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Innovative Finance for Development: Assessing Strengths and Limitations of Development Impact Bonds

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Abstract

Development Impact Bonds (DIBs) are an innovative financial instrument for development, in which funders delegate the pre-financing of an intervention to outside investors who are recompensed only when desired outcomes have been achieved.

The theory of change behind DIBs is rich. Financing aid through this instrument is believed to lead to better fund allocation and aid efficiency. DIBs should increase the financing of evidence-based interventions, foster cooperation and innovation. In addition, they are believed to be a good tool for bridging the funding gap for development. Due to the novelty of the mechanism, this theory of change has yet to be proven.

This multiple case study analyzes the first five DIBs to have ever been launched, to understand whether the theoretical rationale behind DIB adoption is reflected in the reality. To do this, the study analyzes the contracts that have been stipulated between the actors, and the transaction characteristics, and interprets the data through the theoretical lens of the Agency Theory. This is done to understand whether DIBs have succeeded in aligning the incentives of the different stakeholders and delivering on their promises.

The analysis concludes that DIBs are an effective instrument for aligning stakeholder interests in development interventions and introducing market mechanisms in the space, which help confirm the veracity of some the claims of DIBs' theory of change. However, these same facts are also the cause of several adverse mechanisms which threaten to countermand DIB's positive effects on aid effectiveness and the rationale behind their adoption.

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Glossary

ABC	Activity-Based-Contract
AEF	Africa Eye Foundation
CC	Copenhagen Circles
CFC	Common Fund for Commodities
CGD	Center for Global Development
CIFF	Children's Investment Fund Foundation
CoD	Cash on Delivery
DFID	Department for International Development of the United Kingdom
DIB	Development Impact Bond
FHF	Fred Hollows Foundation
HF	Hilton Foundation
HLFPPT	Hindustan Latex Family, Planning and Promotion Trust
ICRC	International Committee of the Red Cross
KIT	Royal Tropical Institute
MICEI	Magrabi ICO Cameroon Eye Institute
OBC	Outcome-Based-Contract
OPIC	Overseas Private Investment Corporation
P-A	Principal-Agent
PbR	Pay-by-Results
RBA	Results-based-Aid
RBF	Results-based-Financing
RFUK	Rainforest Foundation UK
SDGs	Sustainable Development Goals
SFF	Schmidt Family Foundation
SIB	Social Impact Bond
UBS OF	UBS Optimus Foundation
USAID	United States Agency for International Development

1. INTRODUCTION

Development aid effectiveness has been at the center of a heated debate for years. After a long period of undisputed glorification and growth, with aid flows exponentially increasing (Kharas, 2007), some scholars began to question the effectiveness of development assistance in delivering on its promises (Easterly, 2006; Kharas, 2007), initiating the debate on aid effectiveness. While some advocate for the transformational positive effect of development aid, to allow the most disadvantaged people in this planet to overcome poverty (Sachs et al., 2004; Sachs, 2005, 2006; Minoiu & Reddy, 2010), others have uncovered missing links between aid disbursements and recipient country growth (Easterly, 2006; Powell & Bobba, 2006; Roodman, 2007; Doucouliagos & Paldam, 2009; Moyo, 2010), as well as adverse effects (Easterly, 2006; Powell & Bobba, 2006).

In spite of the criticism, development aid has been proven to be linked to positive outcomes under specific circumstances (Hansen & Tarp, 2000; Feeny & Ouattara, 2009; Chong, Gradstein, & Calderon, 2011; Juselius, Møller, & Tarp, 2014). The polarized debate has led practitioners to acknowledge some of the pitfalls of past development intervention and ideate new mechanisms to intensify the positive effects of aid, while limiting its adverse effects: Development Impact Bonds are one of such tools.

Development Impact Bonds (DIBs) are a new Pay-by-Results instrument for funding development interventions with the support of private sector investors (Barder, Eccles, & Littlefield, 2013; Social Finance & CGD, 2013). DIB adoption is meant to improve aid effectiveness by introducing market mechanisms in development aid, aligning stakeholder interests to ensure that funding leads to impact, lowering implementation costs and providing a platform for fruitful cooperation (Social Finance & CGD, 2013; Durland, 2017; Oroxom, Glassman, A., & McDonald, L., 2018). In addition, DIBs are supposed to help close the funding gap for development, attracting private capital and fostering innovation (Social Finance & CGD, 2013; Sobhrino, 2016; I. Gustafsson-Wright, 2017; Shah, 2017).

The first DIB was introduced in 2015, and their popularity has greatly risen since. A total of five have been launched, while other 22 are currently in development, involving high profile stakeholders such as the World Bank, the OECD, the IADB and many others (Gustafsson-Wright & Boggild-Jones, 2018). The Economist recently published an article titled, "Development-impact bonds are costly, cumbersome-and good" (The Economist, 2018), and others have started documenting the trend (Sobhrino, 2016; UNDP, 2016; Shah, 2017; Saldinger, 2017; Ellis, 2018; Saldinger, 2018; E. Boggild-Jones & Gustafsson-Wright, 2018; Chasan, 2018).

Yet, given the novelty of the subject, the theory of change behind the tool has yet to be proven (Gustafsson-Wright, 2017; Oroxom et al., 2018). Out of the two concluded DIBs only one has succeeded in fully reaching its targets, and many questions regarding their competitive advantage over other funding mechanisms remain unanswered (Gustafsson-Wright, 2017; Oroxom, Glassman & McDonald, 2018; The Economist, 2018).

This study evaluates the theory of change behind DIBs, by assessing whether the first five DIBs to have ever been launched have been efficient in aligning stakeholder interest and in delivering on the other promises of the DIB theoretical model. The research question this study aims to tackle is therefore:

- Are Development Impact Bonds a beneficial instrument for improving aid effectiveness?

To answer this question this study assesses whether the current DIB contracts have been efficient at aligning stakeholder interests and ensuring that funding leads to development outcomes to then examines the implications of these processes on aid effectiveness and the development funding gap. The cases were analyzed using the theoretical framework of Agency Theory, to assess whether DIBs are efficient at aligning principal and agent interests and minimize agency risks.

The results of the analysis show that DIBs can in fact be an effective instrument for aligning stakeholder interests, deliver positive impact, and attract private funding for development, provided market mechanisms are inserted in the contracts. However, this alignment fails at eliminating agency problems, and attracting private funding comes at a cost, with potential adverse effects for aid effectiveness and the funding gap for development.

This study, which, to my knowledge, is the only research focused on a comparative case analysis of all five launched DIBs up to today, aims at contributing to the growth of the evidence base around this new financing mechanism, and to provide useful insights for development practitioners interested in the adoption of this instrument.

1.1 Thesis Structure

This research is structured in the following way: after explaining the adopted methods, the study begins by illustrating the theoretical framework used to interpret the data, Agency Theory, to then demonstrate its relevance for the aid effectiveness debate. The key phenomena which are the subject of this study, Development Impact Bonds, will then be explained, as well as the overall category of financing instruments to which DIBs belong: Pay-by-Results (PbR) mechanisms.

The five case studies will then be presented, followed by an analysis on how Agency Theory is reflected in DIB contracts. To do so, the analysis will begin by uncovering who are the DIB principals and who are the agents. After defining the roles, the type of contracts that have been stipulated between all DIB stakeholders will be exposed. The study will then continue with an evaluation of the stakeholder characteristics in order to comprehend if the transaction characteristics reflect Agency Theory's assumptions and DIBs theory of change. Based on the results, an evaluation of DIB's theory of change will then be completed.

2 METHODOLOGY

2.1 Philosophy of Science

This study adopts a critical realist philosophy of science stance. Critical realism is based on the belief that the world exists in an intransitive dimension, independently from our knowledge of it, which is instead transitive, making a distinction between ontology and epistemology (Bhaskar, 1989; Collier, 1994). Critical realists acknowledge that existence is not dependent on observability and consequently believe in the presence of non-observable phenomena, acknowledging the non-exhaustiveness of the power of observation (Collier, 1994; Sayer, 2000). Because of this, in this study, the fallibility of human perception and its connections to the actual and real is recognized (Alvesson & Sköldberg, 2017; Sayer, 2000). In particular, the subjectivity of the interpretation and the existence of epistemological relativism is acknowledged (McLachlan & Garcia, 2015). In accordance with critical realism, this study also recognizes the ability of causal processes to produce different results in different contexts (Sayer, 2000).

2.2 Research Design and Data Collection

The present study is a qualitative research based on a multiple case design. Qualitative research can be defined as "any kind of research that produces findings not arrived by means of statistical procedures or other means of quantification" (Corbin & Strauss, 1990). Qualitative methods were identified as the preferred methodology for a series of reasons, the main one being that this research aims at understanding and assessing underlining cause and effect mechanisms between phenomena, which these type of methods allow to uncover (Yin, 1984).

Qualitative methods were also selected as they allow for discovery without the preemptive reduction of data that is required in quantitative research (Atieno, 2009). This space and flexibility were needed in order to allow for longitudinal adaptation throughout the course of the study (Erickson, 1986; Patton, 2002). Qualitative research has been criticized for its inability to engender generalizable knowledge (Polit & Beck, 2010), yet the primary goal of qualitative research is not to

generalize but rather to provide a rich, multi-faceted and contextualized understanding of a certain phenomenon (Bryman, 1988; Polit & Beck, 2010), which is what this research aims to do. In addition, given the novelty of the subject, not enough data would be available to be used as conclusive evidence to answer the research question using quantitative methods.

This study adopts an inductive research approach. The investigation in fact began by observing the data available, identifying themes and patterns, to then search for existing theories which could support the search for causality (Elo & Helvi, 2008; Pole & Lampard, 2002; Polit & Beck, 2010). The evolving framework supported the definition of the conditions under which the phenomena observed were likely to be found and largely constituted the base of the coding and thematic network creation.

2.2.1 Multiple Case Study Design

A multiple case study design was selected as the preferred approach to answer the research question. This choice was motivated by the rarity, criticality and revelatory nature of the cases, which are characteristics usually linked to the choice of single case studies. According to Yin, "the rationale for single-case designs usually cannot be satisfied by multiple cases. The unusual or rare case, the critical case, and the revelatory case are all likely to involve only single cases, by definition." (Yin, 1984). However, this study can be considered one of the exceptions to the rule. In fact, the five cases that were selected can be considered "critical" "revelatory" and "rare". Rare, since these are the only five DIBs to have ever been implemented. Revelatory, since the comparative analysis of such bonds was previously not possible, and critical as they are necessary to understand what the future of these instruments might hold.

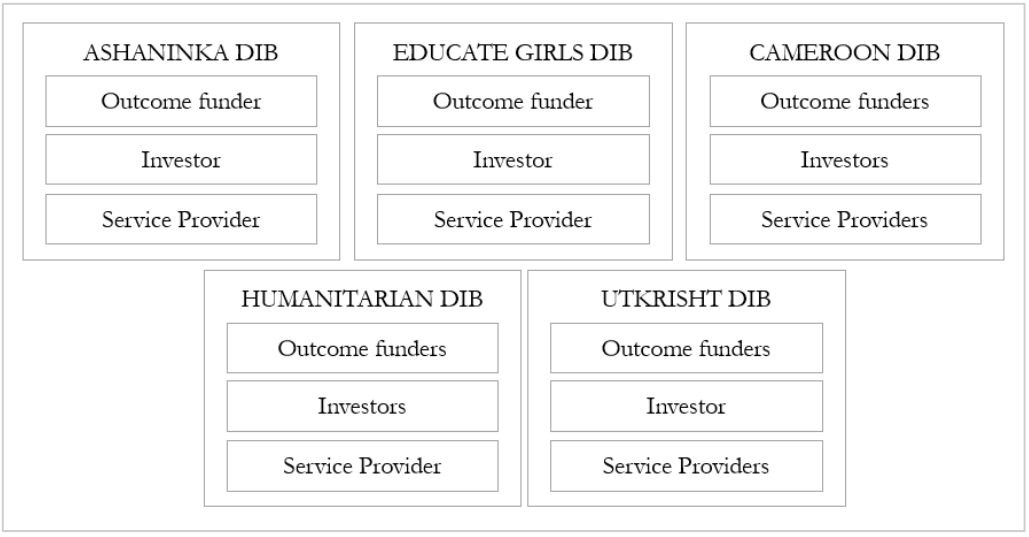

Figure 1: Graphic representation of cases and sub-units of analysis

This research is an embedded multiple case study, as the analysis includes several sub-units per case (Flyvbjerg, 2006; Yin, 1984), summarized in Figure 1. The sub-units were chosen based on the most relevant stakeholder groups present in each DIB. Analyzing each sub-unit separately allowed for a better identification of commonalities and causalities. The sampling choice which determined the selection of case studies, was to include all the Development Impact Bonds which have been successfully launched up to February 2018. This choice was motivated by the desire to include the most representative and informative sample possible.

Like other qualitative methods, the case study approach has been often criticized due to its generalization limitations and subjectivity of results (Flyvbjerg, 2006; Yin, 2013). However, as argued by Erickson "the general lies in the particular" (Erickson, 1986). Case studies do allow for the transfer of learnings from a particular case to similar situations (Flyvbjerg, 2006; Yin, 2013). In addition, yes case study analysis is exposed to risks due to the subjectivity of interpretation and verification bias, yet quantitative methods are not immune from these elements, which consequently does not diminish the value of case study research over other methods(Flyvbjerg, 2006). Ultimately, research design is driven by scope: the intent of this study is not to reach universally generalizable conclusions, but to discover findings which can be empirically applied by practitioners in the field.

2.2.2 Data and Data Collection

The primary data of this study consists on information collected during 14 semi-structured individual interviews with the different DIB stakeholders. The semi-structured individual interview format was selected due to its flexibility element and for its capacity to allow for the exploration of views, experiences, beliefs and motivations of individual participants (Patton, 1987; Pole & Lampard, 2002; Silverman, 2013). The format allowed for the presence of a basic underlining common structure, to facilitate the determination of commonalities between cases and sub-units, while also giving space for adapting the questions to the interviewee. This permitted the uncovering of new territories when needed, increasing the depth and richness of the data collected.

Prior to the interviews the data collection began by reconstructing the five cases through a literature review. The information collected during this initial phase was then triangulated and complemented from additional data collected via the interviews. The respondents were selected through a series of steps. First, a list of all the organizations involved in the five cases was first compiled. Then, a search for the relevant contacts in each organization was made, following which interview requests were sent out. The intent was to be able to interview at least one individual who

had been actively involved in DIB design from each sub-unit of each case. The outcome of this process were 14 semi-structured interviews with 16 different respondents belonging to 14 different organizations (2 interviews included 2 respondents contemporarily).

13 of the interviews were carried out via Skype, while one was carried out in person, the interviews lasted an average of 44 minutes each. Due to different response rates, the distribution of the interviewees among sub-units is unequal. For an in-depth distribution and details of the respondents please refer to the Annex A. One of the respondents (an investor from the Humanitarian Impact Bond) requested to remain anonymous. Five respondents requested that personal citations be verified, before inclusion in the present study. Interviewees did not consent to the inclusion of the interview transcripts in the Appendixes.

The interview guide was chosen on the basis of a literature review around the topic of impact bonds. Based on this literature a few themes were selected and a preliminary interview guide was made. This guide was piloted and validated through a first interview with Ms. Oroxom from the Center for Global Development (CGD), who had worked extensively on a single case study based on the Cameroon Impact Bond (Oroxom et al., 2018). Following this interview, the guide was modified. Three different interview guides were made, based on the type of stakeholder interviewed (outcome funder, investor and service provider). Additionally, based on stakeholder and case peculiarities uncovered during the data triangulation, questions were added or adjusted, in accordance with the semi-structured design. The data collected during the interviews was verified and complemented before and after each interview through the analysis of grey literature, which constituted a very important element to validate the information received and better understand their content.

2.2.3 Analysis and Coding

In line with the choice of inductive approach, the analysis began by observing the data to first identify trends and patterns. In order to enable and facilitate the analysis, all of the interviews were transcribed and coded using the software NVivo. The first identification of trends and patterns was done through a first cycle coding technique known as "data themeing" (Saldaña, 2016), in which groups of recurring ideas were identified. An analysis of the output of this first coding was used to shape and transform the theoretical framework, on the quest for finding a theory that would support the interpretation of the data and search for causality, given the information available.

Following the thematic first coding, a second coding was then done, using a cycle coding technique known as "pattern coding" (Saldaña, 2016). This entailed dividing the previously coded data in

new sub-categories describing patters, which were inspired by the new theoretical framework. The basis for the second cycle coding consisted in the relevant stakeholders and transaction variables outlined by Principal-Agent Theory (principal risk aversity, agent risk aversity, goal alignment, outcome measurability, task programmability and relationship length) as well as the main elements of DIBs' theory of change. To better analyze the data, different "case classifications" were created to highlight the case to which each interviewee belonged, and his or her role in the DIB, facilitating comparisons between sub-units and the overall analysis of the data.

The second cycle coding allowed for the comparison of data to the theoretical framework, and again highlighted the multi-faceted nature and relevance of some elements, such as risk. This analysis led to the undertaking of an additional literature review on the nature of risk in development intervention, identifying the Copenhagen Circles Framework for categorizing risk. The new categories discovered during this further literature review served as the basis for a third coding, to better refine and characterize some elements. For an overview of the nodes created in NVivo through the various coding cycles, please refer to Appendix C.

Throughout all the coding process the analysis focused on identifying causes and effects between the information collected and on uncovering anomalies and contradictions. In order to organize the thought process, ample use of Memos was made, which were inserted directly on NVivo. Once the coding was concluded the data was then interpreted through the theoretical framework, continuing to scout for and link causes and effects. Again, some elements of the theory were added to support the discussion of the causality mechanisms which were unveiled in the data analysis.

3. LITERATURE REVIEW

The study will now begin by describing the theories and concepts which were adopted in order to interpret the data, beginning with Agency Theory.

3.1 Agency Theory

Agents and principals have been interacting since the Agricultural revolution. Adam Smith, in the celebrated 1776 *Wealth of Nations*, recognized the conflict of interest arising between the masters and workmen due to their difference in objectives, "The workmen desire to get as much, the masters to give as little as possible", and was the first to point out the need for providing adequate incentives in order to overcome these competing interests (Laffont & Martimort, 2002). Unknowingly, Smith already recognized in the master the role of principal and in the workmen

that of agents and identified the first issues entailed in the relationship. Yet, it is only at the beginning of the 1970s that the Agency Theory was formally postulated.

In the early 70s Ross and Mitnick presented in parallel the concept of Agency Theory introducing the world to the terminology (Mitnick, 1975; Ross, 1973). The principal is identified as a person or entity delegating actions and/or decisions to an agent in exchange for compensation. The specifics of this proxy are formalized in a contract. Following the delegation, the agent then decides to devote a specific amount of effort to the task based on his own goals and preferences (Mitnick, 1975; Ross, 1973). The principal's challenge is to therefore construct a contract which includes the right incentives to motivate the agent to exercise the principal's desired effort level (Mitnick, 1975). If the principal and agent's goals and preferences were perfectly aligned such a process would be linear, but Agency Theory assumes a misalignment between their interests of principals and agents, who possess different utility curves, which is the cause of the two key Agency risks: moral hazard and adverse selection. (Hart & Holmström, 1987; Mitnick, 1975)

Moral hazard and adverse selection are two forms of opportunism. Opportunism is the practice of taking advantage of opportunities or circumstances with disregard for the counterpart (Williamson, 2010). Williamson divides opportunistic behavior into ex-ante, and ex-post. Ex-ante opportunistic behavior happens before the closing of a contract while ex-post is opportunistic behavior happening after. Limiting ex-ante opportunistic behavior entails transaction costs, search costs, bargaining costs and contract making costs, while monitoring and enforcement costs are incurred in order to limit ex-post opportunism (Williamson, 2010).

Moral hazard is a concept originated in the insurance sector to characterize ex-post opportunism. It is a problem that manifests itself due to the impossibility of the principal to verify and monitor the agent's actions (Holmstrom, 1979; Lambert, 1983; Page, 1991). Moral hazard arises when a party, such as an insured entity, enters a risky transaction, knowing that the actual transaction risk, in the form of cost, is being held by the other party, the insurance company. The cost of the insured's actions is bore by the insurer, which creates incentives for the insured to engage in riskier behavior than he otherwise would (Holmstrom, 1979; Page, 1991; Pitchford, 1998; Rowell & Connelly, 2012). In the case of principal-agent, moral hazard arises when the agent, after a contract is signed, opportunistically acts against the best interest of the principal, acting in a way that skews the agreement, exploiting the principal's inability to monitor the agent's actions (Holmstrom, 1979; Lambert, 1983; Pauly, 1968; Pitchford, 1998).

Adverse selection is instead a form of ex-ante opportunism due to the existence of asymmetric information, stemming from the principal's impossibility to observe the agent's individual

characteristics (Carlier, 2001; Page, 1991). Because of asymmetric information distribution the principal is not aware of the agent's costs and preferences summarized in the agent's utility function. Thanks to this asymmetry, the agent can therefore take advantage of this more knowledgeable position to negotiate a contract that is less optimal for the principal than the one that would have been negotiated if the principal had been fully aware of the agent's utility function (Besanko, 1985; Page, 1991; Carlier, 2001).

Originally, Agency models focused on the study of optimal contracts provided only one of the two fundamental agency problems (Page, 1991). Grossman and Hart (1983) for instance, demonstrated the existence of an optimal, incentive compatible contract selection mechanism for the principal-agent relationship in the presence of moral hazard (Grossman & Hart, 1983). Scholars such as Sappington and Besanko have focused their work on the inefficiencies caused by adverse selection only (Besanko, 1985; Sappington, 1991). Yet principal-agent relationships in the real world are characterized by both problems, which is why researchers such as Picard (1987) and Page (1991) expanded the model to include both moral hazard and adverse selection and provide a more demonstrative representation of real principal-agent dilemmas (Picard, 1987; Page, 1991).

From its roots in insurance and its study of moral hazard and adverse selection, the Agency Theory has developed along two lines: Positivist Agency Theory and Principal-Agent Theory (Jensen & Meckling, 1976; Eisenhardt, 1989; Bendickson, Muldoon, Liguori, & Davis, 2016). Positivist agency theory focuses mostly on the relationship between company managers and owners, and the dilemmas generated by the separation of ownership and control, with the aim of identifying governance mechanisms to limit the agent's self-serving behavior (Eisenhardt, 1989).

The Principal-Agent (P-A) Research has a broader focus and is more concerned with creating a general theory of the P-A relationship (Eisenhardt, 1989). It is based on strict methodological assumptions and focused on identifying the most efficient contract, provided specific levels of variables, such as outcome uncertainty, risk aversion, information asymmetry (Bendickson et al., 2016). Although different, the two streams are in fact complementary as one identifies the different contracts available while the other recognizes which contract should be adopted provided the circumstances (Eisenhardt, 1989). The two streams will be further defined below.

3.1.1 Positivist Agency Theory

As above mentioned, Positivist Agency Theory focuses on the firm and is based on the assumption of conflicting goals, which need to be aligned through the adoption of specific governance mechanisms. It assumes that principals and agents act rationally, meaning they will use the contracting process to maximize their own wealth. In addition, information is assumed to not be

evenly distributed among actors, as principals are not fully aware of the agent's characteristics, generating asymmetric information.

As illustrated above, conflicting goals paired with the impossibility of the principal to monitor agent's action, increase the risk of moral hazard, while asymmetric information leads to adverse selection issues. Positivist Agency Theory aims to find governance models to minimize these two issues and reach a state known as "pareto optimality", meaning an optimal contract in which neither party can increase his or her wealth at the expense of the other (Jensen & Meckling, 1976). The findings of Positivist Agency Theory can be summarized through two important results which provide guidelines to limit the probability of adverse selection and moral hazard in P-A relationships (Eisenhardt, 1989).

First, Jensen and Meckling (1976) argue that when a contract between the principal and agent is outcome based, the agent is more likely to behave in the interest of the principal (Jensen & Meckling, 1976). This implies that, if the manager's compensation depends on the outcome of his or her performance, this will provide an incentive to align the manager's goals with those of the firm's owners. An outcome-based contract (OBC) is a contract tying at least part of an agent's payments to the achievement of specific and measurable performance targets. This is done for example by increasing the manager's firm ownership (Jensen & Meckling, 1976), which encourages the manager to increase firm value since this would immediately translate in an increase in the value of his or her own assets. An OBC is the opposite of activity-based-contract (ABC), which ties the entirety of compensation to the execution of specific actions, regardless of their results (Jensen & Meckling, 1976; Eisenhardt, 1989).

Secondly Jensen, this time with Fama (1983), demonstrated that when the principal has information to verify agent behavior, the agent is more likely to behave in the interest of the principal (Fama & Jensen, 1983; Gibbons, 1998). Investing in information systems improves the ability of the principal to directly observe and measure the agent's behavior, reducing asymmetric information and directly decreasing the agent's likelihood to behave in a fashion that is directly in conflict with the principal's interest. Such information systems could include for example an increase in the number of audits but also, as explored by Fama (1980), efficient capital and labor markets, which decrease managerial opportunism since the manager's actions are immediately and transparently reflected in the capital markets (Fama, 1980).

3.1.2 Principal-Agent Research

Principal-Agent Research creates economic models to support the construction of pareto efficient contracts, which offer the right incentives to minimize the probability of agency risks. Similarly to

Positivist Agency Theory, the simple P-A model is based on the following assumptions: principals and agents want to maximize their own expected utilities, the production cost of the agent and the chosen action is at least partially unobservable by the principal (asymmetry of information), the agent is risk averse, while the principal is risk neutral, the principal can present the contract as a "take it or leave it offer" to the agent, and both agent and principal share the same subjective beliefs on the occurrence of noise (ε), meaning processes beyond the control of the actors (Grossman & Hart, 1983; Eisenhardt, 1989; Gibbons, 1998).

In a simple P-A model the agent exercises a specific amount of effort corresponding to an action (**a**) as a response to the incentives provided by the contract negotiated with the principal. ***y*** represents the production function leading to the outcome, with $y = a + \varepsilon$. Outcome is therefore proportional to the amount of effort exercised ***a*** plus an uncontrollable element of noise **ε**. The noise's influence on outcome can vary. If noise is too large outcome cannot be attributable to the action itself. As per assumption action ***a*** cannot be fully observed by the principal (Grossman & Hart, 1983; Eisenhardt, 1989; Gibbons, 1998).

Exercising effort implies a personal cost to the risk averse agent (***C(a)***), which is at least partially unknown to the principal. This cost needs to be compensated by the principal through a monetary income ***w*** which must account for agent's cost plus a risk premium if risks are implied, also known as wage. In the standard P-A setting, the agent is motivated only by the incentives to perform that are stated in the contract (Eisenhardt, 1989; Gibbons, 1998; Grossman & Hart, 1983; Holmstrom, 1979). If the principal's goals are fully aligned with those of the agent he will then offer a fixed compensation equal to $T(y) = w^*$, believing that the agent will behave in a trustworthy fashion and perform action a^* as agreed in the contract. If this is not the case, additional incentives will need to be included, in order to overcome trust related issues (Grossman & Hart, 1983; Eisenhardt, 1989; Gibbons, 1998).

The compensation assigned to the agent can be determined in different ways depending on the relationships between the parties. A wage is composed of a non-contingent salary (**s**) and a bonus rate depending on the level of outcome (***by***), with wage therefore equal to $w = s + by$. A purely activity-based-contract, such as the one described above, would be compensated with $w^* = s$, a fixed amount independent of outcome ***y***. When alignment is only partial ***by*** is introduced to optimize the contract. ***b*** links output ***y*** to compensation, a connection that implies a greater risk for the agent since ***w*** is no longer fixed, a shift which requires a risk premium (Grossman & Hart, 1983; Eisenhardt, 1989; Gibbons, 1998).

OBCs need to carefully estimate this risk. The larger the ***b***, the larger the transfers of risk from the principal onto the agent, since the agent's compensation becomes more dependent on the outcome of his performance and is therefore less stable. In a pure outcome-based-contract compensation is fully dependent on outcome, with ***w** = by***. Through the output based element the agent is additionally incentivized to perform action ***a***** which leads to outcome ***y***, in order to increase his own utility. Yet, this transfer has a cost for the agent, due to the increase in risk, which has to be compensated through a premium (Grossman & Hart, 1983; Ross, 1973). As stated by Eisenhardt "the heart of principal-agent theory is the trade-off between (a) the cost of measuring behavior and (b) the cost of measuring outcomes and transferring risk to the agent" (Holmstrom, 1979; Grossman & Hart, 1983; Eisenhardt, 1989; Gibbons, 1998).

Depending on the characteristics of the principal and agent, P-A research uncovered a series of ways in which this trade-off, meaning the values of ***s*** and ***b***, can be optimized to reduce the risk of adverse selection and moral hazard. A higher ***b*** creates stronger incentives to undertake action ***a***, but also imposes greater risk upon the agent (Eisenhardt, 1989). In the basic P-A model the agent is risk averse, however this assumption can change. As *agent risk aversity* decreases, transferring risk onto the agent becomes more appealing, which makes outcome-based-pay more convenient (by increasing ***s***). Conversely, more risk averse agents will respond better to activity-based contracts. On the other hand, a more risk averse principal will prefer outcome-based contracts, transferring the risk onto the agent who will only receive the wage if performance is met (Eisenhardt, 1989; Kőszegi, 2014).

Another element which must be considered is *goal conflict*. Although P-A research assumes the existence of a misalignment of goals, goals can differ at different levels. Scholars have proved that, as the level of goal conflict decreases so does the need for outcome based-contracts. The alignment in objectives will intrinsically motivate the agent to act in compliance with what stated in the contract instead of engaging in behavior that is detrimental for the principal (Eisenhardt, 1989; Eisenbeis, 2004). For an OBC the goal misalignment between principal and agent should be large enough to compensate for the costs of the risk premium, and small enough for the contract to still sound desirable for the agent. Too large a misalignment would imply excessive costs and risks for the agent and result in a sub-optimal contract (Besanko, 1985; Hart & Holmström, 1987; Page, 1991).

The nature of the task to be performed by the agent also influences the type of contract that is most indicated. Eisenhardt defines *task programmability* as the degree to which appropriate agent behavior can be specified in advance. The more programmable a task, the easier it is for the

principal to observe and measure performance, which makes activity-based-contracts easier to implement. Adopting an activity-based contract for a task that is complex and difficult to evaluate is not optimal, as the contract will then be difficult to implement (Eisenhardt, 1989). Task programmability is therefore positively correlated to ABCs and negatively correlated to OBCs. Secondly, *outcome measurability* also influences the optimal contract. The harder it is to measure the action's outcome, the higher the verification costs, implying lower incentives to construct an OBC (Anderson, 1985; Eisenhardt, 1989). Lastly, *relationship length* is another relevant element. Longer relationships between stakeholders are thought to generate trust, as trust increases, so do the incentives to establish a behavior-based contract, given the lower motivation to transfer risk (Lambert, 1983).

Table 1: Summary of correlations between P-A variables and contract type		
Variables	**Activity-based-contract**	**Outcome-based contracts**
Agent risk aversity	+	-
Principal risk aversity	-	+
Goal conflict	-	+
Task programmability	+	-
Outcome measurability	-	+
Relationship length	+	-

It is important to underline that, even though OBCs are believed to limit Agency risks, much depends on the choice of outcome ***y***. Some outcomes can in fact incentivize opportunistic behavior. When compensation is based upon the number of items produced for instance, the quality of the product may suffer as agents are incentivized to prioritize quantity over quality (Guajardo, Cohen, Kim, & Netessine, 2012). The choice of outcome upon which to base the compensation, as well as the methodology to measure it and other information systems around the contract, are therefore of paramount importance.

3.1.3 Agency problems in Development Aid

Agency risks caused by misalignments between actors are also the cause of issues in development aid. The development aid value chain, like others, is characterized by principal-agent relations. Carr, in his book *Psychology of Aid*, analyzes the chain, highlighting that every single link presents different, often conflicting, agendas between principals and agents, exposing the chain to the threat of both moral hazard and adverse selection (Carr, 2005).

Scholl and Martens highlight the conflict of interest between donors and recipient governments. Donors are interested in the efficient use of their funds for development, while recipients are interested in securing further funding (Scholl, 2009). Adequate incentives to align objectives therefore need to be provided, in order to avoid misallocation of funds (Martens, Mummert, Murrell, Seabright, & Ostrom, 2002). The debate on aid effectiveness and aid allocation is therefore tightly linked to the alignment of goals between principals and agents.

The negative consequences of moral hazard and adverse selection in aid effectiveness and allocation have been many. Scholars have found that in the absence of appropriate incentives (including penalties for instance), governments expecting support, have little motivation to invest in precautionary measures (Linnerooth-Bayer, 2005), or in developing their own projects and capacity independently (Bräutigam & Knack, 2004; Easterly, 2006). Aid disbursement in fact creates perverse enticements for recipients to engage in opportunistic behavior in order to receive more funding (Kuziemko & Werker, 2006; Kharas, 2007; Doucouliagos & Paldam, 2009; Christensen, Homer, & Nielson, 2011). This behavior is hard to detect due to the difficulty of retrieving information on recipient's effort and activities (Doucouliagos & Paldam, 2009; Elayah, 2016).

Asymmetric information has led to further aid being disbursed on ineffective projects, creating a vicious cycle of aid reliance (Bauer, 2004; Easterly, 2006; Doucouliagos & Paldam, 2011). Governments with a history of high levels of aid are in fact more likely to tolerate corruption and misallocation of funds (Bräutigam & Knack, 2004; Scholl, 2009). Analogously, moral hazard has been found to be a widespread issue also within donor agencies (Christensen et al., 2011). Due to a lack of accountability systems put in place, development practitioners have incentives for not delivering, acting against the principal's best interest in order to receive further funding (Hermes & Lensink, 2001; Easterly, 2006). Additionally, these mechanisms have increased the risk of collusion between contractor and recipient to bend the project to their common interest and secure more funding at the expense of the principal (Elayah, 2016).

Like moral hazard, adverse selection has also negatively impacted development aid. Asymmetric information can in fact lead to the signing of many sub-optimal contracts, misallocating funds. The recipients most likely to seek and receive aid have been found to be in many cases the least likely to use it effectively (Christensen et al., 2011). Donors often lack knowledge about recipient type, or are constrained by norms, rules, or other values which induce them to continue to provide aid to ineffective entities (Elayah, 2016). When development implementers face little sanctions for non-delivery, justifying their position through asymmetric information, there is room for

opportunistic and self-serving behavior (Christensen et al., 2011). This leads to a sub-optimal allocation of funds in projects where the risk of failure is high, and the costs of failure do not fall on the aid agency (Easterly, 2006; Killick, 2004). Aid effectiveness is therefore tightly linked with the ability to detect and manage agency problems.

3.2 Pay-by-Results Mechanisms

To counteract agency problems arising in the development aid value chain, the industry has turned to the same strategies adopted in the private sector: outcome-based contracts. As the name suggests in fact, Pay-by-Results (PbR) contracts, also known as Cash-on-Delivery (CoD) (Birdsall, Savedoff, & Mahgoub, 2011), or Pay-for-Performance (PfP) are substantially OBC contracts for development aid (Clist, 2016). Although there is no universally recognized definition of PbR(Eldridge & Palmer, 2009), a PbR contract can be described as one that "links the disbursement of development funds to the achievement of a specific outcome" (DFID, 2014) upon independently verified results (Clist & Dercon, 2014).

The UK Department for International Development (DFID), who has widely embraced the approach (Green, 2016), divides PbR into three categories: Results-based-Aid (RBA), Results-based-Financing (RBF) and Development Impact Bonds (DFID, 2014). RBA is when recipient governments are paid for results, RBF is when recipient service providers are paid for results, while DIBs are contracts in which investors pre-finance a service provider to be then re-compensated by an outcome funder if the intervention succeeds at achieving success (Eichler, 2006). Being the subject of this study, DIBs will be discussed in more depth in the following section.

Traditionally, development aid has been disbursed through ABCs, using detailed contracts which linked disbursement to the realization of specific activities and a detailed implementation plan to which providers were required to adhere (Hermes & Lensink, 2001; Clist, 2016). With PbR, instead, the mandatories choose measurable indicators to mark progress towards a chosen goal and set prices to be paid for units of progress or target reach. It is then left to the recipient to choose how to make progress, which greatly increases his autonomy, flexibility and ability to innovate (Pearson, 2011). The indicators are then verified by an independent agent. If the goals are met an aid disbursement is made (Pearson, 2011; Fox & Albertson, 2011; Chimhutu, Lindkvist, & Lange, 2014).

In RBA and RBF the aid recipients are required to pre-finance the intervention, as the disbursement only happens upon final verification of the indicators. This means that PbR entails a risk transfer as payment depends on an outcome, an outcome which may not be reached (Eichler, 2006; Pearson, Johnson, & Ellison, 2010; Pearson, 2011). In RBA the risk is transferred to a

government, in RBF it is transferred to a service provider (Clist & Dercon, 2014; DFID, 2014; Eichler, 2006), while in DIBs, as we will see, the risk is transferred to an investor.

3.2.1 Advantages of PbR

The supposed advantage of PbR lies in the efficiency improvements triggered by linking the agent's costs with the principal's utility. The agent performs the way the principal would like as it becomes in his own interest to do so (Eichler, 2006; Pearson, 2011; Pearson, Johnson, & Ellison, 2010). This is believed to largely decrease, or avoid altogether, the high costs of information systems by aligning principal and agent incentives (Oxman & Fretheim, 2009). Conventional aid programs have been criticized for spending more time monitoring inputs, activities and processes than they do documenting the outcomes deriving from the interventions. This has led to aid organizations inefficiently misallocating funds without achieving impact (Easterly, 2006; Pearson, 2011). PbR is thought to eliminate the need for activity monitoring shifting the focus on results verification, consequently improving the efficiency of fund allocation (Pearson et al., 2010; Perakis, & Savedoff, 2015).

PbR is also thought to improve accountability among funders, recipients and eventual constituents. Since funds are disbursed only when outcomes have been achieved, funders are able to optimize their resource allocation and avoid misspends (DFID, 2014; Eichler, 2006; Jabbar, 2013). This allows voters, for example, to know exactly the impact that their tax-payer money is achieving, with PbR acting as a redistributive channel (Birdsall et al., 2011; Perakis, & Savedoff, 2015), while service providers are incentivized to adopt a more outcome-based efficient focus (Perakis & Savedoff, 2015). Moreover, the larger flexibility provided to the implementer leaves space for the testing of new approaches, strategy adaptation and learning-by-doing during the intervention itself, without the binding constraints of ABCs (Holzapfel & Janus, 2015).

PbR contracts are also believed to foster inclusion, local ownership and institution building. The decreased involvement and monitoring by the funder, leaves more freedom to implementers, which is thought to encourage local proactiveness and autonomy (Perakis & Savedoff, 2015). In addition, PbR is believed to allow recipients which are normally deemed too risky for development aid, to receive disbursements, such as those that have recently emerged from conflicts (Eichler, 2006). Even though these actors may lack the financial systems and soundness for traditional grants, they can still be suitable recipients for disbursements upon independently verified results through RBA or RBF (Perakis & Savedoff, 2015). Petersen et al. (2006) did a systematic review of the effect of PbR on quality of health care and found generally positive effects (Petersen, Woodard,

Urech, Daw, & Sookanan, 2006). However, given the novelty of the instrument further research is needed to verify these claims.

3.2.2 Disadvantages of PbR

PbR adoption poses several constraints which limit its applicability. The need for pre-financing of the intervention in RBA and RBF constitutes a huge barrier for service providers, which often proves to be insurmountable (Sobhrino, 2016). PbR has also been found not immune to agency issues of moral hazard and adverse selection, leaving room for opportunistic behavior (Petersen et al., 2006; Jabbar, 2013; Holzapfel & Janus, 2015). Disbursement based on outcomes can in fact greatly increase the incentives to distort results in order to meet the targets (Clist, 2016). Payments contingent on the number of students successfully graduating, for instance, can lower teaching quality as education institutions may be incentivized to not fail any students in order to meet the targets and obtain funds (Jabbar, 2013; Holzapfel & Janus, 2015).

The need for independent evaluation and a careful selection of the target metrics, like with OBCs in general (Guajardo et al., 2012) is therefore of extreme importance. Studies show that the risk of unintended effects and distortions through gaming is present in most PbR contracts (Clist, 2016), although it is still not clear whether these risks are manifesting in reality (Holzapfel & Janus, 2015). Perakis (2015) for example highlights that none of the concerns around PbR's incentives for corruption and other opportunistic behavior have yet materialized (Perakis & Savedoff, 2015).

Choosing the right type of results to be measured is a process entailing many obstacles. Appropriate outcome metrics should be valid, reliable, specific and controllable. Moreover, the indicator set should be the smallest possible but still broad enough to cover the performance domain(Cromwell, Trisolini, Pope, Mitchell, & Greenwald, 2011). Due diligence and assessment of potential adverse effects of some choices can largely increase the overall transactions costs (Cromwell et al., 2011; Holzapfel & Janus, 2015).

Another downside is in fact that the costs of design, monitoring and verification, are still highly above optimal levels (Eichler, 2006; Perakis, & Savedoff, 2015; Savedoff, 2015; Clist, 2016). Given the relative novelty of the sector, which has only gained traction in the last five years (Clist, 2016), and the few cases in which the strategy has actually been implemented (Gustafsson-Wright, 2018), transaction costs have not been reduced and remain extremely high. Yet, practitioners believe that scaling and replication will eventually lead to streamlining, prompting consistent cost reductions as the market matures (DFID, 2014; Perakis, & Savedoff, 2015).

Evidence on applications has shown the that the funds dedicated to monitoring, reporting, evaluation and auditing in many cases are still similar to that of ABCs, which is against what PbR theory would suggest (Eldridge & Palmer, 2009; Gustafsson-Wright & Gardiner, 2016). Studies in fact show that, in many existing PbR contracts, only a few of the indicators chosen are direct outcome measures while many others remain inputs and activity based, with weak ties to underlying results (Holzapfel & Janus, 2015). Some suggest this may be a consequence of funders struggling to adapt their requirements and planning approaches, increasing their involvement, and costs, even when not necessary (Perakis & Savedoff, 2015).

3.2.3 Development Impact Bonds

Development Impact Bonds (DIBs), are the latest addition to the PbR portfolio. They are a by-product of Social Impact Bonds (SIBs), due to their similarities, the two are in fact sometimes grouped together in analyses under the impact bonds category (Gustafsson-Wright, Gardiner, & Putcha, 2015; Gustaffson-Wrigth and Boggild-Jones, 2018a). In spite of the appellation, the term "bond" is misleading, no tradable instrument is issued in impact bond transactions, so these instruments do not really qualify as an actual financial bond (Oroxom et al., 2018).

SIBs are in fact a form of impact investing in which private investors pre-finance the capital requirements of a government's social interventions in exchange of market rates of return, disbursed by the same government, only if the project achieves some predefined outcome targets. The intervention is implemented by a third party, the service provider, and independently verified by a fourth. In addition, an intermediary is sometimes included to coordinate the process (Fox & Albertson, 2011; McHugh, Sinclair, Roy, Huckfield, & Donaldson, 2013). The first SIB, the Peterborough SIB, was launched in the UK in 2009, designed to fund innovative measures to reduce re-offending and reconviction rates (Cooper, Graham, & Himick, 2016; Maier & Meyer, 2017).

DIBs are SIBs implemented in low and middle-income countries (Social Finance & CGD, 2013; Gustafsson-Wright et al., 2015). The DIB concept originated in 2013, through a working group co-chaired by Social Finance, a consulting firm specialized in SIBs and other PbR methods, and the Center for Global Development, a nonprofit think-thank. The working group designed the concept, by involving both development practitioners and finance experts in the adaptation of the SIB model (Social Finance & CGD, 2013).

The SIB model was adapted in the following ways: firstly, the focus of the intervention in DIBs is shifted, from social outcomes to development outcomes, meaning DIBs are aimed at supporting the economic, social and political development of developing countries. Secondly, while in SIBs

governments act as sole outcome funders, in DIBs the role of outcome funders is undertaken by a variety of development actors: from multilateral development banks, to foreign governments, foundations, NGO or other (Social Finance & CGD, 2013; Belt, Kuleshov, & Minneboo, 2017; Oroxom et al., 2018). Thirdly, while in SIBs the intervention is financed by a government who finances an initiative for its own citizens, in DIBs, instead, external outcome funders finance an intervention aimed at the citizens of an external developing country (Dre & Clist, 2015; Oroxom et al., 2018; Shah, 2017; Welburn, Bardosh, & Coleman, 2016).

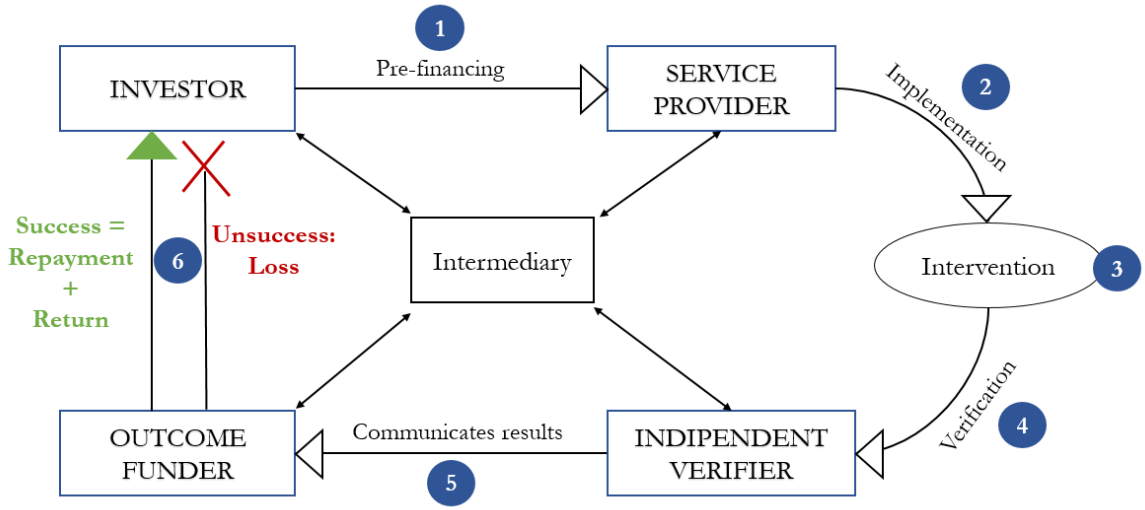

Figure 2: The Development Impact Bond cycle

The crucial element that differentiates impact bonds from other types of PbR is the involvement of private investors as pre-financers. While in RBA and RBF the service providers have to find ways to pre-finance the intervention and only receive funds once, and if, the indicators have been met (Pearson, 2011; Clist & Dercon, 2014), in impact bonds service providers receive funding in advance no matter the outcome. It is investors that pre-finance the totality of the intervention, to then receive their principal back from the outcome funder, with interest, only if the indicators have been successfully reached (Social Finance & CGD, 2013; Dre & Clist, 2015; Sobhrino, 2016). This mechanism shifts the risk from the service provider, who no longer needs to pre-finance its own intervention, to the investor (Social Finance & CGD, 2013; Belt et al., 2017; Oroxom et al., 2018; Boggild-Jones, 2018; Durland, 2017).

To compensate for the risk it absorbs, the investor needs to be rewarded with a return. In case the indicators of intervention success are met, the outcome funder therefore repays the principal in addition to a rate of return (Dre & Clist, 2015; Oroxom et al., 2018; Shah, 2017; Welburn, Bardosh, & Coleman, 2016). In the theoretical DIB model, outcome payments to investors are proportional

to the outcomes achieved. If only 50% of the targets are met, the investor will only receive 50% of the principal back. If no progress towards any of the targets has been achieved the investors will have to forsake the investment completely. If the targets are successfully met investors receive the full repayment of the principal plus an agreed rate of return (Belt, Kuleshov, & Minneboo, 2017; Gustafsson-Wright & Gardiner, 2016).

The theory of change behind DIBs is rich. Firstly, similar to RBA and RBF, DIBs allow the outcome funder to disburse funds only after a specific impact has been achieved. This allows funders to optimize their fund allocation, as they only pay for successful measurable interventions, improving accountability (Gungadurdoss, 2016; Welburn et al., 2016). Secondly, in low and middle-income countries funds are rarely available to cover up-front costs of implementation and traditional donor grants are not enough to cover the demand. By attracting private capital DIBs are believed to be able to help fill the estimated finance gap of about 2.5 trillion USD needed in order to reach the Sustainable Development Goals (SDGs) (Sobhrino, 2016; Shah, 2017). Because of this, DIBs are believed to be useful also for the implementation of neglected projects, which would otherwise be extremely difficult to finance (Welburn et al., 2016).

A fourth key argument supporting DIB adoption are the gains in aid efficiency stemming from private sector participation. DIBs introduce market mechanisms in the delivery of aid, by aligning the interests of development practitioners with those of investor. The outcome based focus, matched with the financial risk involved and time constraints are meant to stimulate implementers to be as efficient and cost effective as possible, ultimately resulting in improved aid efficiency (Social Finance & CGD, 2013; Sobhrino, 2016; Belt et al., 2017; Oroxom et al., 2018; Gustaffson-Wright and Boggild-Jones, 2018a). The involvement of private investors in DIBs is therefore believed to compensate for the above-mentioned agency problems leading to the shortcoming of development aid.

Fifth, impact bonds are believed to possess a stronger focus on evidence-based interventions than other options. Studies argue that the risk transfer onto private investors forces designers to adopt a more evidence-based approach as a basis for financing, in order to limit investor's risk (Social Finance & CGD, 2013; Gustafsson-Wright & Gardiner, 2016). Sixth, given the focus on output as opposed to activities, DIBs are assumed to give more space to innovation in implementation (Social Finance & CGD, 2013; Welburn et al., 2016; Belt et al., 2017). This has proven to be true for SIBs, Azemati for instance, discovered that the interventions being tested in most of the initial SIB projects appear to be riskier, more innovative, and offer more potential learning benefits than anticipated (Azemati, 2016).

Lastly, as a last rationale, DIBs are believed to stimulate development cooperation, as they bring together different actors, requiring them to align their interests and cooperate, leveraging on the strengths of each to jointly obtain development impacts (Social Finance & CGD, 2013).

	Table 2: Summary of Development Impact Bonds' theory of change
①	DIBs allow outcome funders to only disburse funds when measurable developmental outcomes have been achieved
②	DIBs stimulate aid efficiency and, consequently, cost effectiveness
③	DIBs help finance evidence-based interventions
④	DIBs help to close the funding gap for development
⑤	DIBs stimulate innovation in development interventions
⑥	DIBs stimulate intra-stakeholder development cooperation
⑦	DIBs can help finance neglected but relevant development interventions

The many potential upsides to the use of impact bonds cannot hide the complexity linked to their design and implementation. The mix of actors involved requires a shift from simple contracting to a network of multilateral and or/bilateral contracts and intricate performance payment schemes, all of which need to articulate different interests (Clist, 2016; Dre & Clist, 2015; Ellis, 2018). A study of 38 impact bonds (largely SIBs) found that deals have taken anywhere from 6 months to 3 years to develop(Gustafsson-Wright et al., 2015).

Moreover, the complex design entails very high transaction costs, which must decrease in order for the sector to gain traction (Gustafsson-Wright et al., 2015; Clist, 2016; Belt et al., 2017; Oroxom et al., 2018). Currently, they are extremely elevated as they involve not only the identification of the intervention, provider, and evaluation process, but also the recruitment of private financiers and the structuring of investment repayment schemes. This has been proven to be not only be complex, but also costly and time consuming (Belt et al., 2017; Durland, 2017; Gustafsson-Wright & Gardiner, 2016; Oroxom et al., 2018; Warner, 2013). The space for DIBs appears to be potentially large, but more evidence is needed in order for the theory of change to be proven, and transaction costs will need to be reduced dramatically for the market to really grow. (Gungadurdoss, 2016; Belt et al., 2017; Shah, 2017; The Economist, 2018; Oroxom et al., 2018)

3.2.4 Risk in PbR

The risks that principals and agents are trying to shield themselves from in a private business through OBCs are different in nature from the risks that principals and agents are facing in the development aid sector through analogous instruments such as DIBs. As PbR is based on a risk transfer mechanism, it is important to unravel the term "risk" to understand that not all risk is equal.

The risk entailed in PbR is composed of both what Knight defined as "proper risk" and what he identified as uncertainty. "Uncertainty must be taken in a sense radically distinct from the familiar notion of risk, from which it has never been properly separated" Knight declared in his 1921 book, *Risk, Uncertainty, and Profit* (Knight, 1921). The economist distinguished between "proper risk", which applies to situations where we do not know the outcome, but where we can accurately measure the odds, and uncertainty, which applies to situations where we cannot know all the information we need in order to set accurate odds in the first place (Knight, 1921). In PbR not all risk entailed is accurately measurable, so Knightian uncertainty is also involved.

In order to facilitate the quantification of risk, several categorizations have been created. The OECD proposes a comprehensive and intuitive framework known as the Copenhagen Circles (CC), to assess risk in development aid interventions, which has been used by practitioners such as the Danish (DANIDA, 2013). The framework distinguishes between: *contextual risk*, *programmatic risk* and *institutional risk* (OECD, 2014). The CC has been used by development practitioners such as the Danish International Development Agency (DANIDA), to assess the risk of its interventions (DANIDA, 2013).

Through the Copenhagen Circles the OECD draws a useful distinction between risk *factors* and risk *outcomes* in order to highlight the causality mechanisms entailed in risk management (OECD, 2014). Risk factors are those elements that cause risk outcomes, however the nomenclature is not static, as outcomes for a specific type of risk can become factors for others. As the circles show, *institutional* and *contextual risks* overlap to form programmatic risk, this is because they themselves are potential factors of *programmatic risk* (OECD, 2014).

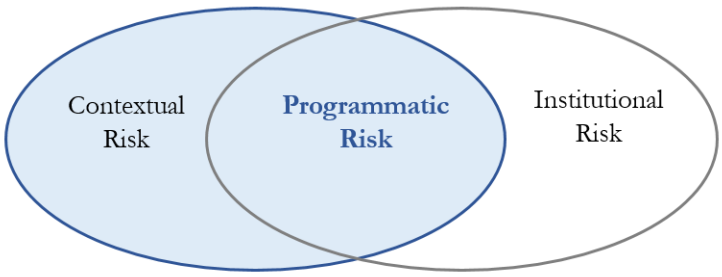

Figure 3: The Copenhagen Circles - adapted from (OECD, 2014)

*Contextual risk*s, are the external risks which development agents have the least control on, they include outcomes such as state failure, rampant inflation, a return to conflict, or a humanitarian crisis. The factors that lead to the manifestation of these risks are elements such as ineffective governance, natural hazards, etc. (OECD, 2014; DANIDA, 2013). These risks entail the highest level of Knightian uncertainty. *Institutional risks* fall typically onto the aid donor and include instead outcomes such as reputational risk, financial losses and fiduciary failure. Factors leading to institutional risk are effects such as mismanagement, opportunistic behavior, etc. and in some cases *programmatic risks*. *Programmatic risk*s are the risks of not meeting the desired targets of the intervention, or the risks of an intervention actually causing harm to its recipients (OECD, 2014; DANIDA, 2013).

Contextual risks and *institutional risks* can themselves become risk factors leading to *programmatic risks*, other programmatic risk factors include management and operational failures, failure of planning and co-ordination etc. (OECD, 2014). Agency problems are a cause of both *programmatic risk* and *institutional*. The framework has been used by development practitioners to assess, and consequently manage, the risk of specific interventions. In order to do this, the risks observed are categorized on the basis of the CC categories and condensed in a risk management matrix. Ratings for the relative likelihood of each risk are then assigned, on the basis of which a risk management strategy must then be formulated (DANIDA, 2013).

The following table highlights the fluidity and complexity of the relationship characterizing risk categories, outcomes and factors.

Table 3: Factors and Outcomes of Risk in Development Interventions

Risk Type	OUTCOMES	FACTORS
Contextual	State failure Return to conflict Economic crisis …	Bad governance Natural hazards …
Programmatic	Intervention not meeting targets Intervention causing harm	*Contextual risk* *Institutional risk* Management failures Operational failures Failure of planning and coordination …
Institutional	Reputation risk Financial failure Fiduciary failure	*Programmatic risk*

4 THE CASES

After having described the elements this study uses to interpret the data and uncover the findings, the five cases will now be introduced. The cases were constructed through a review of grey and academic literature, triangulated during the interviews. For data validation and richness, interviewee quotes have been included in some case descriptions. A portion of the primary data can therefore be encountered in the below accounts.

The cases consist on the five DIBs which have been currently implemented. Two of these bonds have been completed, one, the Educate Girls DIB, in July 2018, during the course of this study, while the other three have been only recently launched. The data available on the cases was consequently unevenly distributed among the cases. During the interviews some of the relevant information gaps were addressed and filled.

4.1 Ashaninka Impact Bond

The Ashaninka Impact Bond was the first DIB to ever be launched and concluded. This DIB was perceived by all stakeholders as a pilot, with the purpose of testing the SIB concept in a development context (Kuleshov & Belt, 2015). As Mr. Kuleshov, CFC Senior Project Manager, declared during our interview, CFC kickstarted the design process, after hearing about a successful SIB case at an event organized by the Global Impact Investing Network, which inspired the organization to explore DIBs and pilot the concept (Kuleshov, 2018). The design was supported and enabled by The Royal Tropical Institute (KIT). KIT ultimately acted as verifier, but played a crucial role in the bond design from the start (Kuleshov & Belt, 2015).

The partners then proceeded to look at the requests for financing they were receiving. When the Rainforest Foundation UK (RFUK) applied for grant funding, for the continuation of an agricultural development project in Peru, a potential fit was identified and the organization was asked if they would be willing to finance their project through an impact bond. Following RFUK's agreement, the consortium was then able to engage the Schmidt Family Foundation (SFF), the investor, thanks to existing business relations (Kuleshov, 2018).

Once the consortium was created the stakeholders, including the service provider and verifier, took part in the definition of the bond objectives and scope (Belt et al., 2017). RFUK with the support of KIT determined the target specifics and was given freedom to set the desired target levels (Belt, 2015; Kuleshov & Belt, 2015; Belt et al., 2017). The bond design has been defined as a "co-creation" effort by both Mr.Kuleshov, Mr.Belt, KIT Senior Economist and personal

evaluator of the bond, and Mr.Soto, RFUK's Peru and the Andean Amazon Program Coordinator in charge of implementation (Belt, 2018; Kuleshov, 2018; Soto, 2018).

The agreed upon objective of the impact bond was to increase productivity and market sales of cocoa and coffee produced by the indigenous Ashaninka people living in the Peruvian Amazon (Belt, 2015; Belt, Kuleshov, & Minneboo, 2017). This was to be done by assisting the members of the Kemito Ene Association in establishing "an environmentally sound production and marketing system for coffee and cocoa" (Belt, 2015).

Four success indicators were collectively chosen (Belt, 2015):

1. At least 60% of the members of the Kemito Ene Association must increase their supply to the association by at least 20 per cent, thereby improving their income
2. At least 60% of the members of the Kemito Ene Association must improve their cocoa yield to 600 kg/ha or more
3. The Kemito Ene Association must buy and sell at least 35 tons of cocoa in the last year of the DIB project
4. At the end of the DIB project, 40 members of the Kemito Ene Association must have established at least 0.5 ha with a leaf rust-resistant coffee variety

The outcome funder agreed to repay the investor in proportion to the reaching of each of the targets. A 75% success rate of target one would imply a 75% disbursement for that target. Each target was assigned the same weight of 25%. The total repayment per indicator was of 27.500 USD for 100% achievement, for a total maximum repayment of 110.000 USD for all four indicators fully achieved. In case of a 0% success rate no fund disbursement would be made by the outcome funder to the investor. The service provider received the full amount of pre-financing prior to the start of the implementation (Belt, 2015; Belt et al., 2017).

Table 4: **The Ashaninka Impact Bond**
(Belt et al., 2017)

Stakeholders	Outcome Funder	CFC – Common Fund for Commodities
	Investor	SFF - Schmidt Family Foundation
	Service Provider	RFUK - Rainforest Foundation UK
	Verifier	KIT – Royal Tropical Institute
Duration	1 year (January 2015 – December 2015)	
Total Amount Invested	100.000 USD	
Return	Maximum:10% – Minimum: 0%	

Principal guarantee	0

The evaluation was carried out by KIT at the end of the implementation, following which the investors were compensated accordingly. The results of this first DIB were mixed. The target for the third and fourth outcome were fully achieved, the target for the first outcome was only 75% achieved, while the second outcome was not achieved. The total final repayment to the investor amounted to 75.625 USD, implying a loss of 24.375 USD (Belt et al., 2017).

4.2 Educate Girls Bond

The Educate Girls Bond was also launched as a proof of concept, initiated through an initial partnership between the UBS Optimus Foundation (UBS OF) and the Children's Investment Fund Foundation (CIFF) (Saldinger, 2017). This DIB introduced the intermediary figure to the DIB space, Instiglio, with the role of managing the intervention and articulating the partnership (Instiglio, 2015). The DIB was created in order to improve the quality of education and level of enrollment of young girls in Rajasthan, India.

The idea seems to have originated thanks to an existing relationship between CIFF, the outcome funder, UBS OF, the investor, and the support of Instiglio, a consultancy firm specialized in PbR methods (Instiglio, 2015; Saldinger, 2018). The cooperation with CIFF was helped by the strong relationship between UBS OF and CIFF (Wouters, 2018). The foundation's CEO Phyllis Kurlander Costanza, worked previously as CIFF's Director, retaining a bond with her previous employer(World Bank Live, 2015). Together, these three stakeholders structured the DIB and identified in Educate Girls the ideal implementation partner, given the type of intervention, region and strategic fit.

The targets chosen were the following (Kitzmüller, McManus, Shah, & Sturla, 2018):

1. A combined improvement of at least 5592 grade levels on the ASER test for English, Hindi and Math
2. A minimum of 79% enrollment of girls who were out of school at the baseline

The outcome payments were unevenly distributed between targets. Learning gains accounted for 80% of the total repayment and enrollment of out of school girls 20%. CIFF agreed to pay 48,28 USD for each unit of improved learning and 935,64 USD for every percentage point increase in the enrollment rate, with a maximum outcome payment of 422.000 USD, implying a maximum IRR of 15%, with an expected return of 10% (Instiglio, 2015; Kitzmüller et al., 2018).

CIFF's outcome payment to UBS OF, was fixed in Swiss Francs, relieving the foundation of some exchange rate risk, the same was done for disbursements to Educate Girls, which were fixed in

Indian Rupees. UBS OF disbursed to Educate Girls 40% of the working capital requirement in the spring of 2015, and 60% in the spring of 2016. UBS OF incentivized Educate Girls to perform above expected milestones by assigning it 32% of the excess return between the outcome payments and initial principal invested (Instiglio, 2015).

The baseline for the intervention metrics was set through a door-to-door survey in the designated region after the targets had been set (Kitzmüller et al., 2018). Verifications were carried out at the end of each project year, for a total of three project assessments done by IDinsight, the chosen verifier. Learning gains, constituting 80% of the chosen outcomes, were measure via randomized control trials (Kitzmüller et al., 2018).

Table 5: **The Educate Girls Bond**
(Kitzmüller et al., 2018)

Stakeholders	Outcome Funder	CIFF – The Children's Investment Fund Foundation
	Investor	UBS OF – UBS Optimus Foundation
	Service Provider	Educate Girls
	Verifier	IDinsight
	Intermediary	Instiglio
Duration	3 years (2015 – 2018)	
Total Amount Invested	267.000 USD	
Return	48,28 USD per unit of improved learning and 935,64 USD for percentage increase in enrollment Maximum: 15%– Minimum: 0%	
Principal guarantee	0	

The Educate Girls Bond was successfully completed in July 2018. Upon verification, IDinsight determined that 160% of the learning targets and 116% of the enrollment targets have been achieved (Kitzmüller et al., 2018; Saldinger, 2018). This success was obtained, in spite of the operations being behind schedule during year 2 of the implementation, with only 42% and 27% progress towards the final targets being reached, which led to a successful change in Educate Girls' strategy (Gustafsson-Wright, 2017; Kitzmüller et al., 2018). As a result of the final over-achievement, UBS OF fully recouped its initial pre-financing plus a 15% internal rate of return, for a total return of 144.085 USD (Kitzmüller et al., 2018; Saldinger, 2018; UBS, 2018).

The returns were fully re-directed to development programs. 32% of the return was given to Educate Girls, to continue its operations (UBS, 2018). UBS OF's funding consists of donations

from high net worth clients of UBS, the world's largest private bank to which the foundation is affiliated. The capital that UBS OF invests is therefore not returned to investors. As a foundation UBS OF is not allowed to redistribute profits to its funders. All of the foundation's income is instead re-invested in other UBS OF's projects, while its operating costs are fully financed by UBS (Wouters, 2018).

4.3 Cameroon Impact Bond

Unlike the Educate Girls and Ashaninka DIB, the Cameroon Impact Bond, although in design for some years, has only recently launched. The DIB concept originated from the Fred Hollows Foundation's (FHF) desire to reduce the incidence of cataract blindness, by improving service delivery, paired with their wish to test the DIB concept (Oroxom et al., 2018). In our interview Mr. Miyashito, Project Officer at the Hilton Foundation (HF), explained that FHF contacted the HF in 2015, and together, with the support DCapital, the intermediary, they then went on to scout for the appropriate type of intervention and service provider (McAuliffe & Miyashito, 2018). The search ended with the decision to finance the development of the Magrabi ICO Cameroon Eye Institute (MICEI) from the Africa Eye Foundation (AEF). The MICEI was deemed optimal given the grants it had already secured and the tried and tested approach it was adopting (Oroxom et al., 2018). The intervention's focus is to support the growth and development of the MICEI, for it to reach self-sufficiency (Oroxom et al., 2018).

"Initial expectations around investors' appetite for the cataract bond did not fully play out in reality" (Oroxom et al., 2018). The consortium in fact encountered a few difficulties in fundraising, with potential investors abandoning the negotiation early. Yet, in 2017, the investor fundraising was successfully completed with the entering of the Overseas Private Investment Corporation (OPIC) as main investor (Oroxom et al., 2018) and the Netri Foundation as minority co-investor. FHF covered the initial costs of development. Together, the outcome funders contributed roughly 800.000 USD in development costs, in addition to their investment. Aside from financing through the DIB, the hospital secured an additional 10 million USD from a range of NGOs, international investors, technological companies, and through philanthropist Dr.Akef El-Maghraby (Oroxom et al., 2018).

Ms.Sanko AEF's Senior Development Director, Ms.Martin, OPIC's Managing Director, and Ms.Oroxom from the CGD acknowledged, OPIC's intervention drastically changed the structure of the DIB (Martin, 2018; Oroxom, 2018; Sanko, 2018). OPIC entered the negotiations in late 2016, after the fall out of other prospective investors, such as The Deutsche Bank Community Development Finance Group (Oroxom et al., 2018). When interviewed, respondents from the

Hilton Foundation and AEF highlighted the difficulty encountered in finding investors, often due to a lack of thematic fit with potential financers.

OPIC's annexation to the DIB consortium led to structural changes. OPIC is not allowed to issue equity nor grants, only debt, the DIB therefore "had to be a structure where, no matter what, we got 100% of our principal back" (D.Martin, 2018). Consequently, in this DIB, both investors will benefit from a 100% principal guarantee, independently from the success of the intervention. Additionally, OPIC will receive a return of 4% even in case of failure or the intervention, while the maximum return in case of success will be capped at 8%. The return in case of failure for the the Netri Foundation will be 0% (Oroxom et al., 2018).

The stakeholder responsible for the outcome payments will vary based on the results of the intervention. In case of success, outcome funders will be responsible for both principal repayment and interest rate, in case of failure, the service provider will instead become responsible for repaying 32,1% of the principal, while outcome funders will pay the remaining 67,9% in addition to the 4% guaranteed return. Assessments will be made during year 3 and 5, disbursements of both accrued interest and principal will be made during those same years, in accordance with the evaluation's results (Oroxom et al., 2018).

Four different targets were selected to measure and define success. Meeting the first three targets will define the success of the intervention, the fourth target was included as a specific incentive for the service provider, who will receive a bonus if this metric is met (Oroxom et al., 2018).

1. 18,000 cataract surgeries (+/- 10%) completed over 5 years (volume), 7,000 surgeries after 3 years (+/- 20%)
2. At least 50% of annual surgeries must have a "good outcome", i.e., visual acuity of 6/18 in their operated eye as measured one day after cataract surgery
3. The MICEI hospital must record a net profit (before interest, taxes, depreciation, and amortization) within 5 years of opening
4. 40% of cataract surgery patients are in the bottom two income quintiles in Cameroon. (Oroxom et al., 2018)

The development of the Cataract Impact Bond, here briefly summarized, took much longer and presented more fundraising difficulties than its two predecessors, Ashaninka and Educate Girls. The negotiations resulted in a very different type of DIB than what envisioned in the theoretical model (R. Oroxom et al., 2018).

Table 6: **The Cataract Impact Bond** (Oroxom et al., 2018)		
Stakeholders	Outcome Funders	Hilton Foundation (80%) Fred Hollows Foundation (10%) Sightsavers (10%)
	Investors	OPIC-Overseas Private Investment Fund(87,5 %) Netri Foundation (12,5 %)
	Service Provider	AEF - Africa Eye Foundation – MICEI
	Verifier	Non-disclosed
	Intermediary	DCapital
Duration	5 years (2018 - 2023)	
Total amount invested	2.000.000 USD	
Return	Maximum: 8% if targets are met – Minimum: 4% if targets are not for OPIC, 0% if targets are not met for Netri	
Principal guarantee	100%	
Design time	3 years	

4.4 Humanitarian Impact Bond

The Humanitarian Impact Bond, was initiated by the International Committee of the Red Cross (ICRC), the service provider (ICRC, 2018c). As Mr.Epprecht, Head of Project from the ICRC explained during our interview, the bond design began in 2016 due to the ICRC's need and desire to diversify its sources of funding (Epprecht, 2018). The ICRC is a humanitarian institution with an annual budget of around 2 billion Swiss Francs (ICRC, 2018a), the majority of which comes from regular donors, which are for the most part governments (Epprecht, 2018).

The financial needs of the organization continue to rise (ICRC, 2018), which has led traditional donors to stimulate the ICRC to explore alternative funding mechanisms (Epprecht, 2018), ultimately resulting in the creation of the Humanitarian Impact Bond. As Mr. Martin, Global Head of Philanthropy for the private bank Lombard Odier, mentioned, the bank, which is a historic ICRC donor, supported the ICRC with the conceptualization and DIB design given its previous involvement in an ICRC innovation working group. The bank also acted as main DIB investor, raising funds through a very targeted private placement (M. Martin & De Monte, 2018).

For outcome funders, the ICRC reached out to its traditional governmental donors. For governments such as that of the United Kingdom, as described by Ms.Crhova, Development

Impact Bond Adviser for DFID, the participation in the bond did not entail much difficulty, being the UK an experiences SIB outcome funder. Other governments, such as that of Belgium, instead notably had to adapt their legislation in order to be able to partake in the transaction (Crhova, 2018).

The intervention chosen for this DIB consists in the creation and improvement of the operational efficiency of three new ICRC centers of physical rehabilitation in Mali, Nigeria and the DRC (Epprecht, 2018; ICRC, 2018c; Worley, 2018). The intervention is divided in two phases. During the first 3 years the ICRC will build and equip three new physical rehabilitation centers in Mopti, Maiduguri and Kinshasa, as well as train new staff. During the second phase the ICRC will run the centers (Epprecht, 2018; Worley, 2018).

The outcomes will be calculated using an outcome-based staff efficiency ratio (SER) (Epprecht, 2018; ICRC, 2018). This ratio will be computed by dividing the number of beneficiaries having regained mobility, thanks to the fitting of a prosthesis/orthosis or provision of a wheelchair, at the end of the five-year period, by the number of local rehabilitation professionals (physiotherapists and orthopedists) in each of the centers built thanks to the HIB (ICRC, 2018).

For the implementation of the project, including the development of the impact bond, the ICRC has secured 26 million CHF in total pledges, with more than 18 million CHF raised from the bond investors, making it the largest DIB launched to date (Wells, 2017). The maximum return to be gained by the investors is a 7% annual return, while the maximum loss investors can suffer is a 40% loss on their initial investment. The investors have in fact been granted a 60% principal guarantee. In case of complete unsuccess of the intervention the ICRC will be responsible for the repayment of approximately 10% of the working capital onto investors, while outcome funders for the remaining portion (ICRC, 2018).

Table 7: **The Humanitarian Impact Bond**
(Epprecht, 2018)

Stakeholders	Outcome Funders	UK Government (38,34%) Government of Belgium (35,67%) Government of Italy (12,31%) Government of Switzerland (9,58%) La Caixa Foundation (4,10%)
	Investors	Lombard Odier (39,98%) NewRe (13,97%) 6 undisclosed (from 2,88% to 9,99%)

	Service Provider	ICRC – International Committee of the Red Cross
	Verifier	Non-disclosed
Duration	5 years (2017 – 2022)	
Total Amount Invested	18.598.932 CHF, equal to approx. 20.000.000 USD	
Return	Maximum: 7% annual return- Minimum: 0%	
Principal guarantee	60%	

4.5 Utkrisht Impact Bond

The Utkrisht Impact bond has as objective improving new-born and maternal health in India's Rajasthan region (PSI, 2017; USAID, 2017). The bond was initiated by Palladium, as stated by Mr.Vanderval, former Head of Innovative Financing, who championed and led the process on Palladium side (Vanderwal, 2018). The organization was the DIB conceiver, designer and implementer(Vanderwal, 2018). Palladium first reached out to the Rajasthan Government to then engage both outcome funders, Merck for Mothers and USAID (Convergence & Palladium Group, 2018).

The two outcome funders, as Ms.Sharma, USAID Senior Policy and Innovative Financing Advisor, confirmed, had already been scouting for DIB opportunities and found in this initiative the right match (Sharma, 2018). As mentioned by Mr.Higgins, Director of Operations for Merck for Mothers, the organization had also been searching for opportunities to advocate for and catalyze private sector involvement in improving healthcare and was already in contact with USAID (Higgins, 2018). The DIB was effective at picking up on the interests not only of outcome funders but also of service providers.

The concept for the intervention originated on the basis of a previous projects the stakeholders had been engaged in. Palladium had been supporting the HLFPPT in similar initiatives involving PbR (Vanderwal, 2018). Contemporarily both Merck for Mothers and PSI had been exploring potential PbR projects with USAID (Higgins, 2018; Vanderwal, 2018). Palladium brought together these parallel interests through the DIB. UBS OF, the investor, was the latest addition to the partnership, with previous experience in both DIBs and the implementation region. Given this knowledge, the investor was heavily involved in DIB design (Convergence & Palladium Group, 2018).

This DIB is the first to involve two different service providers, PSI and HLFPPT, in addition to Palladium implementation manager in charge of coordination and intermediation. Their task is to prepare an evenly split number of health facilities for accreditation under a new joint quality standard for maternal and new born healthcare, the JSQ. The JSQ is a new certification standard developed by the National Accreditation Board of Hospitals and Healthcare Providers and the Federation of Obstetric and Gynecological Societies of India. This metric was chosen after previous indicators were discarded in favor of a more concrete and measurable target (Convergence & Palladium Group, 2018).

Payments are contingent on a single indicator: a minimum of 360 health facilities in the region must be ready to obtain the JSQ qualification (Convergence & Palladium Group, 2018). The investor will be rewarded with 18.000 USD per facility, for a maximum of 444 facilities in total. 25% of the payment will be made on verification that the facility has reached a defined progressive standard, reflecting good progress towards the JQS, while the final 75% will be made on verification that a facility is ready for accreditation. UBS OF will receive a return of up to 8% in case of success. Any surplus over 8% will be pooled with other surplus outcome payments for achievements above target (if any) and distributed to service providers. Currency risk is held by the investor (Convergence & Palladium Group, 2018).

In 2016 Convergence awarded Palladium a grant in order to complete structuring activities and launching of the bond, which risked being halted due to a lack of funds (Convergence & Palladium Group, 2018). The outcome funders have committed a maximum of 9 million USD in total, 1 for the independent verification and future costs and the remaining 8 for outcome funding. Investments amounts to 4.8 million USD, which is expected to be enough to cover the working capital costs for the accreditation of 360 facilities(Convergence & Palladium Group, 2018).

UBS OF is providing 80% of the total investment amount as pre-financing, while the service providers are providing the remaining 20%. Although this 20% has been defined as "co-investment" in all the available grey literature (PSI, 2017; USAID, 2017; Convergence & Palladium Group, 2018), perhaps more accurately, it can be described as a delayed payment. Service providers have in fact agreed on receiving 20% of their costs, at the end of the program period upon verification of the final results. This is different to investing risk capital as of day one (Wouters, 2018).

The ultimate goal of the Utkrisht Impact Bond is to demonstrate to the Rajasthan government the most efficient way to improve maternal and new born care. A memorandum of understanding with the Rajasthan Government was signed, for the government to take over the DIB after the

thee year implementation period (Higgins, 2018). The government is in fact part of the non-executive advisory committee and will consequently watch implementation and outcome closely (Convergence & Palladium Group, 2018).

Table 8: **The Utkrisht Impact Bond**
(Convergence & Palladium Group, 2018)

Stakeholders	Outcome Funders	MSD Merck for Mothers (50%) USAID (50%)
	Investor	UBS Optimus Foundation (3.500.000 USD)
	Service Providers/ Co-investors	HLFPPT – Hindustan Latex Family, Planning and Promotion Trust (500.000 USD) PSI – Population Services International (500.000 USD)
	Verifier	Mathematica Policy Research
	Intermediary	Palladium (300.000 USD)
Duration	3 years (2018 – 2021)	
Total Amount Invested	4.800.000 USD	
Return	Maximum 8%, 7.1% expected IRR - Minimum 0%	
Principal guarantee	0	

5 DATA AND ANALYSIS

In order to assess whether DIBs are in fact able to deliver on their premises, the analysis will begin by understanding whether they are effective contracts according to Agency Theory. To assess this, the present chapter has been divided in two main parts. The first section outlines the roles of the different stakeholders, defining principals and agents, and the types of contracts that are being stipulated between the various actors. The second section uncovers and analyzes the characteristics of the principals and agents involved, whose assessment is necessary in order to evaluate the effectiveness of the contracts stipulated in DIBs according to P-A Theory.

5.1 Agency Theory and DIBs: from theory to practice

5.1.1 Agents and Principals

As stated by the definition, a principal is an actor delegating a task onto an agent (Ross, 1973). DIBs present multiple delegations from multiple actors, which, as a consequence, generates

multiple agents and principals. In the theoretical DIB model, the outcome funder chooses some development outcomes it would like to impact and allocates future funds to be disbursed upon their reaching. Instead of directly financing the operation the outcome funder fully delegates the pre-financing to the investor, therefore becoming the principal with the investor being the agent.

Yet, a DIB investor is not only an agent but also a principal. Investors are in fact delegating implementation to a third party: the service provider. Through this second delegation the investor becomes a principal, since he is paying the service provider to perform actions upon which his own return will depend on, in the same way that a shareholder, by buying shares of a listed company, is tying his financial return to the performance of the management. Unlike what declared by Clist (Clist, 2014), who represents the agent and who represents the principal in the DIB theoretical model is not unclear. The complexity lies instead in the different delegation levels, leading to the existence of multiple principals and multiple agents linked to the same transaction through a web of bilateral and multi-lateral contracts.

In four out of the five DIBs analyzed the outcome funders delegated the full amount of working capital pre-financing onto the investor, reflecting the theoretical DIB model. In the Utkrisht Impact Bond instead, pre-financing was delegated to both investors and service providers. As explained above, HLFPPT, PSI and Palladium were in fact required to anticipate 20% of the pre-financing themselves (Wouters, 2018). The service providers therefore became direct agents not only of the investor, but also of the outcome funders, who is delegating on them a fraction of the pre-financing. Despite this change, the underlining P-A roles match those of the theoretical DIB model in all five cases studied.

5.1.2 Contracts

Different DIB participants are tied to one another through a series of different bilateral contracts. Outcome funders and investors, in the theoretical model are linked through, a pure OBC. Investors in fact receive both repayment and return only if their pre-financing leads to a specific set of development outcomes (Social Finance & CGD, 2013). The investor's return is therefore determined by the above-mentioned $w = ry$, with y being the outcome achieved, and r being equal to the return of the bond. In case of success of the intervention the investor receives the principal p plus the return, the total compensation in case of success is therefore equal to $w^* = p + ry$. If the targets are only partially met the return will be equal to $w = \Delta y$, with Δ representing the portion of outcome achieved. If no impact is obtained, no return is received, and no principal repayment is made, compensation becomes $w = 0$.

Unlike in the standard P-A model, the agent, in this case the investor, is not able to fully control the amount of effort exerted on the action ***a*** in order to obtain ***y***, since this effort is delegated to the service provider, who independently chooses and exerts it, and is instead compensated via an ABC. Being an ABC, the service provider's compensation is not contingent on outcomes, and corresponds instead to $w = y$. In this particular type of ABC the activities are not specified as service providers are given the freedom to decide the best course of action in order to reach the pre-determined targets, actions which can change over the course of the DIB.

The Ashaninka Impact Bond and the Educate Girls Bond fully reflect the theoretical DIB model and the type of contracts that are stipulated between the different stakeholders. On the contrary, the insertion of elements such as a principal guarantee, changes the nature of the contract between outcome funder and investor, going from an OBC to a hybrid or an ABC entirely depending on the amount of guarantee granted.

In the case of the Cameroon Impact Bond for instance, what the theoretical model envisions as an OBC was turned, through the insertion of a 100% principal guarantee, into an ABC with an added output-based bonus. In the words of Ms.Martin, due to OPIC's restrictions, the instrument had to be changed, "from a development impact bond to more of a development impact loan" (Martin, 2018). A loan does not qualify as an OBC.

Additionally, by making the service providers responsible for 32,1% of the principal repayment in case of intervention unsuccess, the nature of the ABC offered to the implementer was also changed. These clause inserts a strong outcome-based element in the contract, which turns into an OBC. After the introduction of the principal guarantee and of the guaranteed rate of return, only the additional 4% of OPIC's rate of return is truly dependent on outcomes.

These elements largely increase the costs for both the outcome funder and service provider in case of unsuccess. Similar contract changes took place in the Humanitarian Impact Bond, the other bond providing principal guarantees, out of the five studied. Table 8 and 9 summarize the changes in gains, losses and compensation, which are caused by the contract shifts deviating from the theoretical model.

Table 8: Summary of compensations, gains and losses in case of unsuccess		
	Theoretical DIB	Cameroon Impact Bond
Outcome disbursement	HF: 0 FHF: 0 SS: 0	HF: 1.086.400 USD FHF: 135.800 USD SS: 135.800 USD
Investors compensation	OPIC: - 100% NETRI: -100%	OPIC: 4% NETRI: 0%
Service Provider's final compensation	AEF: 2.000.000 USD	AEF: 1.358.000 USD

Table 9: Summary of compensations, gains and losses in case of unsuccess		
	Theoretical DIB	Humanitarian Impact Bond
Outcome disbursement	UK Government: 0 Government of Belgium: 0 Government of Italy: 0 Government of Switzerland: 0 La Caixa Foundation: 0	UK Government: 6.417.747 CHF Government of Belgium: 5.970.815 CHF Government of Italy: 2.060.575 CHF Government of Switzerland: 1.603.560 CHF La Caixa Foundation: 686.301 CHF
Investor compensation	Lombard Odier: -100 % NewRe: -100 % Other 6: -100%	Lombard Odier: - 40% NewRe: - 40% Other 6: - 40%
Service Provider's final compensation	ICRC: 18.598.932 CHF	ICRC: 16.739.038,8 CHF

In the Utkrisht Impact Bond instead, although no principal guarantee was provided to UBS OF, the contracts agreed also deviated from the theoretical model. In the Ashaninka and Educate Girls this contract was straightforward, in the words of CFC's Mr.Kuleshov, the contract "can be as simple as a direct contract between an investor and a service provider to provide services" (Kuleshov, 2018). Yet, in the Utkrisht impact bond the simple contracts have been slightly modified, to include co-investment.

In this bond the service providers are in fact DIB pre-financers too, this implies that they are not offered a pure ABC, rather a part of their return is now linked to the outcome of their own implementation effort, which means they are now offered an OBC. In case of unsuccess of the intervention, they will incur losses amounting to 20% of the working capital, the amount of pre-financing that they provided in the first place. The specific amount of pre-financing assigned to each service provider is not known, so a financial comparison of the changes in utility similar to that done for the Humanitarian and Cameroon bond is currently not possible.

In practice, when implementing DIBs it appears that several of the contract types have had to diverge from the theoretical model, changing mainly ABCs into OBCs or vice-versa, as summarized below.

Table 10: Contract shifts from theory to practice	
Cameroon Impact Bond	Outcome Funders - Investors: from OBC ➡ to ABC Investors – Service Provider: from ABC ➡ to OBC
Humanitarian Impact Bond	Outcome Funders - Investors: from OBC ➡ to part ABC Investors – Service Provider: from ABC ➡ to OBC
Utkrisht Impact Bond	Outcome Funders - Service Providers: from ABC ➡ to OBC

5.2 Principal and Agent Characteristics

The types of contracts that have been stipulated between all the DIB stakeholders in the five cases studies have been illustrated. The study will now evaluate whether the contracts are effective in aligning stakeholder interests, according to P-A Theory. In order to do so, we first need to uncover the actors' and transaction's characteristics based on the data collected. The characteristics which need to be assessed are namely: principal and agent risk aversity, goal conflict, relationship length and task programmability.

5.2.1 Risk and Risk Aversity

To determine the degree of risk aversity of the DIB stakeholders, the different types of risk which are bore by each DIB actor will now be analyzed, to then assess their relative perceived strength. This is not to be interpreted as an in-depth all-inclusive risk assessment, but rather a reflection of the most relevant elements of risk involved in DIBs according to the data collected.

Risk Assessment

a. Investor risk

In the original DIB model investors absorb the large majority of the risk. For Mr.Kuleshov the investor "simply takes on the risk of the service provider doing what they promised to do" (Kuleshov, 2018), "USAID transferred all of the risk onto the investor" (Sharma, 2018). But what type of risk is this? In these cases investors are absorbing all of the financial risk of the intervention, which the CC include within the institutional risk category. Investors bear this risk as they provide the pre-financing and are only repaid if outcomes are achieved.

A DIB peculiarity is that the instrument inextricably links institutional financial risk and programmatic risk. This is because programmatic risk in DIBs is a *factor* causing institutional financial risk to manifest. DIB programmatic risk is, however, triggered by a series of different factors. Let us begin by exposing and breaking down the multi-faceted aspects of DIB programmatic risk. Investors are in fact exposed to the risk of service providers not being able to reach the targets due to a variety of different reasons.

Investors programmatic risk can be caused by the service provider not being able to reach the targets, due to either the chosen intervention not being effective, or service provider's mismanagement. DIB actors appear to be particularly aware of this risk. Every investors and outcome funder interviewed expressed the importance of the service provider's solid track record, as well as a tried and tested effective intervention (Crhova, 2018; Higgins, 2018; D. Martin, 2018; M. Martin & De Monte, 2018; McAuliffe & Miyashito, 2018; Sharma, 2018; Undisclosed, 2018; Wouters, 2018). To back up these claims, investors required large volumes of historical data as evidence (Epprecht, 2018; D. Martin, 2018; Sanko, 2018; Undisclosed, 2018; Vanderwal, 2018).

One private sector investor of the Humanitarian DIB held the availability of profuse amounts of historical data from the ICRC as the determining factor in the decision to invest. This evidence was essential, as it allowed the investor to quantify the programmatic risk and deem the return fair (Undisclosed, 2018). The private sector investor added that historical data is absolutely necessary, as DIBs cover "risks that are not necessarily well known and well accepted by those within the risk-taking communities" (Undisclosed, 2018). The ICRC already runs 139 physical rehabilitation projects analogous to those the DIB involves, in 34 different countries (Allen, 2017), which supplied enough data for prospective private investor to feel comfortable enough to invest.

To further control this programmatic risk factor, the data shows that all of the DIB interventions studied are in fact "uncontroversial" (Epprecht, 2018; McAuliffe & Miyashito, 2018), both in terms of type of intervention and service provider. The efficacy of cataract surgeries is a highly agreed

upon subject (McAuliffe & Miyashito, 2018; Sanko, 2018). Both the DIB implementers and outcome funders (FHF, Sightsavers and AEF) are well known reputable experts in the field (D. Martin, 2018; McAuliffe & Miyashito, 2018). The ICRC's work with treating disabilities is well acknowledged (Crhova, 2018; Epprecht, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018) and so are the interventions in the other DIBs (Kuleshov, 2018; Wouters, 2018).

In relation to service provider un-controversiality respondents highlighted the importance of the service provider's "brand" to further decrease their perception of the risk of intervention failure (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018). Organizations such as the ICRC are seen as recognizable "brands" in their respective fields of action, which, played a big role in the investment decision (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018). In spite of these risk buffers (brand and evidence-based intervention), the risk of the intervention not being as effective in reaching the targets remains (Higgins, 2018; Kuleshov, 2018; D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018; Vanderwal, 2018). In Mr.Vanderwal's words, "just because an intervention has been proven to work with one body or one group doesn't mean it's going to work with another group" (Vanderwal, 2018). This is largely due to contextual risk.

As the CC show, programmatic risk can be caused by the manifestation of contextual risks. "These are high risk environments […] the location constitutes a risk factor" (M. Martin, 2018), a thought that resonated with other investors (D. Martin, 2018; Undisclosed, 2018). Changing regulations, political turmoil, climate related disruptive events, etc cannot be fully forecasted, entailing Knightian uncertainty. In addition, DIBs are time sensitive, which increases risk. "If there are delays in the project, the investor stands to lose money" (Higgins, 2018). Delays can be caused by implementation inefficiencies, but also by contextual factors.

DIB designers try and limit this uncertainty as much as possible through a careful choice of location and implementer. Cameroon for example, is considered a stable country in the area (McAuliffe & Miyashito, 2018). UBS OF felt comfortable investing in a region in which it has previous experience and knowledge. Both bonds in question are implemented in India, a nation which "has strong local knowledge and expertise in the development sector that help support implementation. In addition, government is very supportive of innovative development approaches" (Wouters, 2018). Investors and outcome funders are aware of contextual risks and are willing to operate only in environments which they perceive stable and predictable enough for these risks to be quantified.

Exchange rate fluctuations are another contextual risk which can lead to DIB programmatic risk. Both investors and service providers are exposed to exchange rate fluctuations, as this alters the amount of expected funds received. To shield from this risk, in the Educate Girls DIB the disbursement rate was fixed, in Indian Rupees for Educate Girls and in Swiss Francs for UBS OF (Instiglio, 2015). The outcome funding for the Humanitarian DIB was provided in three different currencies, the private placement was therefore done to match investor currency with that of the outcome disbursement to limit exchange rate risk for investors(M. Martin & De Monte, 2018). This risk was mentioned by only one respondent.

Another risk which can lead to service providers not meeting the targets is that of target overstatement. Some outcome funders advocated for target increases during the negotiations, after consulting with both the service provider and other experts in the topic (McAuliffe & Miyashito, 2018). There is a subtle balance between ambition and overstatement. Overstating involves financial risks for the investor. This materialized in the Ashaninka bond. RFUK was given space to set its own targets (Belt, 2018; Kuleshov, 2018) yet, as discovered during the evaluation, a mistake in the baseline productivity was made, which led the organization to overstate what they could achieve within the DIB timeframe, causing the investor's financial loss (Belt, 2018).

Target overstatement is an adverse selection problem. Information between service providers and investors is asymmetrically distributed. This makes it hard for investors, especially those not familiar with development interventions, to assess the feasibility of the targets being set up by the other actors. It is investors, in the theoretical DIB model, who suffer the financial consequences of overstatement. Mr.Kuleshov believes DIBs have the ability to self-limit this risk by imposing "market discipline" on service providers (Kuleshov, 2018). With time, he believes, implementers will understand DIB mechanisms better, and adopt more realistic expectations of what they can achieve, given the visibility that is given to their outcomes (Kuleshov, 2018).

An additional metric related risk that is shifted onto the investor is programmatic evaluation risk. As mentioned by Mr.Belt "outcome sponsors may want an indicator that looks good on paper but is not measurable nor indicative" (Belt, 2018). Investors and service providers need to make sure that the outcomes originally determined are not only realistically achievable, but also measurable. The target discussion needs to be driven by the need to be practical and realistic in terms of what's actually measurable (Sharma, 2018). In both the Utkrisht and the Educate Girls DIB, UBS OF advocated for more specific and measurable metrics, to minimize this risk (Sharma, 2018; Vanderwal, 2018; Wouters, 2018), a role that was assumed by Mr.Belt in the Ashaninka bond (Belt, 2018; Kuleshov, 2018) .

It is worth pointing out that, according to the P-A model, "outcome measurability" is one of the variables which need to be considered to determine the appropriate contract needed (Anderson, 1985; Eisenhardt, 1989). Evaluation risk has to be minimized in the design phase, or no DIB can be successfully launched. No interviewee expressed current concerns over evaluation risk, which supposedly signifies that all apprehensions have been appropriately addressed prior to the DIB launch.

The risk of insufficient funding is another type of risk investors need to be wary of. A shortage of funds to reach the targets could be due to an underestimation of the intervention's financial needs, to overspending linked to service provider's inefficiency, or to the manifestation of contextual risk. Either way this poses a financial threat to the investor. Some believe that investors might be willing to step in in such situations, to provide additional funding and enable the success of the process (Kuleshov, 2018). In the case of the Humanitarian Impact Bond instead Mr.Epprecht stated that this eventual extra costs would be covered by ICRC, the service provider (Epprecht, 2018). Yet, no respondents seemed especially concerned about this risk.

Investors may incur financial losses also in case of optimal intervention success due to fiduciary risk, which the CC place under the institutional risk category. This risk is caused by the potential for default of the outcome funder, who might be unable to repay investors. To protect from this risk investors admitted to carefully considering the solidity and trustworthiness of the outcome funders, before entering the contracts (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018).

Since the outcome funders in all cases assessed are foundations and governments with plenty of capacity to cover the costs of the operations, their risk of default was deemed very low by investors (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018). However, a principal guarantee partially covered by service providers, such as in the Cameroon DIB, may increase fiduciary risk. Ms.Martin did highlight that the 32,1% principal guarantee for which AEF is responsible intensified OPIC's perception of the DIB's fiduciary risks (D. Martin, 2018).

a. Outcome funder risk

In the theoretical DIB model outcome funders transfer all of the above-mentioned risks onto investors, retaining only a few. "We don't have to pay anything if it doesn't work, so we've shifted all of the programmatic and financial risk upfront onto the investor, which is very attractive for us" (Sharma, 2018). "From the outcome funder perspective there are not a great deal of risks, as you are only paying for the results" (Higgins, 2018). Yet some risk remains.

While target overstating implies a programmatic risk for the investor, target understating infers a programmatic risk to the outcome funder (Kuleshov, 2018). Understating a target in fact implies efficiency losses for the outcome funder, who could have otherwise obtained a higher impact for the same amount of funds. Understating is therefore a factor of outcome funder programmatic risk, as it leads to the intervention not being as effective as it could have been.

Mispricing the outcome funds also entails risks for outcome funders. In DIBs, "outcome funders have a project but they are not sure what they are going to spend" (Belt, 2018). They cannot predict the final outcomes, therefore the disbursements, yet they have to ensure they will have the capacity to cover the future costs of the operation, tying funds for the length of the DIB. This complexity in budget planning can be perceived as risky by some, especially for outcome funders who are used to planning on a shorter-term basis.

Most importantly, outcome funders are exposed to programmatic risk caused by moral hazard. Like in other types of PbR, DIBs may offer perverse incentives for service providers, and investors, to engage in opportunistic behavior to meet the targets without delivering the developmental outcomes desired by the outcome funder. Service providers may potentially cherry pick respondents, or introduce ghost recipients in order to reach the targets more easily and receive outcome payments (Crhova, 2018).

In the Humanitarian Impact Bond these risks were accounted for. "The ICRC has identified the risk that the bond could create perverse initiatives to focus and channel efforts towards outputs (for example, the number of prostheses fitted or wheelchairs delivered), rather than outcomes for beneficiaries (such as autonomy, independence and social integration)" (ICRC, 2018). The organization, analogously with what other outcome funders have declared, believes it is able to limit this institutional risk through the choice of a valid target metric and a valid independent verifier, paired with due diligence prior and throughout implementation (Crhova, 2018; ICRC, 2018c). Yet, this ability remains to be proven.

Lastly, it is important to observe that the introduction of a principal guarantee, introduced in three out of the five DIBs studies, changes the risk transfer dynamics, redistributing risk. Through a principal guarantee the outcome funder is now bearing a fraction of all of the risks that DIB investors are subject to, risks which outcome funders had previously fully shifted onto investors. In case of unsuccess of the intervention in fact, outcome funders will still have to repay a part of the principal, or all of it such as in case of the Cameroon Impact Bond. A principal guarantee therefore shifts a percentage of all the above-mentioned risks bore by investors, back to outcome funders.

b. Service Provider risk

For service providers, "the bigger risks are from the reputational perspective" (Epprecht, 2018). Through the impact bond, the ICRC is interacting with a new set of investors, coming from the financial sector, venturing into an unfamiliar territory it does not want to disappoint, given its potential for further future funding (Epprecht, 2018). Mr.Soto agreed, highlighting that the reputational stakes for RFUK, which the CC include in the institutional risk category, are higher in DIBs than those entailed in simple grants, due to the higher exposure given to the intervention and the higher visibility of outcomes (Soto, 2018). Reputation is a risk shared among all the partners (Sharma, 2018). "Nobody wants this to be a high profile disaster" (Vanderwal, 2018). Yet it appears to resonate much more among service providers (Epprecht, 2018; Sanko, 2018; Soto, 2018; Vanderwal, 2018).

Service provider participation in certain DIBs did imply additional costs, imposing an additional financial weight and programmatic risk. Without the grant awarded by Convergence in order to finalize the design of the Utkrisht Impact Bond, Palladium would have not been able to complete its work and the instrument would have not been able to launch (Convergence & Palladium Group, 2018). Without the external additional financial support that they received from Dr.Akef El-Maghraby and other donors, during the design period of the bond, it would have been impossible for AEF to sustain the necessary expenses to participate in the bond while continuing operations (Sanko, 2018).

Again, it is very important to highlight, that the introduction of a principal guarantee, such as the 32,1% imposed to AEF in the Cameroon Impact Bond, and the 10% held by the ICRC (Epprecht, 2018; M. Martin & De Monte, 2018; Oroxom et al., 2018), transfers a portion of all of the programmatic and contextual risks, which this study initially linked to investors, this time onto the service provider. In case of unsuccess, these service providers become responsible for the repayment of a part of the principal to investors. Additionally, in the Utkrisht Impact Bond, service providers also act as co-investors, consequently they logically share a fraction of all investor risks themselves.

The Figures 4 and 5 summarize the risks held and transferred via DIBs. The first Figure (Figure 4) shows the risk division and transfer in bonds reflecting the DIB theoretical model, such as the Ashaninka and Educate Girls DIB. The second figure (Figure 5), shows the risk redistribution that is caused by the insertion of a principal guarantee and/or service provider co-investment, such as in the cases of the Cameroon, Humanitarian and Utkrisht Impact Bond.

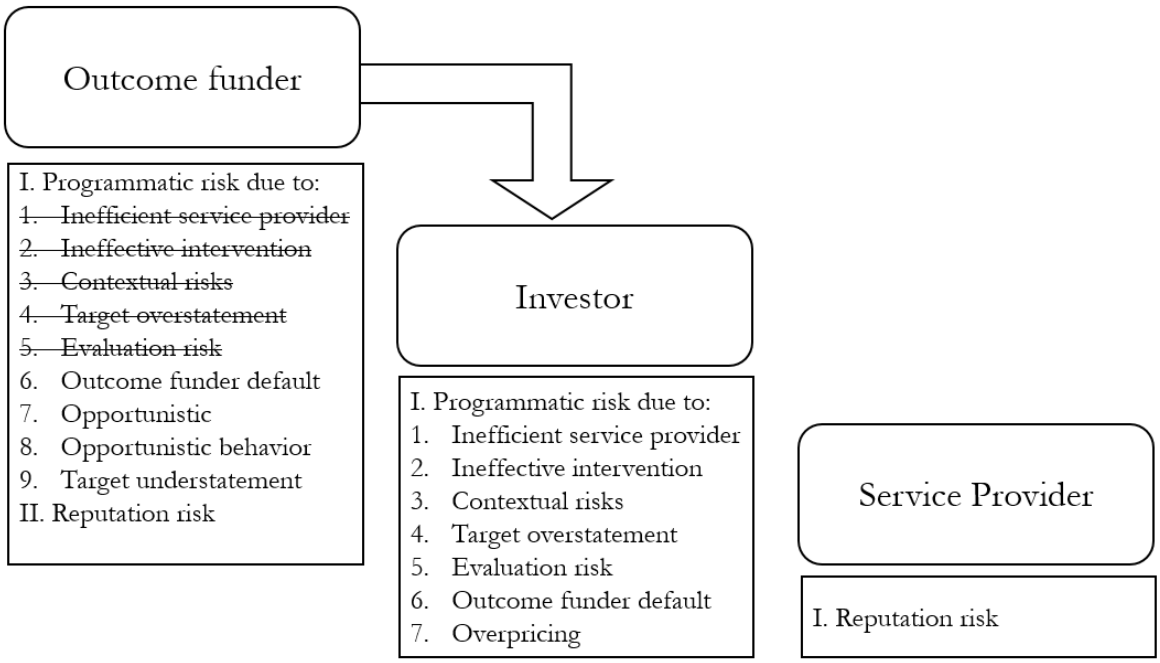

Figure 4: Risk transfer in theoretical DIB model

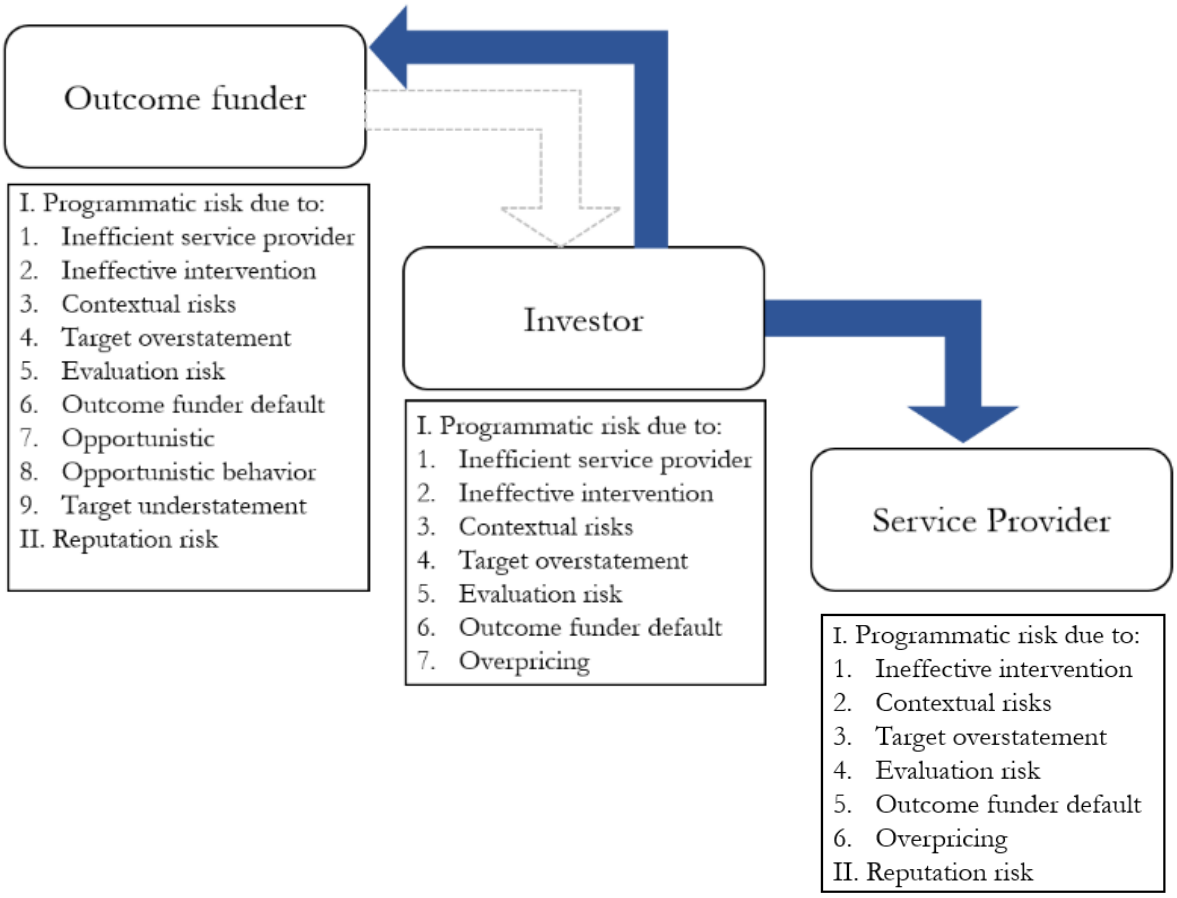

Figure 5: Risk redistribution in modified DIB models

Risk Aversity

We've uncovered the different types of risks entailed in a DIB transaction according to the different stakeholders, however, different risks hold very different weights for each actor, determining different risk aversities.

In the Ashaninka Impact Bond both investor and outcome funder did not perceive the DIB transaction as risky (Kuleshov, 2018). In spite of the investor absorbing the great majority of the risk, 100.000 USD for a foundation such as the SFF is not large (Kuleshov, 2018). In 2014, SFF assets amounted to 399 million USD, with over 24.3 million USD in grants awarded that same year (Influence Watch, 2016). The CFC is in an analogous situation, with a 2016 budget of almost 200 million USD (CFC - Common Fund for Commodities, 2016). Because of this, the CFC did not perceive the DIB as a risky transaction and was actually more eager to get the project started (Kuleshov, 2018). Further proof of the low risk aversity of the CFC is the fact that they were open to the possibility of taking the role of investor, instead of outcome funder, absorbing most of the risk if needed, a flexible position they are maintaining even for future DIBs (Kuleshov, 2018).

However, low risk aversity, does not imply that outcome funders embrace risk, only that their risk aversity is lower in proportion to that of other stakeholders. Outcome funders in fact are interested in the DIB concept also in order to transfer the majority of their programmatic risk onto investors (Crhova, 2018; Kuleshov, 2018; Sharma, 2018), and pay only for success (Sharma, 2018). Despite perceiving the specific transaction risk as low, the participation of outcome funders in the DIB is itself a sign of risk aversity. If outcome funders were risk inclined they would simply finance the intervention through a grant.

In the Ashaninka DIB the service provider perceived their own risk very differently to the other two partners. In spite of RFUK not co-investing nor it being responsible for any principal guarantee, the operation "was perceived as having a high reputation risk" (Soto, 2018). "We were worried about the risk of not achieving or how we were going to be seen if we don't achieve" (Soto, 2018). The investor was seen by RFUK as a new potential future funder, so the stakes for them were high. Not being able to achieve one of the targets, due to a misrepresentative baseline, did create issues for the organization (Soto, 2018).

Financing via a DIB required RFUK to adapt its approach, increasing risk. The funding was in fact directed at an ongoing project, which had been financed through simple grants during the previous two years. Mr.Soto said that for RFUK this set up was not optimal, as the implementation had to be adapted to the DIB structure after the project had already started (Soto, 2018). RFUK perceived participating in the DIB as a riskier undertaking than its usual funding mechanisms (Soto, 2018).

In the Ashaninka bond, institutional reputation risk appears to have been perceived as much more of a threat by service providers, than all the programmatic, contextual and institutional risks falling onto investor and outcome funder.

Similar risk aversity levels can be observed in the Educate Girls DIB. Given the small budget assigned to the project, relative to CIFF's and UBS OF's resources, the risk aversity of outcome funder and investor was relatively low (Wouters, 2018). However, UBS OF did position itself as a DIB champion through this bond, giving it high visibility (UBS Optimus Foundation, 2017; UBS, 2018), which implied an increase in the institutional reputation risks. Nevertheless, overall the organization demonstrated low levels of risk aversity, relative to other investors, not requesting any principal guarantee and actually advocating for an increase in the targets (Wouters, 2018), which amplified the foundation's own programmatic risk.

For Educate Girls, similarly to RFUK, the stakes appear higher than for the other DIB actors. The organization's work and the outcome of the implementation, was given extremely high visibility (Instiglio, 2015; Saldinger, 2017; Gustafsson-Wright, 2017), which greatly increased the organization's vulnerability to institutional reputation risk. The risk aversities of all the stakeholders of the first two DIBs to ever be implemented are therefore analogous.

The Cameroon DIB presented a slightly different dynamic. The Hilton Foundation, main outcome funder, is responsible for a large principal guarantee (Oroxom et al., 2018), yet it appears to not be risk averse. The foundation was initially approached as a potential investor, absorbing most of the risk, since only a 20% principal guarantee had been foreseen at the negotiation start. The Foundation would have been happy to accept this role and the programmatic risk attached (McAuliffe & Miyashito, 2018). As Mr.Miyashito highlighted: "We pride ourselves in being strategic funders, in the sense that, when there's a certain gap, we make ourselves available for that"(McAuliffe & Miyashito, 2018). This low risk aversity led the organization to ultimately accept the new terms required to launch the DIB (McAuliffe & Miyashito, 2018).

The same cannot be said for OPIC. OPIC seems to be institutionally risk averse. The organization's regulations in substance forbid it from absorbing too much risk (D. Martin, 2018). This led to a dramatic transformation of the DIB reward scheme to adapt to their requirements (D. Martin, 2018; McAuliffe & Miyashito, 2018; Sanko, 2018). In spite of this, Ms.Martin declared, "when I looked at this project from a credit perspective it was actually a pretty strong credit because of the quality of the implementer and the financial capital of the outcome funders" (D. Martin, 2018). In addition, given the amount of the investment (2 million USD), next to OPIC's

23 billion USD portfolio, she clarified that overall this transaction is not perceived as risky (D. Martin, 2018). Yet, the relative risk aversity remains.

In spite of the good credit perceived, geographically, OPIC does view the DIB as an operation entailing higher contextual risk than usual (D. Martin, 2018), in addition to the above-mentioned higher fiduciary risk involved. To compensate for these risks, OPIC insisted on the service provider having "skin in the game" as a further guarantee (D. Martin, 2018; McAuliffe & Miyashito, 2018; Sanko, 2018). OPIC seems to be a structurally risk averse investor, especially when compared with the other DIB investors studied. The Netri Foundation for instance, investing in the same DIB, did not impose a return in case of failure of the intervention (Oroxom, 2018), and was described as much less risk averse than its counterpart (Sanko, 2018).

AEF risk aversity, alike OPIC's, appears to be high. The inclusion of the principal guarantee clause found much resistance within the organization (Sanko, 2018). Not only are the stakes for AEF now much higher than they would be if the financing had happened through a simple grant, but they are also much higher than what AEF envisioned when it first got involved with the Cameroon DIB (Sanko, 2018). Analogously to Educate Girls and RFUK, AEF is risk averse, with the only difference that it was matched by an equally risk averse investor.

The Humanitarian and Utkrisht Impact Bond present similar outcome funder dynamics. Governments and NGOs, such as the outcome funders in these two bonds, are used to absorbing all the risk themselves by disbursing aid via simple grants (Crhova, 2018; Higgins, 2018; Sharma, 2018). "These donor countries, or at least the ones which we are engaged with, have traditionally been able to assume these type of risks"(Epprecht, 2018). In addition, some, such as DFID, are still assessing the amount of risk which it wishes to transfer, if any, depending on the circumstances (Crhova, 2018). From an institutional financial perspective, they are therefore not very risk averse compared to their DIB counterparts.

In spite of this, the complex design phase presenting high transaction costs, might be perceived as risky by some outcome funders. DFID benefitted from pre-existing regulations and an existing understanding of the risks and benefits that impact bonds entail, thanks to the UK's extensive experience with SIBs. Other governments, such as Belgium, were not as familiar with the instrument and had to find ways to overcome regulatory and political obstacles (Crhova, 2018; Epprecht, 2018). Mr.Epprecht mentioned how "for the funders, to make a contract that says that in five years they will pay from a budget which they don't even have, coming from a government which might be different, is obviously a challenge" (Epprecht, 2018). In addition, the high design

costs did lead to skepticism with regards to the added value of the bond (Epprecht, 2018), increasing outcome funder's perception of institutional risk.

Service providers in the two bonds are instead unequally risk averse. In the Utkrisht DIB, implementers are co-investors, sharing a fraction of programmatic risk. They perceive the transaction as riskier, since they need to adapt to the OBC as opposed to the ABC they are used to (Higgins, 2018). In addition, the bond was given a very high level of visibility, including a publicized launch at the 2018 World Economic Forum in Davos (United Nations Foundation Blog, 2018), which further increased their reputation risks. The Utkrisht DIB implementers can therefore be described as relatively risk averse, unlike the ICRC.

The ICRC appears to be an atypical service provider due to its low risk aversity. As Mr.Epprecht admitted, "a 20 million impact bond is relatively big in the impact bond environment but compared to our 2 billion Swiss Francs annual budget it is very small" (Epprecht, 2018). The ICRC initiated the bond itself (Epprecht, 2018; M. Martin & De Monte, 2018), demonstrating to be more willing than willing to take the risks that DIBs entail. In addition, the organization appears extremely confident in its ability to deliver (Epprecht, 2018), which further decreases its perception of programmatic risks, in spite of the 10% principal guarantee for which it is responsible.

The risk aversity of investors in the Humanitarian and Utkrisht Impact Bond also differ. As previously mentioned, the UBS OF is not risk averse relative to the other investors analyzed. Through the Utkrisht impact bond it confirms itself as a DIB champion, again not benefitting from any principal guarantees. Investors of the Humanitarian Impact Bond, are instead granted a 60% buffer, provided to compensate for risk. "You could have gone down to 100% capital at risk but that would have called for a much higher potential return" (Epprecht, 2018). Investors agreed, "we like that the service provider does have something to lose or something to gain depending on the performance, put the investors mind in this" (Undisclosed, 2018).

The principal guarantees simply reflect investors' high risk aversity. The Humanitarian DIB was structured as a high risk investment for the financial sector, yet "mission aligned investors are still willing to take such risks"(M. Martin, 2018). The private placement was described as difficult, requiring the private bank to be extra careful in selecting potential investors due to this risk (M. Martin & De Monte, 2018). Despite the complexity, the small size of the DIB, for the financial industry, facilitated the fundraising (Epprecht, 2018; M. Martin & De Monte, 2018).

Risk aversity if heavily linked to the amount of risk that the organizations are used to absorbing and how they are used to handling risk. Private banks and insurance companies are used to working

with risk, it's their core business (Undisclosed, 2018) and in order to manage it, even if they don't perceive it as high, they require financial risk sharing mechanisms, tools they are used to. Foundations and governments normally absorb all the risk by disbursing simple grants, so they are happy to delegate even just a small portion of it, whether as outcome funders (Crhova, 2018; McAuliffe & Miyashito, 2018), or as investors in the case of UBS OF. Service providers on the other hand are highly risk averse, they are accustomed to receiving simple grants and they are not used to the outcomes of their implementation having the same visibility and being subject to the amount of scrutiny that DIBs bring. Consequently, they are very risk averse.

The different levels of risk aversity of all the DIB stakeholders has been assessed. However, principal and agent risk aversity are only two of the transaction characteristics which define the appropriate contract. The analysis will now continue with the assessment of the other relevant traits.

5.2.2 Goals and Goal Conflict

Another relevant variable for contract optimization is the level of goal conflict. In the interviews all respondents were questioned around their main reasons for joining the consortium and their motivations for potentially collaborating in eventual future DIBs.

Goals

a. Outcome Funders

All outcome funders interviewed expressed their desire to test the new financing model as the first reason for choosing to engage in the DIB. "We really felt that we wanted to move this from theory to practice" (McAuliffe & Miyashito, 2018), a desire shared by all other outcome funders (Crhova, 2018; Higgins, 2018; Kuleshov, 2018; Sharma, 2018). As Ms. Sharma mentioned: "the whole theory of change for impact bonds is that private sector can manage better than public sector, and so what we're trying to test is if that is actually correct" (Sharma, 2018).

As already mentioned, outcome funders also expressed their desire to shift at least a portion of the risk onto other stakeholder through the DIBs (Crhova, 2018; Kuleshov, 2018; McAuliffe & Miyashito, 2018; Sharma, 2018). In addition, some funders expressed their desire, through the DIB to also handover a large fraction of the bureaucratic and project management tasks which they would normally be responsible for (Crhova, 2018; Sharma, 2018).

Outcome funders also hope that financing interventions via DIBs will allow for the discovery of a more efficient way to positively impact a specific set of developmental indicators (Higgins, 2018; Sharma, 2018). Funders are in fact "first and foremost trying to achieve development outcomes"

(Sharma, 2018). Through the DIB, implementers are being forced to "peel back and understand not only their cost structure but also the most effective means to achieve the results outcome funders have prioritized" (Higgins, 2018). Additionally, funders see DIBs as an opportunity to improve their levels of transparency and accountability (Crhova, 2018; Sharma, 2018). DIBs allow them "to actually point to: this is what we paid for. This is what this implementation successfully led to"(Sharma, 2018).

Lastly, private outcome funders, such as Merck for Mothers, see the DIB as a way to encourage further private actors to engage in the space, catalyzing private sector involvement. "We wanted this to be a proof point for other private sector stakeholders so they might also use impact bonds to invest in health and development" (Higgins, 2018).

b. Service Providers

Service providers have instead as a goal that of securing funding for their activities, present and future (Epprecht, 2018; Sanko, 2018; Soto, 2018). DIBs are an opportunity for service providers to connect with new potential funders (Epprecht, 2018; Sanko, 2018; Soto, 2018). The ICRC is interested in finding alternative ways to finance its activities, given its ever growing need for funds (Epprecht, 2018; ICRC, 2018b). AEF is interested in securing multi-year funding for the development of the MICEI. As Ms.Sanko admitted, AEF would not be able to receive the same amount of pre-financing through a grant as it did through the DIB(Sanko, 2018).

Financing via DIBs is also attractive as it offers pre-financing for a project lasting three or more years. As Mr.Epprecht pointed out, service providers are usually constrained by yearly budgets, , which makes multi-year pre-financing extremely attractive (although tied to a single project) (Epprecht, 2018). Understandably, service providers, favor a steady, low risk predictable funding source. Moreover, for larger implementers, such as the ICRC, who was also the bond initiator, the DIB "was clearly pushed by a desire to try something new, something different, in order to understand what this is all about and what being active in this kind of market requires from the ICRC"(Epprecht, 2018).

c. Investors

Investors instead joined the DIBs to diversify their portfolio of impact investing products (M. Martin & De Monte, 2018; Undisclosed, 2018; Wouters, 2018). Investors highlighted that they do not view their involvement as philanthropy, but as an investment within the impact investment spectrum, and they expect an appropriate compensation (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018). "We are a business looking into ways of diversifying, doing new things

and innovate, we do expect to be compensated for the risks we face" (Undisclosed, 2018). Investor's desired compensations are both economical and developmental.

Investors do expect positive developmental outcomes as a consequence of their pre-financing (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018; Wouters, 2018). In addition, respondents mentioned personal motivations for joining the DIB, for Ms. Martin "it was a project that appealed to me personally, as well as to our mission at OPIC and the kind of impact work that we should be doing" (D. Martin, 2018). Ms. Kuleshov also mentioned that in the Ashaninka bond, a representative from SFF felt personally attracted to the DIB concept and took it upon her to champion the project within the organization (Kuleshov, 2018).

In connection to the social impact goals, investors also highlighted the catalyzing factor of them joining the DIB. Respondents mentioned how their contribution to these first DIBs is also finalized at stimulating future private sector financing for development (D. Martin, 2018; M. Martin & De Monte, 2018; Undisclosed, 2018; Wouters, 2018). "Our goal is to use this as the first project and have others come on board […] our goal is to mobilize private capital" (D. Martin, 2018).

Similar sentiments were shared by outcome funders. "There is huge merit in terms of catalyzing the field for organizations and donors who really understand the effect that first pilots have" (Crhova, 2018). All interviewees agreed, highlighting the importance of their role as organizations willing to test the concept, and face the transaction costs and complexities that this entails, in order to provide benchmarks for future DIBs (Belt, 2018; Higgins, 2018; Kuleshov, 2018; D. Martin, 2018; M. Martin & De Monte, 2018; Oroxom, 2018; Sharma, 2018; Vanderwal, 2018; Wouters, 2018).

Goal Conflict

So, to condense this information, while the data does show alignment between some of the goals, others diverge. Investors and outcome funders agree on their catalyzing role, and share the objective of achieving developmental outcomes through their bond participation, however the analysis also highlights a series of goal misalignments between principals and agents:

1. Outcome funders would like to achieve the highest impact possible, therefore aiming for high targets. Investors instead want to recoup their investment and limit its risk. Consequently, they are instead interested in lower targets which are easier to achieve
2. Risk averse investors would like service providers and outcome funders to share part of the risk, service providers prefer not to bear any portion of the programmatic risk

3. Service providers would like to secure funding, present and future, outcome funders wish instead to disburse as little funding as possible and only pay for actual achieved outcomes
4. Investors prefer a high return to compensate for unfamiliar risks, outcome funders prefer a lower return in order to decrease their own costs

5.2.3 Relationship Length

Relationship length is another relevant variable according to P-A Theory. The data showed a clear common trend with regards to this trait. Almost every principal and agent benefitted from a longstanding relationship with one another. Just a few examples: DFID, Lombard Odier and all the other outcome funders have had a longstanding relationship with the ICRC (Crhova, 2018; Epprecht, 2018; D. Martin, 2018). Lombard Odier is also involved in an innovation working group within the organization, in which it is contributing in virtue of its experience in the financial sector (D. Martin, 2018). UBS OF's and CIFF benefit from a strong relationship (Wouters, 2018), USAID has had a longstanding connection with PSI and Merck for Mothers(Higgins, 2018; Sharma, 2018).

The majority of the DIB stakeholders have previously worked with each other and have developed a stable and trusting relationship over time. Relationship length is therefore on average long. The reason for this trend can be summarized in Mr. Epprecht's words "marrying an unknown donor to an unknown project would have been too much of a risk" (Epprecht, 2018).

Additionally, the interviewers highlighted DIBs' capacity to strengthen relationships independently of their previous length. DIBs entail infra-sectoral multi-stakeholder partnerships which require a lot of communication and coordination between actors, to align on a common goal (Higgins, 2018; McAuliffe & Miyashito, 2018). DIBs are an opportunity to "catalyze partnerships," they are "forcing people together in a room where they need to align on common objectives" (Higgins, 2018). Relationship length, and intensity, therefore greatly increases with DIB design.

5.2.4 Task Programmability and Outcome Measurability

The last two transaction characteristics to consider are task programmability and outcome measurability. Due the nature of DIB contracts we know that outcome measurability is high since the whole model is based on the assumption that the outcomes set need to be measurable (Social Finance & CGD, 2013; Durland, 2017; Oroxom et al., 2018). As mentioned during the scrutiny of evaluation risk, investors and outcome funders go to great lengths to ensure this is the case.

Task programmability is instead limited. This is because, in the theoretical DIB, service providers are given the flexibility to adapt their strategy in order to reach the targets. Both concluded DIBs, the Ashaninka and Educate Girls, re-adjusted their implementation approach during the course of

the operation in order to facilitate target reach. DIB tasks are therefore subject to variations and consequently not easily programmable (Kitzmüller et al., 2018).

5.2.5 Comparing Theory and Practice

Now that we've analyzes stakeholder characteristics separately, we need to verify whether they coincide with those suggested by P-A theory, based on the type of contract stipulated. In the below charts, the traits of the different actors, and of the DIB transaction, have been condensed, to assess and visualize whether P-A assumptions are reflected in DIB reality. Some relationships have been marked as ambiguous due to the inability to identify a clear upward or downward pattern from the data.

Table 11: OBC between Outcome Funder and Investor (Ashaninka, Educate Girls and Utkrisht DIBs)		
Stakeholder characteristic	Connection to theory	
↑ Principal risk aversity	Confirms theory	
↓ Agent risk aversity	Confirms theory	
↓ Goal conflict	Conflicts with theory	
↓ Task programmability	Confirms theory	
↑ Outcome measurability	Confirms theory	
↑ Relationship length	Conflicts with theory	

Table 12: ABC between Investor and Service Provider (Ashaninka & Educate Girls DIBs)		
Stakeholder characteristic	Connection to theory	
↓ Principal risk aversity	Confirms theory	
↑ Agent risk aversity	Confirms theory	
≈ Goal conflict	Ambiguous	
↓ Task programmability	Conflicts with theory	
↑ Outcome measurability	Conflicts with theory	
↑ Relationship length	Confirms theory	

As already illustrated, the introduction of a principal guarantee of 50% or higher changes the nature of the contracts between outcome funder and investor from a pure OBC to an ABC with a variable component. The introduction of a principal guarantee or a co-investment clause for the service provider modifies the contract between investor and service provider, from a pure ABC to an OBC. The analysis has proven that the OBC factor is perceived as especially strong for service

providers, even if less than 50% of their compensation is dependent on outcome. Consequently, the analysis focuses on this OBC component, when present.

Table 13: ABC between Outcome Funder and Investor (Cameroon DIB)		
Stakeholder characteristic	Connection to theory	
↓ Principal risk aversity	Confirms theory	
↑ Agent risk aversity	Confirms theory	
≈ Goal conflict	Ambiguous	
↓ Task programmability	Conflicts with theory	
↑ Outcome measurability	Conflicts with theory	
≈ Relationship length	Ambiguous	

Table 14: ABC component between Outcome Funder and Investor (Humanitarian DIBs)		
Stakeholder characteristic	Connection to theory	
↓ Principal risk aversity	Confirms theory	
↑ Agent risk aversity	Confirms theory	
≈ Goal conflict	Ambiguous	
↓ Task programmability	Conflicts with theory	
↑ Outcome measurability	Conflicts with theory	
↑ Relationship length	Conflicts with theory	

Table 15: OBC component between Investor and Service Provider (Cameroon and Utkrisht Impact Bond)		
Stakeholder characteristic	Connection to theory	
↑ Principal risk aversity	Confirms theory	
↑ Agent risk aversity	Conflicts with theory	
↑ Goal conflict	Confirms theory	
↓ Task programmability	Confirms theory	
↑ Outcome measurability	Confirms theory	
≈ Relationship length	Ambiguous	

Table 16: OBC component between Investor and Service Provider (Humanitarian Impact Bond)		
Stakeholder characteristic	Connection to theory	
↑ Principal risk aversity	Confirms theory	
↓ Agent risk aversity	Confirms theory	
↑ Goal conflict	Confirms theory	
↓ Task programmability	Confirms theory	
↑ Outcome measurability	Confirms theory	
≈ Relationship length	Ambiguous	

It transpires how several transaction traits conflict with P-A theory while numerous others match. In the next section the consequences of these results will be discussed.

6 DISCUSSION AND FINDINGS

6.1 Interest Alignment and Risk Aversity

P-A researchers claim that if stakeholder characteristics are fully reflected in the type of contract stipulated, then the contract is likely to succeed at aligning incentives and eliminating agency risks. From the above analysis we can see that the characteristics of the different groups of stakeholders in the five cases are mostly reflected in the contracts they have established in the respective DIBs, with only a few exceptions.

The pure OBC stipulated between outcome funders and investors in the Ashaninka, Educate Girls and Utkrisht Bonds appears to be a highly effective contract according to the precincts of P-A Theory. The OBC matches the needs of a slightly higher principal risk aversity to those of more risk inclined agents, UBS OF and SFF. The contract is also appropriate given the low task programmability as well as the high outcome measurability. The only element of divergence is the absence of goal misalignment. However, goal alignment can only be beneficial for the success of a transaction. Provided these stakeholder traits, the OBC between investors and outcome funders envisioned in the theoretical DIB model appears to be a contract which succeeds at aligning P-A interests. This indicates that the contract offers the right incentives for both investors and outcome funders to work towards the achievement of the same goal: reaching the development indicators.

The fit of the ABC stipulated between investors and service providers in the Ashaninka and Educate Girls DIBs is mixed. The contract does match the principal's relative tolerance for risk as well as the agent's high risk aversity. The low level of task programmability and high outcome measurability are in contrast with the model. Yet, this is a consequence of the double delegation

of DIB models and does not infer losses in contract effectiveness, which remain valid. It is worth noticing that the only two contracts in which service providers are offered a pure ABC are these two DIBs, which were the first to ever be launched and the only two bonds fully reflecting the DIB theoretical model.

From the Educate Girls DIB onwards in fact, the model varies. The contract between investor and service provider is shifted from an ABC to an OBC. This OBC component contrasts with the agents' risk aversity, in both the Cameroon and Utkrisht Impact Bond, which causes a disutility. From the perspective of implementers, these DIBs are in fact riskier than desired. Yet, despite the lack of fit with some of the P-A assumptions, these contracts still succeed at aligning interests, due to the return service providers are receiving.

Service providers are in fact re-compensated for the additional disutility. Firstly, implementers receive a pre-financing they would otherwise not be able to access (Sanko, 2018). Secondly, they are given access to private capital, potential source of future financing, which is in line with their goals (Epprecht, 2018; Soto, 2018). Thirdly, their intervention is given large exposure, which can be very beneficial in case of success, but also cause of large disutility in case of failure. This variable can therefore be perceived as a liability or an asset depending on the implementer. For organizations such as Palladium, participating in the bond is an opportunity to gain visibility and relevance in the space.

In the case of the Humanitarian Impact Bond, due to ICRC's low risk aversity, the OBC shows as almost perfect fit with the P-A model. Overall, this DIB seems to be the one that has been the most successful at aligning the interested of all stakeholders involved, largely thanks to the ICRC's low risk aversity, due to its large budget and the trust in its own ability to deliver what is requested by outcome funders and investors.

It is worth noticing, that every contract stipulated matched with the investor's risk aversity, whether as agent or principal. Risk averse investors were offered OBC to compensate for their perception of risk, through the form of either principal guarantees or service provider co-investment. Principals and agents appear to have had to adapt to investor's traits.

Overall the great majority of the transaction and stakeholder traits do match with the contract types. Consequently, according to P-A Theory, the contracts stipulated are in fact adequate and succeed at aligning stakeholder interests. Achieving the set development targets is in fact in the best interest of all actors, in line with DIBs' theory of change. Investors have very high incentives to support implementation since their financial return is attached to it. Outcome funders are

interested in outcomes by nature. The introduction of principal guarantees and co-investment clauses for service providers further increase the incentives for service providers to meet the targets agreed. In addition, in three bonds, the Educate Girls, Cameroon and Utkrisht DIB, service providers have been offered OBC bonuses for over-performance, which further increase their incentives to perform.

In line with DIBs' theory of change, this successful alignment is likely to lead to an enhancement of aid effectiveness, as all stakeholders are in fact highly incentivized in reaching the targets: measurable development outcomes. However, the alignment between the different stakeholders does come at a cost, which can potentially decrease the effectiveness of development aid financed via DIBs, counteracting the gains.

6.2 Consequences of P-A Alignment on Theory of Change

6.2.1 Outcome disbursement upon success

According to DIBs' theory of change, the bonds allow traditional donors, the bond's outcome funders, to disburse funds only when development outcomes have been achieved. This is fully true in cases where no principal guarantee has been granted, such as the Ashaninka, Educate Girls and Utkrisht DIBs. However, when risk averse investors join the transaction, the evidence has shown that, to align the interests of agents and principals, principal guarantees need to be included. As a consequence of this alignment, outcome funders have to disburse funds even in case of intervention failure. DIBs are therefore guaranteed to ensure outcome disbursement upon success only if investors are not risk averse, which seems to be the exception, not the rule.

6.2.2 Aid efficiency

DIBs are meant to encourage aid efficiency, driving down intervention costs by encouraging implementers to find the most effective way to reach a development goal within a specific timeframe and budget. Both Educate Girls and RFUK adapted their strategy during the course of the project, on the hunt for more efficient ways to reach the targets. Educate Girls ended up over-performing and RFUK, in spite of the unsuccess of reaching some of the targets, still learned from the different approaches it was able to test (Soto, 2018). The flexibility DIBs permit can therefore be conductive to aid efficiency. However, two other potentially negative consequences on aid efficiency have been identified.

On one hand the cost of aligning all stakeholders has proven to be extremely high due to the complexity of design. The high transaction costs have so far counteracted any potential cost savings achieved during the implementation for the DIB actors. All practitioners expect these costs to decrease, as more DIBs are launched, and the process is streamlined. Yet, it is still an element

to keep in mind. On the positive side, if cost-efficiencies have in fact been discovered during the implementation, the learnings can be shared and replicated in future interventions, ultimately resulting in overall improvements in systemic aid efficiency.

On the other hand, to align the interests of risk averse investors, service providers must share programmatic, institutional and contextual risks. This increased pressure incentivizes moral hazard. Due to the increase in the disutility incurred if the metrics are not met, service providers may be motivated to engage in ex-post opportunistic behavior to avoid financial and reputational losses. Implementers may be incentivized to decrease the quality of the support they provide, or use ghost recipients, or to find other ways to tweak the results of the evaluation in their favor, even when impacts have not been achieved, such as through bribes. Meeting the targets by engaging in moral hazard is detrimental to overall efficiency of aid.

Additionally, the risk sharing element introduced by risk averse investors also increases the likelihood of adverse selection. Service providers have more incentives to lobby for lower targets, which are easier for them to reach, taking advantage of their insider information. The only method to limit the scope for these behaviors, is for outcome funders and investors to invest in solid due diligence structures, meaning the information systems advocated by Positivist Agency (Fama, 1980).

Information systems can greatly increase the cost of the intervention, to the detriment of cost effectiveness. Comprehensive intervention evaluation methodologies (such as randomized control trials) are expensive and often hard to scale. The interests of stakeholders in keeping transaction costs within an acceptable and sustainable level, may hinder the potential for limiting the threat of agency risks during the design, implementation and evaluation phase. Successful stakeholder alignment is therefore not equivalent to the elimination of agency risk, which can lead to losses in aid efficiency and aid allocation.

DIBs work hard on minimizing the programmatic risk of an intervention not meeting its targets, however they do not succeed at eliminating the programmatic risk that the intervention may harm its recipients, due to their inability to eliminate agency risk. However, it is important to mention again, that the risk of moral hazard and adverse selection exists also in other types of aid financing mechanism, such as simple grants and other PbR tools, as shown in the discussion regarding Agency problems in development aid.

Additionally, DIB adoption is still limited to actors which benefit from a long relationship in order to decrease risk aversity. This is likely to exclude competitive service providers from the market

and limit efficiency gains. As the market mature, these limitations are likely to decrease as the transactions open up to new stakeholders.

6.2.3 Funding Evidence-Based Interventions

Another element of DIBs theory of change is that they allow for the financing of evidence-based interventions. The analysis of the data collected shows that this is in fact true. To align investors interests with those of outcome funders and service providers, implementers had to provide copious amounts of evidence to back up their intended intervention. This was an essential pre-requisite to be able to engage and align all stakeholders, confirming part of the rationale behind DIBs. However, this element has potentially adverse consequences on two other aspects of DIB's theory of change.

6.2.4 Closing the Funding Gap

In spite of the difficulties in engaging private funders, largely due to the novelty of the instrument, DIBs appear to be an instrument which is able to attract private capital for development, as confirmed by all investors interviewed. That is, provided more risk sharing elements are included, to compensate for their risk aversity.

Yet, additional private investor capital channeled through DIBs, needs to be matched by a superior amount of funds from outcome funders, who are providing philanthropic capital. This is because outcome funders, in case of success of the intervention, need to recompense the investors for all the implementation costs, in addition to providing a financial return. Under these circumstances, if all DIB interventions are successful, impact bonds will lead to a financial gain for investors but a decrease in the total amount of philanthropic capital available for development. If the same amount of funds for the successful projects had been disbursed through grants, for instance, the overall funding available for development at the end of the intervention would have been greater.

The theory of change behind DIBs assumes that the overall funding for development will increase, since private sector investors will absorb the costs of failed interventions, while philanthropic capital will only be dedicated to successful implementations. However, the risk aversity of private investors appears to be limiting the scope of DIBs, restricting their implementation to low risk evidence-based projects which are very likely to succeed. If this trend continues, DIBs may actually decrease the amount of funding available for development, as opposed to increase it.

On the other hand, DIBs may be able to narrow the funding gap if they succeed at increasing the amount of philanthropic capital available. Existing donors may be stimulated to increase their contributions, or additional philanthropists may be motivated to donate, when they see that their

funding is leading to improved and measurable development impacts. This has yet to be proven, however attempts to stimulate this mechanism are being made.

UBS OF and DFID are in fact working with a number of other organizations on creating an Outcomes Fund to fund multiple DIBs. The outcomes fund in question would be linked to an Investment Fund that will provide capital to the underlying impact bond programs (Crhova, 2018; Wouters, 2018). "UBS OFs hypothesis is that we will be able to crowd in private capital using a mix of philanthropic, DFI and mainstream investor capital (Institutional investors, family offices and high net worth investors). The Investments fund in question would invest (provide working capital) in underlying Development Impact Bonds. Such a fund would be a tool to bring in private sector funding into the development sector"(Wouters, 2018). The funds are yet to be launched, so their ability to deliver has yet to be proven. However, if this initiative wishes to be effective, the funds will have to stimulate an increase in philanthropic capital to match the new private one, or invest in risker and more innovative projects.

6.2.5 Fostering Innovation

A focus on evidence-based interventions to engage risk averse investors can also negatively affect DIBs' capacity to foster innovation, another element of their theory of change. The exclusive implementation of tried and tested approaches to minimize risk, can largely hamper incentives to innovate, as innovation often entails additional risk. Moreover, the evidence-based approach, almost by definition, excludes product innovation, which would nonetheless be deemed too risky for DIB investors. However, this does not exclude the possibility of process innovation.

DIBs can in fact be a good instrument to innovate and optimize processes. The time sensitivity of DIB interventions, mixed with the incentives for outcome achievement, can in fact stimulate implementers to improve the efficiency of existing evidence-based interventions, or to test different types of tried and tested approaches, to identify the one that works best for the specific context. Through this type of innovation, DIBs can therefore galvanize aid efficiency and potentially lead to process innovation.

However, this only works if service providers are given enough flexibility. The data also showed that this is sometimes limited. Ms.Sanko highlighted that AEF had to provide risk averse OPIC extensive activity planning prior to the start of the execution, limiting AEF's scope for flexibility during the implementation phase (Sanko, 2018). Mr.Wouters and Mr.Epprecht both described this obstacle, and mentioned the necessity for the outcome funders to understand the new DIB dynamics, which requires them to shift from activity tracking to pure output tracking, something which they believe has not fully happened yet (Epprecht, 2018; Wouters, 2018).

6.2.6 Encouraging Cooperation

Another positive effect of DIBs which the analysis demonstrated is their capacity to stimulate cooperation. In order to successfully launch a DIB, different stakeholders with diverse goals, mentalities, experiences and risk aversities need to interact and cooperate. All these elements need to be aligned in order to formulate a set of bilateral and multilateral contracts with clear outcome metrics and delimitations which are deemed satisfactory by everyone. DIBs therefore do force practitioners and investors to cooperate, in line with its theory of change.

6.2.7 Financing of Neglected Interventions

Lastly, aligning stakeholder interests appears to hamper DIBs' ability to finance neglected but developmentally relevant interventions. The analysis highlighted the need for thematic mission alignment for successful DIB deployment. Outcome funders, investors and service providers, all have thematic focus areas which they would like to impact: these need to be compatible.

The search for compatible actors has proven a challenge even for non-neglected uncontroversial interventions, such as cataract surgeries. Neglected interventions, by definition, are not prioritized by the majority of stakeholders, which would, at this stage, increase the complexity of the fundraising process. This, however, does not preclude the possibility that, in the near future, provided an evidence-based intervention and a larger pool of investors and funders, perhaps through the DIB fund, neglected but necessary development projects may be able to access DIB financing. The market simply appears to not be mature enough to venture in this space yet.

In addition, the necessity for outcome measurability implies an additional limit in the type of projects which can be financed through DIBs. DIBs cannot be considered an efficient mechanism for financing broader capacity building and system strengthening interventions, but are only adequate for extremely targeted projects whose outcomes can be accurately measured. The time required to set up a DIB contract and agree on the terms is also an additional limitation. A lot of the ICRC projects for instance require financing to be provided upon short notice, which would be impossible to finance via a DIB. Financing broader capacity building and emergency intervention is necessary, which means that DIBs cannot be seen as a substitute of other financing mechanisms for aid, but a complement.

6.2.8 Consolidation of DIB effects on Aid Effectiveness

The current effects of Development Impact Bonds on aid effectiveness are therefore ambiguous. DIBs appear to be an instrument able to improve aid effectiveness on some aspects, but have also potential for being detrimental to the sector. Some elements of their theory of change have already been demonstrated by the existing data, others will have to be proved or disproved as more DIBs

are completed and more evidence is made available, in order to be able to assess whether the negative or positive effects prevail.

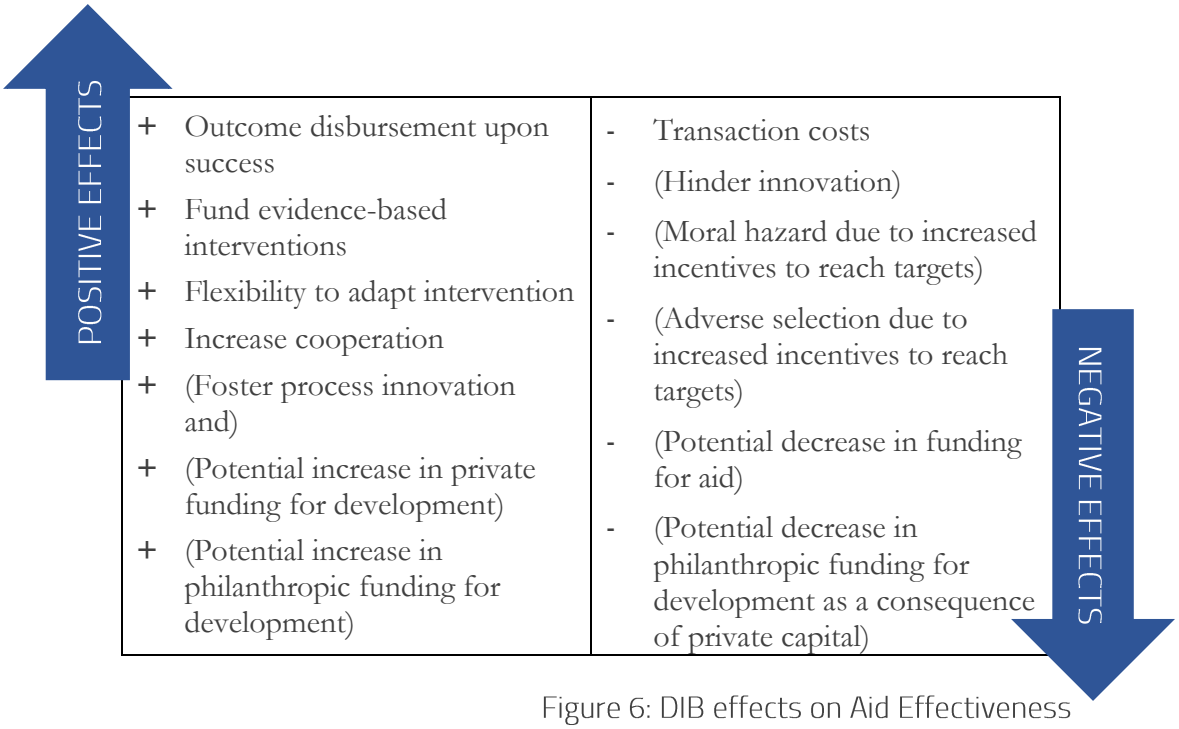

Figure 6: DIB effects on Aid Effectiveness

DIBs have so far demonstrated to be able to benefit aid effectiveness in the following ways. They stimulate disbursement of funds upon success, even if only a fraction of it, when investors are risk averse. They are useful to fund evidence-based interventions, since those are the only interventions which can be funded, given risk aversity. They allow service providers to change their approach during the course of the intervention, in order to find the most efficient way to reach a target, testing and adjusting different types of evidence-based approaches. They have proven to increase cooperation between diverse stakeholders and are able to attract private capital for development, with all the consequences that that entails. On the other hand, the positive effects on aid effectiveness which so far have taken place have been counteracted by the very high transaction costs due to the complexity of design.

However, there are other effects which have not been physically verified but imply both risks and opportunities for DIBs and aid effectiveness. DIBs can stimulate process innovation thanks to the implementation flexibility they permit, but might also hinder it, due to the risk aversity of service providers. DIBs succeed at aligning P-A interests but when risk averse investors are involved, this is actually increasing the risk of moral hazard and adverse selection.

Most importantly, DIBs have the potential to both help close but also widen the funding gap for development. By attracting additional philanthropic capital and/or private capital, provided some

projects fail, they might be able to increase the overall amount of funds available for development interventions. However, if the philanthropic capital remains the same but risk averse private capital increases while the majority of projects succeed, DIBs will actually increase the funding gap, a threat which is not mentioned in any of the available literature.

The overall effect of DIBs is potentially positive but only if proper mechanisms to limit their adverse effects while stimulating their strengths are put in place. Future evidence will have to shed light on whether practitioners have been able to pick up on the opportunities DIB offer, while efficiently limiting their threats to aid effectiveness.

6.3 Risk Averse Investors and Model Adaptation

Several of the limitations of DIBs theory of change are due to the relative risk aversity of private sector investors, which is at the origin of DIBs current "conservative" approach to financing. The data demonstrates that investors with low risk aversity are not the norm and that the DIB theoretical model is based on unrealistic assumptions about the stakeholders it wishes to involve.

The only institution which so far has agreed on investing in DIBs an amount greater than 100.000USD without any principal guarantee is the UBS OF (E. Gustafsson-Wright & Boggild-Jones, 2018). The Foundation, as admitted by Mr.Wouters himself, is in "an extremely privileged position", being able to benefit from a wide network of proactive and willing high net-worth funders, who normally fund its philanthropic activities, thanks to its link to the largest private bank in the world (Wouters, 2018). The remaining ten analyzed investors in fact, all required principal guarantees ranging from 60 to 100%.

Considering that the majority of the DIBs currently in development do not have foundations as investors (Gustaffson-Wright and Boggild-Jones, 2018a), and that a large part of the rationale behind DIBs is to crowd in additional private sector financing for development, a revision of the theoretical DIB must be done. Attracting private funding in fact, entails adapting to private funding mechanisms and perceptions. This process requires changing the theoretical DIB model, to account for the need to share programmatic and contextual risk among all stakeholders through principal guarantees and/or service provider co-investment, as the evidence has shown. A more realistic and effective DIB set up is therefore more similar to that in Figure 5 than the one in Figure 4.

7 CONCLUSION

The outcome of the assessment of Development Impact Bonds' theory of change is mixed. Some elements have been confirmed, others have been disproved and several limitations have been identified. DIBs have demonstrated to be able to improve aid efficiency by aligning stakeholders around the backing of evidence-based interventions, encouraging process innovation and stimulating multi-stakeholder cooperation. In addition, DIBs appear to be a financial instrument capable of successfully attracting private capital for development.

However, the instrument's strengths are also the cause of its limitations. Introducing market mechanisms in development intervention means adapting to the needs of risk averse investors. This forces outcome funders to disburse funds even when positive impacts have not been achieved, limits the scope for innovation and increases the incentives for moral hazard and adverse selection, potentially decreasing aid effectiveness.

The effects of DIBs on the funding gap for development are ambiguous. DIB success may be able to stimulate an increase in philanthropic donations. Yet, if this does not happen, and the majority of interventions succeed, the return which needs to be provided to investors to compensate for risk may ultimately result in an overall increase in the funding gap.

In addition, the need for alignment between private investors, outcome funders and service providers largely limits the scope of projects which can be financed via DIBs. To limit risk, the projects need to be uncontroversial, and able to provide large amount of historical data to back up their claims. Furthermore, the need to outcome measurability excludes important system strengthening and capacity building interventions which will still need to be financed through other means.

The analysis also displayed that the theoretical DIB model is based on unrealistic expectations on the market DIBs are targeting. The initially envisioned DIB model is based on an almost total transfer of risk onto investors, which conflicts with their observed risk aversity. Moreover, DIBs assumed outcome funder risk aversity, yet DIBs have struggled to attract outcome funding. This may be due to their observed relative low risk aversity, which does not allow them to perceive the added value of transferring risk through a complex mechanism such as a DIB. As the complexity and related transaction costs decrease, the interest might rise.

DIBs are therefore instruments with potential to improve aid effectiveness, but also with significant limitations which must be taken into account before adoption. The analysis shows that the DIB market is still nascent, practitioners are still experimenting with different designs to

understand what works and what does not. Some of the evidence is promising, however DIBs still need to prove with facts, rather than assumptions, their ability to decrease their transactions costs and deliver on their promises. Yet, one thing is certain: DIBs cannot be considered a complete substitute for other development financing mechanisms, but must be seen as a potentially useful complement, to be used with caution and awareness of its limitations.

7.1 Future Research

Given the novelty of the instrument, and the additional evidence that will be generated as more DIBs are launched and completed, many aspects still need to be explored, with plenty of opportunities for future relevant research. First of all, as more DIBs, implementing slightly different models come to completion, further comparative case studies will need to be done, in order to assess which is the model that delivers the best results.

An interesting angle to tackle could be the analysis of incentives. In the Educate Girls DIB, UBS OF and CIFF decided to reward Educate Girls for overperforming without imposing any financial penalty in case of unsuccess. Models offering both penalties and reward are adopted in the Utkrisht and Cameroon DIBs, while other are relying solely on punishment. It would be interesting to be able to evaluate which system is better at incentivizing service providers. In addition, in depth single case studies of all the DIBs which just launched and are about to launch should be performed, including studies which focus on the analysis of the service providers work and its impact on recipients, to understand whether the risks for moral hazard and adverse selection are materializing.

Most importantly, DIBs are one financing mechanism for development, but there are others. In order to truly assess the benefits of DIB implementation, they need to be compared with the alternatives, to assess their comparative advantage. As more DIBs are launched and completed, and the evidence unfolds, future research must be carried out.

7.2 Limitations

In spite of the researcher's best attempts to provide the most verifiable analysis of the phenomena, this study presents a series of limitations. Due to lack of availability, it was not possible to interview key respondents belonging to the sub-units of analysis such as additional investors, service providers and outcome funders. The researcher recognizes that this additional data may have confirmed or disproved some of the findings encountered. The fact that only two out of the five DIBs have been completed, and that on average only one respondent per organization was able to be interviewed, restricted the amount of evidence, compelling part of the analysis to be based on

practitioners' assumptions and expectations rather than facts. In addition, the chosen methodology is vulnerable to cognitive biases due to the subjectivity of interpretation, which the researcher is aware of, in line with the critical realist philosophy of science approach adopted.

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Appendixes

Appendix A – Respondents List

Name	Surname	Position	Organization	DIB
John	Belt	Senior Economist	KIT - Royal Tropical Institute	AIB
Radana	Crhova	Development Impact Bonds Adviser	DFID	HIB
Mara	De Monte	Senior Philanthropy Advisor	Lombard Odier Bank	HIB
Tobias	Epprecht	Head of Project	ICRC - International Committee of the Red Cross	HIB
Scott	Higgins	Director of Operations	Merck For Mothers	UIB
Andrey	Kuleshov	Senior Project Manager	CFC - Common Fund for Commodities	AIB
Dia	Martin	Managing Director, Social Enterprise Finance Team	Overseas Private Investment Corporation	CIB
Maximilian	Martin	Global Head of Philanthropy	Lombard Odier Bank	HIB
Justin	McAuliffe	Program Associate, Special Projects	Hilton Foundation	CIB
Robert	Miyashito	Program Officer, International Programs	Hilton Foundation	CIB
Roxanne	Oroxom	Policy Analyst	Center for Global Development	
Christina	Sanko	Senior Development Director	Africa Eye Foundation Optometry Giving Sight	CIB
Priya	Sharma	Senior Policy and Innovative Financing Advisor - Center for Accelerating Innovation and Impact	USAID	UIB
Aldo	Soto	Peru and the Andean Amazon Program Coordinator	Rainforest Foundation UK	AIB
Peter	Vanderwal	Former Head of Innovative Impact Financing	Palladium	UIB
Sietse	Wouters	Director, Innovative Finance	UBS Optimus Foundation	EGB & UIB
---	---	Non disclosable	HIB Investor	HIB

AIB – Ashaninka Impact Bond

EG – Educate Girls Impact Bond

CIB – Cameroon Impact Bond

HIB – Humanitarian Impact Bond

UIB – Utkrisht Impact Bond

Appendix B – Interview Guides

Investors:

- How did you get involved with the …. Bond?
- What were the motivations behind your initial involvement?
- What were the reasons behind your final decision to invest?
- At which stage did you get involved?
- What was your role in the negotiations?
- What do you believe are the risks entailed in this operation for your organization?
- What do you believe are the risks bore by the other DIB partners?
- What do you believe are the main strengths of this instrument?
- What are the limitations?
- What is your opinions on DIBs future scalability?

Outcome Funders:

- How did you get involved with the …. Bond?
- What were the motivations behind your initial involvement?
- At which stage did you get involved?
- What was your role in the negotiations?
- What do you believe are the risks entailed in this operation for your organization?
- What do you believe are the risks bore by the other DIB partners?
- What do you believe are the main strengths of this instrument?
- What are the limitations?
- What is your opinions on DIBs future scalability?

Service Providers:

- How did you get involved with the …. Bond?
- What were the motivations behind your initial involvement?
- At which stage did you get involved?
- What was your role in the negotiations?
- How would you describe your experience being financed through a DIB as opposed than through a grant or other instrument?
- What do you believe are the risks entailed in this operation for your organization?
- What do you believe are the risks bore by the other DIB partners?
- What do you believe are the advantages of being financed through a DIB?
- What are the limitations?
- What is your opinions on DIBs future and scalability?

Appendix C – Coding Nodes

First Cycle Nodes: risk, principal, agent, inefficiency, moral hazard, adverse selection, advantages, disadvantages, perception of others, role, intrinsic non-financial motivation, financial motivation, risk transfer, theory of change

Second Cycle Nodes:

Theory of change → service provider flexibility, cost efficiency, incentive alignment, attract private funding, eliminate adverse selection, eliminate moral hazard, other

Risk → programmatic risk, contextual risk, institutional risk, other

Goals, relationship length, task programmability, outcome measurability

Third Cycle Nodes:

Programmatic risk → outcomes, factors

Contextual risk → outcomes, factors

Institutional risk → outcomes, factors