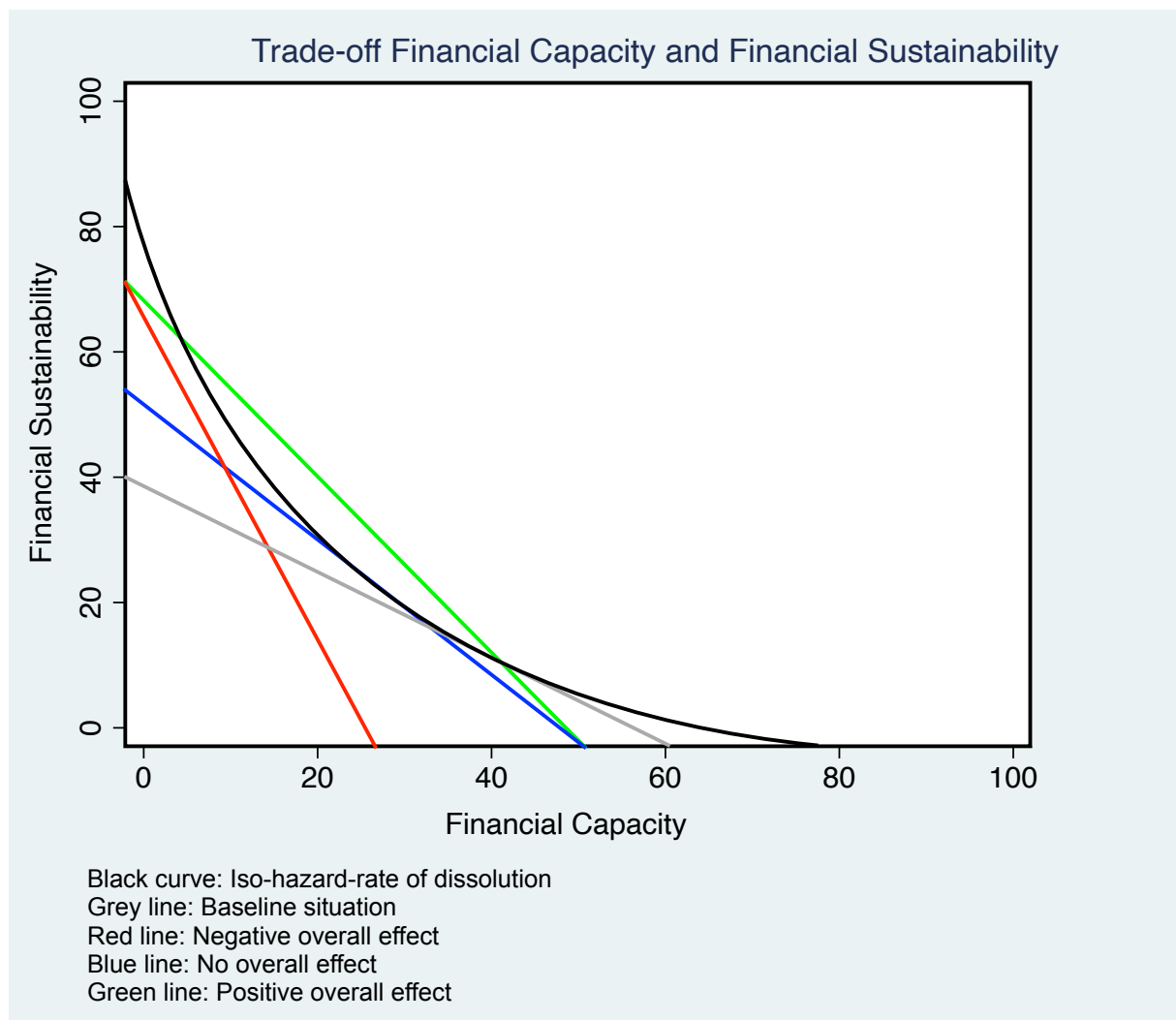


Figure 10: Effect of revenue diversification on Hazard Rate of Dissolution

So, considering that revenue diversification leads to a smaller financial capacity, the overall effect of this revenue diversification can be either negative, null or positive on the vulnerability of NPOs.

In the case of positive effect (green line in figure 8), the revenue diversification has a such positive impact on financial sustainability that it exceeds the reduction in financial

capacity leading to another “iso-hazard-rate-of-dissolution” curve with a smaller hazard of dissolution.

In the case of null overall effect, the increase in financial sustainability compensates exactly the reduction in financial capacity, we stay on the same iso curve.

Finally, in the case of negative overall effect, the loss of financial capacity induced by the revenue diversification exceeds the positive effect of a better financial sustainability.

When deciding whether revenue diversification may be interesting, an NPO should try to assess whether the gain in financial sustainability exceeds the lower financial capacity it brings. Thus, there could be a danger if a manager of an NPO considers that the NPO needs to diversify its revenue. Indeed, this diversification has a cost, and, in some circumstances, revenue diversification can be counterproductive. The manager must, henceforth, somehow assess the benefit of a revenue diversification on the financial sustainability and the financial capacity. This effect will ultimately depend on the actual level of financial capacity and financial sustainability of the NPO.

## Discussion

The results hold for the large Belgian NPOs that have existed for at least 3 years. For small new NPOs, some other dynamics may be taking place in the early stages of the NPO's life that determine if the NPO will nip in the bud or not.

It could be interesting also to test these hypotheses for other countries such as France or the USA for instance. The findings should not differ very much for the other countries.

Also, this methodology could be adapted to study for-profit enterprises' vulnerability but, in this case, return on asset is no more a measure of change of capacity over time as for-profit enterprise can distribute the possible excess capacity. There is therefore an additional difficulty in the choice of the amount of revenue to be distributed by the enterprise. This would probably depend on the anticipation of the future of the economy or the current shareholder expectation on profit distribution. Henceforth, this would complicate the analysis.

Finally, we considered dissolution as being mainly driven by financial problems. Indeed, we used the word dissolution nearly as meaning bankruptcy or, at least, the result of too much financial difficulties. But some nonprofits may dissolve for other reasons than financial ones. To investigate these other reasons, we can identify NPOs that appeared to be financially healthy with this approach which yet dissolved and conduct more qualitative research.

## Conclusion

We have reviewed the main structural reasons of existence of NPOs that could also be reasons of structural vulnerability if the institutions that enable their existence, are modified. Then we have looked at more individual reasons that suggest which NPOs are more at risk.

Thereafter, we have shown the importance of taking financial capacity and financial sustainability together when assessing the financial vulnerability of an NPO. It appears that the hazard rate of dissolution, or the vulnerability of NPO, seems to be a function of financial capacity and financial sustainability. With this function, we can draw “iso-hazard-rate-of-dissolution” curves with financial capacity and financial sustainability. Then, when increasing financial capacity and financial sustainability, the hazard rate of dissolution decreases but if we increase only one of these two, keeping the other steady, the decrease of the hazard rate of dissolution becomes smaller and smaller. So, there is decreasing marginal effect on the hazard rate of dissolution.

It is then necessary for managers to think of the effects on the equilibrium of financial capacity and financial sustainability when taking a financial decision such as changing a source of revenue for example, because it affects probably both financial capacity and financial sustainability.

It could be interesting, henceforth, to study, for instance, the revenue diversification or the effect of commercial activities on revenue with this approach by studying separately the effect of these on financial capacity and on financial sustainability and then, assess the overall effect with for example a survival analysis. This would enable us to better grasp the mechanisms at play with such policies.

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## Appendices:

Table 8: Nace Rev 2 classification structure

Section	Title	Divisions
A	Agriculture, forestry and fishing	01 – 03
B	Mining and quarrying	05 – 09
C	Manufacturing	10 – 33
D	Electricity, gas, steam and air conditioning supply	35
E	Water supply; sewerage, waste management and remediation activities	36 – 39
F	Construction	41 – 43
G	Wholesale and retail trade; repair of motor vehicles and motorcycles	45 – 47
H	Transportation and storage	49 – 53
I	Accommodation and food service activities	55 – 56
J	Information and communication	58 – 63
K	Financial and insurance activities	64 – 66
L	Real estate activities	68
M	Professional, scientific and technical activities	69 – 75
N	Administrative and support service activities	77 – 82
O	Public administration and defence; compulsory social security	84
P	Education	85
Q	Human health and social work activities	86 – 88
R	Arts, entertainment and recreation	90 – 93
S	Other service activities	94 – 96
T	Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	97 – 98
U	Activities of extraterritorial organisations and bodies	99

Source: Eurostat NACE Rev.2

Table 9: Status Nonprofits

Inactive	Frequency	Percentage
Yes	7,544	88.38%
No	992	11.62%
Total	8536	100%

Source data: Orbis.

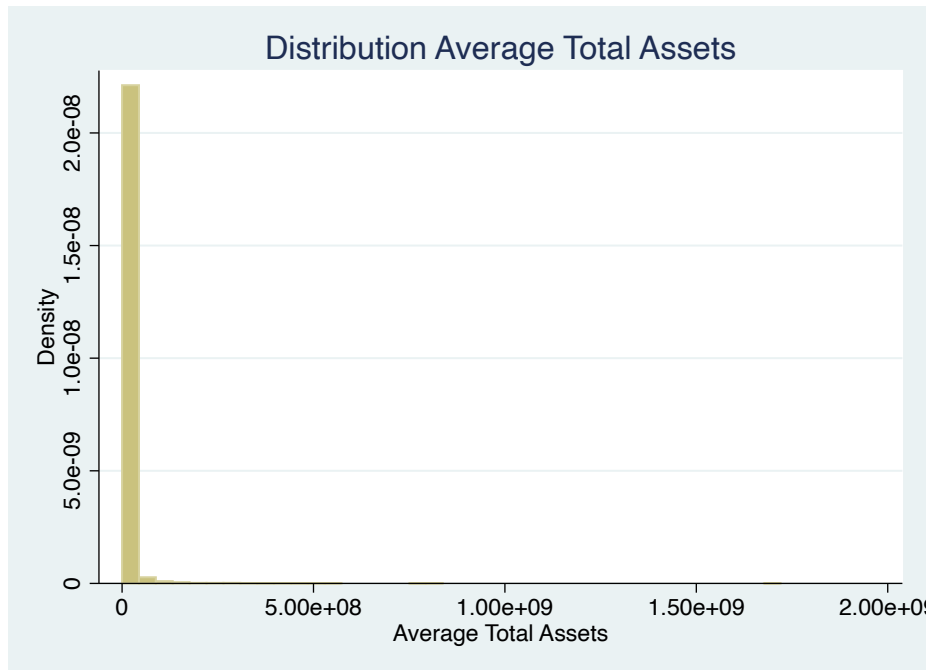


Figure 11: Distribution Average Total Assets NPOs (source data: Orbis)

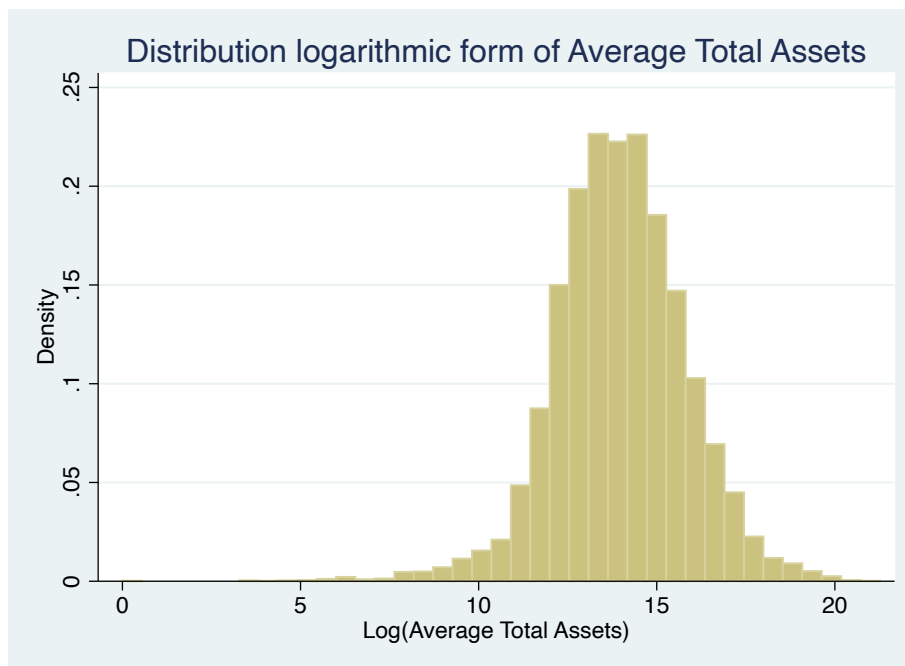


Figure 12: Distribution logarithmic form of Average Total Assets NPOs (source data: Orbis)

Table 10: Frequency dissolution by sector

Sector	Active	Inactiv e	Total
Education	1319	181	1500
	87.93	12.07	100
Social work	1221	160	1381
	88.41	11.59	100
Human health	1030	145	1175
	87.66	12.34	100
Residential care	682	62	744
	91.67	8.33	100
Membership organization	488	56	544
	89.71	10.29	100
Support services	447	84	531
	84.18	15.82	100
Other services (without religion and memb. org.)	358	52	410
	87.32	12.68	100
Professional scientific and technical activities.	293	50	343
	85.42	14.58	100
Art and entertainment	283	22	305
	92.79	7.21	100
Religion	242	24	266
	90.98	9.02	100
Sport	237	25	262
	90.46	9.54	100
Food services	111	16	127
	87.40	12.60	100
Information and	108	16	124

Communication	87.10	12.90	100
Real estate	113	6	119
	94.96	5.04	100
Public administration and social security	98	19	117
	83.76	16.24	100
Cultural activities	105	9	114
	92.11	7.89	100
Wholesale and retail	94	14	108
	87.04	12.96	100
Accommodations	73	13	86
	84.88	15.12	100
Manufacture	54	5	59
	91.53	8.47	100
Finance and insurance	35	10	45
	77.78	22.22	100
Amusement	31	7	38
	81.58	18.42	100
Agriculture	29	2	31
	93.55	6.45	100
Construction	21	4	25
	84.00	16.00	100
Forestry	12	2	14
	85.71	14.29	100
Total	7484	984	8468
	88.38	11.62	100

Nbr. Obs. and percentage inactive by sector,

Five strongest sectors, Five weakest sectors.

Source data: Orbis

Table 11: Results regressions with sector dummies

	(1)	(2)	(3)	(4)	(5)
Avg Equity Ratio	-0.00861*** (0.000969)	-0.00599*** (0.000985)	-0.00618*** (0.000986)	-0.00615*** (0.000987)	-0.00599*** (0.000991)
S.D. RoA	0.0000292*** (0.00000810)	0.0000270** (0.00000861)	0.0000271** (0.00000862)	-0.000000796 (0.0000391)	0.158*** (0.0211)
Avg Total Assets	-2.59e-08*** (4.58e-09)				
Log(Total Assets)		-0.285*** (0.0225)	-0.289*** (0.0225)	-0.290*** (0.0226)	-0.260*** (0.0223)
Avg ER/S.D. RoA			0.00000372*** (0.000000865)	0.00000372*** (0.000000865)	0.00000380*** (0.000000861)
(S.D.RoA) <sup>2</sup>				3.04e-10 (3.95e-10)	-0.00172*** (0.000403)
Art and entertainment	-0.479 (0.245)	-0.567* (0.245)	-0.570* (0.245)	-0.570* (0.245)	-0.576* (0.245)
Cultural activities	-0.153 (0.344)	-0.188 (0.344)	-0.173 (0.344)	-0.174 (0.344)	-0.199 (0.344)
Sport	-0.450 (0.235)	-0.447 (0.235)	-0.450 (0.235)	-0.450 (0.235)	-0.447 (0.235)



Amusement	0.652 (0.388)	0.429 (0.389)	0.422 (0.389)	0.421 (0.389)	0.459 (0.389)
Agriculture	-1.064 (1.004)	-1.035 (1.004)	-1.031 (1.004)	-1.032 (1.004)	-1.026 (1.004)
Forestry	0.764 (0.712)	0.864 (0.712)	0.866 (0.712)	0.867 (0.712)	0.887 (0.712)
Manufacture	-0.469 (0.456)	-0.328 (0.456)	-0.324 (0.456)	-0.324 (0.456)	-0.343 (0.456)
Construction	0.718 (0.507)	0.745 (0.507)	0.745 (0.507)	0.746 (0.507)	0.763 (0.507)
Retail	0.0998 (0.281)	0.139 (0.281)	0.132 (0.281)	0.132 (0.281)	0.140 (0.281)
Accommodation	-0.189 (0.328)	0.0354 (0.329)	-0.0396 (0.333)	-0.0390 (0.333)	-0.130 (0.334)
Food services	-0.196 (0.313)	-0.214 (0.313)	-0.217 (0.313)	-0.218 (0.313)	-0.322 (0.315)
Info and commu	0.158 (0.280)	0.203 (0.280)	0.205 (0.280)	0.205 (0.280)	0.216 (0.281)
Finance & Insurance	1.440*** (0.331)	1.663*** (0.331)	1.667*** (0.348)	1.669*** (0.348)	1.622*** (0.348)

Real estate	-0.632 (0.418)	-0.389 (0.418)	-0.386 (0.418)	-0.385 (0.418)	-0.414 (0.418)
Sciences and tech	0.507** (0.170)	0.645*** (0.171)	0.623*** (0.172)	0.624*** (0.172)	0.618*** (0.172)
Support services	0.650*** (0.141)	0.690*** (0.141)	0.676*** (0.141)	0.676*** (0.141)	0.635*** (0.142)
Public adm Social sec	0.403 (0.261)	0.503 (0.260)	0.509 (0.260)	0.510* (0.260)	0.450 (0.261)
Other services	0.0644 (0.171)	0.173 (0.171)	0.175 (0.171)	0.175 (0.171)	0.108 (0.171)
Religion	-0.814*** (0.244)	-0.584* (0.246)	-0.579* (0.246)	-0.578* (0.246)	-0.673** (0.250)
Membershi p orga	-0.221 (0.157)	-0.257 (0.157)	-0.257 (0.157)	-0.258 (0.157)	-0.242 (0.157)
N	8247	8247	8238	8238	8233
LR Chi <sup>2</sup>	250.68	342.09	350.35	351	398.42

Standard errors in parentheses

\*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$

Source data: Orbis