Inception Report

Study of CDC's mobilisation of private investment

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Results in development

Acknowledgements

Disclaimer

Contents

List of acronyms

AP	Approach Paper
ASFF	Africa Sustainable Forestry Fund
AVCA	African Private Equity and Venture Capital Association
CA	Contribution Analysis
CDS	Credit Default Swap
CGD	Center for Global Development
COM-B	Capability, Opportunity, Motivation, Behaviour
DAC	Development Assistance Committee
DE	Demonstration Effects
DEG	German Investment Corporation
DEGRP	DFID–ESRC Growth Research Programme
DFI	Development Finance Institution
DFID	UK Department for International Development
EMPEA	Emerging Markets Private Equity Association
EQuALS	Evaluation Quality Assurance and Learning Service
ESG	Environmental, Social and Governance
E&S	Environmental and Social Responsibility
ESRC	Economic and Social Research Council
FMO	Dutch Development Bank
GIIN	Global Impact Investing Network
GMM	Generalized Method of Moments
ICA	Independent Component Analysis
IDS	Institute of Development Studies
IFC	International Finance Corporation
IFU	Danish Investment Fund for Developing Countries
IMF	International Monetary Fund
IV	Instrumental Variables
KfW	German Development Bank
KPI	Key Performance Indicator
LSSG	Longitudinal Study Steering Group
MAEC	Ministry of Foreign Affairs, European Union and Cooperation
MDB	Multilateral Development Bank
OCA	Open Capital Advisors
OECD	Organisation for Economic Co-operation and Development

PSD	Private Sector Development
RATER	Reliability, Assurance, Tangibles, Empathy and Responsiveness
SDG	Sustainable Development Goal
TAG	Technical Advisory Group
ToC	Theory of Change
ToR	Terms of Reference
UK	United Kingdom
UNCTAD	United Nations Conference on Trade and Development
US	United States
VAR	Vector Autoregression
VfM	Value for Money African Private Equity and Venture Capital Association
VIX	Chicago Board Options Exchange Volatility Index

Executive summary

This Inception Report describes our proposed approach to the longitudinal evaluation of CDC's ability to mobilise private investment. The primary aims of the evaluation are to understand:

1. The drivers of direct mobilisation, demonstration effects and investor sentiment in key markets and sectors;

2. How the activities that CDC undertakes affect these different forms of mobilisation and market sentiment, including the relative importance of these activities;

3. How both 1 and 2 are affected by the nature of investment and the investment context;

4. How CDC could increase its ability to mobilise private investment, and what DFID and other development actors could do to support this; and,

5. Whether CDC's and other DFIs' activities in target markets create observable macroeconomic effects.

There is no one way to definitely answer these research questions. Rather, we will build a cumulative weight of evidence, where our level of understanding and the confidence we have in this grows over time. Over the course of the 10-year study we will deliver a number of interconnected studies that combine to provide the evidence base. These include:

1) A study of DFI approaches to mobilisation
2) Report on the baseline of historic demonstration effects
3) Biennial reports on direct mobilisation (case study based)
4) Biennial reports on demonstration effects by investment mode/context (case study based)
5) Biennial reports on the investor survey findings
6) Annual Reports on sentiment in key target markets
7) Macroeconomic study
8) Midterm synthesis of findings (at Year 5)
9) Synthesis and final evaluation report (at Year 10)

The reports will go beyond the reporting of mobilisation numbers by providing insights into how mobilisation is achieved, CDC's contribution, and the influence of broader systemic factors. We will work with CDC and DFID to support how this evidence can best feed into CDC's evolving strategy. There will also be spin-off products that are likely to have practical use for different audiences. For example, briefings on investor sentiment in key markets, including special reports on major positive shifts in sentiment.

These are detailed in the workplan.

We have organised the work to ensure a relatively even distribution of effort over the course of the evaluation. For this study, the research is divided into four thematic research areas:

1. Direct mobilisation: Our approach to direct mobilisation builds upon the development of logic models, which capture how CDC's activities influence private co-investment in CDC deals. Draft versions of these models have been constructed for debt, direct equity and intermediated equity (the 'investment modes'). These have drawn on a range of data including: (i) a review of 500 publicly available CDC documents (case studies, press releases etc), (ii) interviews with key CDC staff from investment teams, and (iii) a review of internal documents by a study team member seconded into CDC in the summer of 2018. From these sources, a typology of CDC activities was created, and evidence sought to understand how these activities influence co-investment, how important they are, and how this is affected by investment context.

The logic model has a behavioural filter – i.e. the COM-B model. This empirically based framework developed by researchers at UCL, finds that changes to behaviour ('B') require the capacity ('C'), opportunity ('O') and motivation ('M') to do so. This is a useful lens through which to view investor decision-making, as it allows us to link CDC activities to the specific ways that they influence investor behaviour, and thereby isolate more precisely which activities matter most and why, in different investment contexts.

Having developed the draft logic models, the next step is to finalise these through engagement with CDC investment teams in autumn 2018. Following completion, we will undertake a series of case studies in 2019 to validate and refine the logic models. Designed within a contribution analysis framework, the studies will improve our estimates of the relative importance of different CDC activities with respect to mobilisation – i.e. contribution weights. Studies will be repeated every two years.

As well as systematically improving the accuracy of the logic models, this approach allows us to estimate CDC's direct mobilisation across the portfolio. To facilitate this, we will ask CDC to complete a short information sheet for each project that specifies which activities they have been involved in, and to what degree. Based on the contribution weights for these activities, we can estimate CDC's contribution to mobilisation at the project level, and sum this at the portfolio level.

2. Demonstration effects: Our approach to demonstration effects is based upon the creation and use of logic models in a similar way to that described for direct mobilisation. An important difference is the source of information to create the models. Demonstration effects are created when investors mimic a previous CDC investment, in whole or in part, in deals that do not involve CDC. This means that, unlike direct mobilisation we cannot rely as much on inputs from CDC as to the most important drivers.

To address this, we propose to develop initial logic models from two complementary sources. First, we will survey CDC staff for examples of projects that they think may have generated demonstration effects. After filtering these using techniques adapted from Castalia (2012), we will identify project characteristics that seem to be predictors of demonstration effects. At the same time, we will undertake a survey of investors to understand the internal and external drivers of decision-making for CDC-type deals in key markets and sectors, and also to identify examples of previous CDC projects that have positively influenced their investment decisions. These two sources of data will be combined to develop draft logic models for demonstration effects by instrument during 2019 and validated with workshops with CDC and other DFIs.

We then propose to follow the same case study process as with direct mobilisation, with contribution analysis used to improve the accuracy and our confidence in contribution weights with respect to demonstration effects. This will be augmented with biennial surveys of investors, with the sample constructed to include current and potential investors in CDC-type deals.

3. Investor sentiment: Our approach to market sentiment is rather different. While we are interested in the drivers of sentiment in target markets in general, the real interest is in what causes this to change positively, and how this might be influenced. While there are a number of relevant measures of investor sentiment, they are either too general (e.g. Africa) or relate to the wrong countries (e.g. South Africa). To address this, we propose to develop Investor Sentiment Indices for each of CDC's major target markets. As described in this report, the indices will be constructed from a combination of risk appetite and investor behaviour data and used to identify significant spikes in investor sentiment. To contextualise this, the sentiment work will be augmented by regular media monitoring of key markets and sectors, and meetings with an Investor Focus Group.

Detailed case studies will be triggered by major changes in an Investor Sentiment Index. These studies will seek to understand the drivers of investor sentiment shifts, including any role that DFIs such as CDC have

played. The complementary media monitoring and investor focus groups will also help us to understand what CDC – as well as DFID – could do to help encourage such shifts in the future.

4. Macroeconomic effects: The approach to macroeconomic impacts is more exploratory than the other elements described above. Estimating the causal macroeconomic impacts of CDC (and DFIs generally) is very challenging methodologically, largely because of endogeneity issues. Given the options available, we believe the most promising approaches are likely to be: (i) an Instrumental Variable (IV) approach in a cross-country framework, and (ii) quasi-experimental estimations at country levels, including time-series analyses (notably structural VAR). However, given uncertainty over how effective these approaches will be, we also believe it would be premature to dive into the econometrics straight away. We therefore advocate a two-phase approach.

Phase 1 will examine if, with relevant and appropriate cross-country and within-country data, the identification assumptions around these models are met. To enable this, we will compile relevant datasets and undertake a robust descriptive analysis of CDC investments. This is a 'no-regrets' approach, as it would have considerable value even if no further analysis occurred. The descriptive analysis will focus on five areas: (i) characteristics of CDC investments; (ii) co-evolution of CDC investments and the economic and political environment; (iii) within-country allocation of CDC investments; (iv) measuring project characteristics; and (v). minimum (threshold) expected returns for CDC and the private sector.

It is important to note that we will focus only on CDC investments in phase 1. There will be an effort to examine the possibility of a wider DFI analysis where relevant, as we do recognise that this would be useful, but comprehensive work on this would also require substantially more resources.
At the end of phase 1 we will obtain an academic peer review of the results and undertake a stock-take of the feasibility of the econometric methods in light of the descriptive results and peer review feedback.

Depending on the outcome of these activities, phase 2, may entail cross-country and within-country econometric analysis. For cross-country, we will extend the current literature by implementing an IV approach instead of the GMM approach and extend to other macro outcomes that have not been typically examined for DFI investments, such as innovation, socio-economic development and state capacity. For within country (sub-national), we may explore the opportunity to inform macro outcomes based on underlying micro work at the level of geographical areas, firm networks and trade relationships. While technical feasibility is already demonstrated in existing work, some amount of scoping work will be required to examine the feasibility of pursuing the current within-country options from a resources point of view.

Taken together, these four elements will generate a new and comprehensive evidence base on the determinants of private investment in lower-income countries, and what DFIs such as CDC could do to boost this – an area that is gaining traction in the policy debates. While focused on CDC in the UK, the hope and intention is that this work will be of much wider interest, both to other DFIs and to all development actors concerned with significantly increasing the scale of private investment in the developing world.

1. Introduction

1.1. Rationale for the study

Development finance institutions (DFIs), like CDC, invest returnable capital to promote private sector development in lower-income countries. CDC is one of the larger – and more influential – bilateral DFIs. Similar to other DFIs in Europe and the US, CDC has seen a significant increase in public funding over recent years. Despite this growth in investible capital, it remains only a small proportion of what is needed. Increasingly, the international consensus is that, to achieve the Sustainable Development Goals (SDGs) by 2030, there is an annual financing gap of $2.5 trillion every year. Mobilising private investment is a crucial part of addressing this gap, and DFIs have an important role both directly through co-investment and indirectly through demonstration effects and influencing market sentiment.

This study's primary purpose is to enable a better understanding of the determinants of mobilisation in developing contexts, and to provide evidence and learning that can help in realising the full potential of CDC's mobilisation approach. In this regard, it is expected that the findings of this research will have broader relevance to other DFIs and investors.

1.1.1 CDC and Private Sector Investment Mobilisation

In 2017, CDC as an institution had £5.1 billion net assets, and a portfolio size of roughly £3.9 billion. Furthermore, CDC has made an average annual return on net assets of 7% since 2012. Before 2012, CDC only had the mandate to make indirect investments (in funds managed by external partners), specialising in capacity building first time fund managers. Since then, CDC's proportion of direct investments, as well as the provision of debt financing has grown substantially. According to CDC's Strategic Framework 2017–21, CDC is projected to have more than half of its portfolio in direct investments by 2021 (see Figure 1).

Furthermore, CDC's strategy also expects greater focus (i.e. invested capital) on lower income geographies (relative to middle-income countries) and in seven priority sectors: infrastructure, financial institutions, manufacturing, food and agriculture, construction, education, and health.

All these features in CDC's strategy have implications for CDC's ability to mobilise private sector capital (i.e. attract investors to invest capital in CDC geographies and sectors). Investing direct, as opposed to with a number of partners in a fund, creates less interaction with a wider range of investors. Investing more in lower income geographies can dissuade investors who are worried about risk implications for their financing. Similarly, sectors such as infrastructure have long investment horizons (time between investment and realised returns) that can limit the number of private sector partners that CDC can engage with.

So where did these changes in strategy come from? In short, CDC has multiple mandates; investment return, job creation, building better capital markets, payment of local taxes by investee companies to name a few. Mobilisation of private capital features alongside those but is not seen as the primary feature behind CDC investment, nor as a primary reason why an investment deal may be considered a success or not.
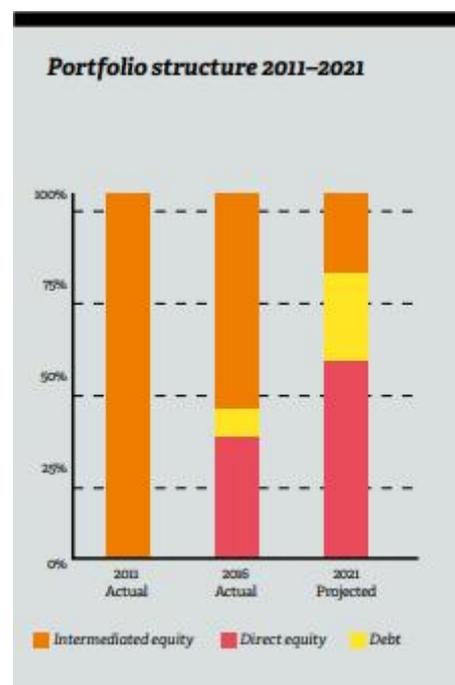

Figure 1 Portfolio Structure 2011–2021

This does not mean that CDC underplays its role in private sector mobilisation, CDC reports on mobilisation as part of its annual reports, and through two reporting standards. One, the Multilateral Development Bank (MDB) agenda and OECD reporting initiatives on mobilisation.[1]

CDC's geographical composition of investments has also changed. Part of this involves a movement away from middle income countries – towards those which can be considered more developmentally impactful in lower income countries (or in the case of India, lower income states). This is why some regions and countries (notably Latin America in 2012) "graduated" from CDC investment. However, on the other side, this reduces CDCs propensity to mobilise capital, particularly from local markets, as the capital markets that CDC is investing in will be less developed, so that the propensity to find co-investors who share a similar level of risk appetite will vary.
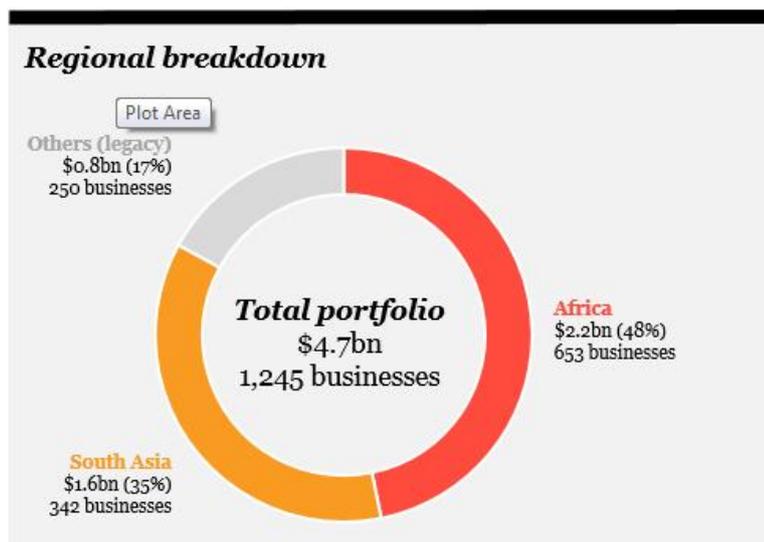
Figure 2: CDCs Regional Breakdown (2017) Source: ICAI Briefing Pack
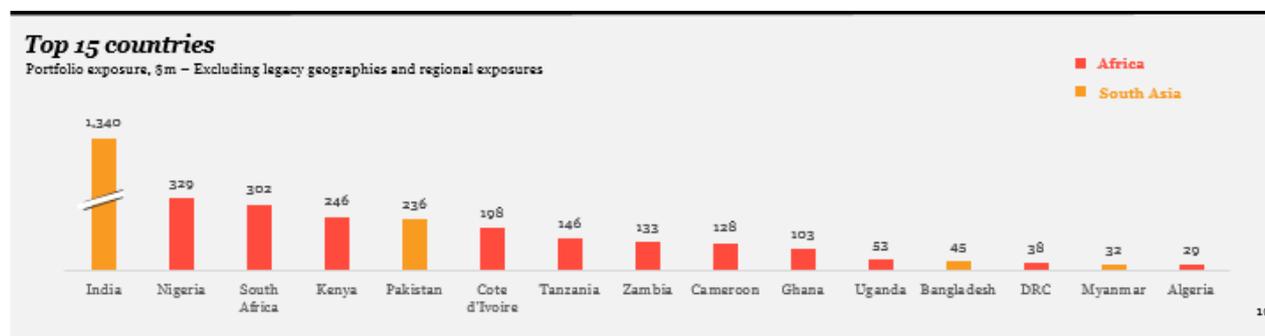
Figure 3: Top 15 Countries of Portfolio Exposure (2017) Source: ICAI Briefing Pack

CDC's Development Impact Grid, is a tool that is used for helping ensure that CDCs investments take place in lower income geographies and in sectors that have the highest propensity to generate employment. This is amalgamated into a score[2]CDC has a target score, based off the blend within its portfolio, to ensure that capital is directed to lower income geographies. This target can change over time and ensures that CDC's capital will remain in lower income countries. This means compared to the figures above – less money will flow to companies in South Africa and Kenya in the future vis-a-vis other African nations.

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[1] Please see the Mid-Inception Report for a discussion of the strengths and weaknesses of these reporting mechanisms. While they are best placed to avoid double counting of mobilisation, they do not necessarily address the question of additionality (would funding have been provided anyway?). Similarly, they are functions of compromise between a number of development actors looking to report on mobilisation, and do not necessarily reflect the underlying activities that lead to mobilisation. This study will attempt to fill that gap.

[2] For further details see https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/722390/Methodology-Note-CDC-development-impact-grid-score.pdf

Furthermore, within CDCs 2017-2021 strategy to engage in more direct investments, a number of regional offices are expected to be open. This will increase footfall on the ground for conducting due diligence. In early 2019 CDC will open a regional office in Lagos, Nigeria.

1.2. Scope and objectives of the study

The UK Department for International Development (DFID) terms of reference (ToR) for the study are provided in Annex 1 of this report. In summary,[3] the main aim of the study is to provide evidence as to the drivers (CDC and external factors) of mobilisation – and in doing so, to provide lessons on how to better mobilise private investment improve mobilisation through different instruments, in different investment contexts, over time.

The study seeks to answer two core questions:

- **To what extent has CDC successfully mobilised private sector investment, and what are the key determining factors?** This includes investment through funds and direct equities loans and other instruments? What (if any) have been the limitations?

- **What, if any, have been the systemic impacts of CDC on the private sector investment market,** including their influence (if any) on investor sentiment and behaviour as well as broader indicators of activity such as macroeconomic data? What (if any) have been the limitations?

The expected **output** of the study is that data collection and analysis will be released regularly over 10 years (at least every two years), with the aim of providing insights for policy and practice into what works in mobilising private sector investment. The expected **outcome** of the study is that DFID, CDC and others will use the evidence to develop more effective policies and interventions to better mobilise private sector investment.

This study does not, however, assess development impact as a consequence of these investments (such as on creating jobs, economic growth and poverty reduction). Both DFID and CDC are planning to commission studies to further explore the development impact of CDC investments over the coming years. Few details are available at the time of writing this report, but we fully understand the importance of linking with such studies as appropriate. There may, for instance, be important trade-offs for CDC (and other DFIs) to consider in pursuing both objectives, whereby a strategy for maximising mobilisation may focus on investments that have a lower development impact.

During the Inception Phase, and in discussion with DFID and CDC, there have been some refinements to the scope of the study. These are detailed further in this report, but the main ones to note are:

- *Changes in the governance structures.* The ToR (paragraphs 44–46) envisaged a Longitudinal Study Steering Group (LSSG) and a Technical Advisory Group (TAG). The former has evolved into a Steering Group chaired by DFID's chief economist, whereas the TAG has been dropped in favour of a more streamlined approach. We expand on this in section 3 on Governance.

- *Sentiment survey.* The ToR suggest a sentiment and behaviour survey (paragraphs 35–37). We have considered this extensively and conclude that a broad sentiment survey is unlikely to yield data that can be (even remotely) attributed to CDC mobilisation – and thus this would not offer value for money. In section 2.2 on the methodology, we propose using secondary data to capture broad shifts in sentiment, alongside a more focused investor survey to collate primary data.

1.3. Inception process

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[3] Based on DFID Terms of Reference, Sections 14–18 – Objectives. See Annex 1. Note that in discussions with DFID and CDC during the Inception phase, the emphasis is on improving the understanding of the determinants rather than measuring the extent of mobilisation. The latter will be part of the study but not the main emphasis, as CDC will in any case report mobilisation figures using both the MDB and OECD methodologies. It was agreed not to create a third (potentially competing) methodology.

The Inception Phase ran from September 2017 to 2018, with a Mid-Inception Report produced in April 2018. Much of the process has focused on engagement with DFID's Private Sector Development team (including the evaluation adviser), and CDC's Development Impact and investor teams. The inaugural Steering Group meeting was held on 16 July 2018. Key stages in the inception process are summarised below:

- **September–October 2017, Study Team kick-off and kick-off with DFID.** The Study Team focused on contractual and other kick-off activities to manage the Inception Phase, including initial budgeting and work planning; development of ToRs and contracts for subcontractors; and initial kick-off meetings. This entailed discussions with DFID covering the purpose and context of the study, mid-inception requirements, proposals for the TAG, ways of working and so on.

- **November–December, kick-off with CDC and initial design thinking on Study Approach.** The Study Team met with CDC stakeholders for initial discussions, including literature reviews and first drafts of the Approach Papers (on direct mobilisation, demonstration effects, investor behaviour and sentiment and macroeconomic effects).

- **January–mid April, refinement of the Study Approach, feedback from DFID and CDC, initial stakeholder consultations and fact-finding, Mid-Inception Report.** During this period, the Study Team developed the second draft of the Approach Papers, along with a Summary Note, submitted to DFID and CDC in February 2018. This also included an updated table summarising preliminary data requirements, and the Mid-Inception Report and workplan.

- **April–August, wider consultations, working with CDC to develop Logic Models, discussions on way forward for the Macroeconomic Study, secondment into CDC to review data, working with Open Capital Advisors (OCA) to develop investor database.** This period included responding to feedback on the Mid-Inception Report, attendance at relevant conferences and discussions with stakeholders (including the Organisation for Economic Co-operation and Development (OECD), International Finance Corporation (IFC), Global Impact Investing Network (GIIN) and others). Discussions were also held with CDC investor teams (debt, equity funds, private equity), as were analysis of cases of mobilisation to develop initial Logic Models, a workshop with leading experts on Contribution Analysis (CA), review of CDC data including a secondment to gain on-site access and tripartite meetings with CDC, DFID and the Study Team to agree way forward for the Macroeconomic Study. The investor database for Africa was also developed with OCA, capturing nearly 300 investors from which to sample. Towards the end of this period two Notes were circulated for feedback from DFID and CDC on (i) options for the Macroeconomic Study and (ii) updated study design (incorporating feedback and baseline Logic Models).

- **September, response to feedback from CDC and DFID, production of the Inception Report, Note on data needs.** An updated Note on data needs, setting out the status and implications for the study, was produced to take forward data access issues.

1.4. Purpose and outline of this report

The purpose of a yearlong inception process was both to provide time to develop relationships with CDC and, as part of a 10-year study, to further develop the questions, approach and deliverables – something difficult to achieve in a single ToR. This report summarises the culmination of the Inception Phase, with a refined study design (questions, methodologies, data requirements and analysis) and details on implementation (governance, management and deliverables).

The report is structured in the following way:

- **Section 2: Study design,** including definitions, questions and methodological approach

- **Section 3: Governance of the study,** including structures, principles and ethics

- **Section 4: Management,** including team structure, roles and responsibilities and risks

- **Section 5: Uptake of the study,** including target audiences, communication channels and outputs

- **Section 6: Implementation,** covering the workplan and list of deliverables

To enhance the readability of the report, we have streamlined the study design as far as possible, with detailed annexes containing the literature reviews and Approach Papers used to develop the approach. These cover key topics, including direct mobilisation, demonstration effects, market sentiment, CA and Bayesian updating.

2. Study design

This section of the Inception Report describes the approach to the research in detail. First, we define the key terms to be used, and set out the research questions, and sub-questions, that will guide the process. Second, we provide a methodological overview, followed by sections on direct mobilisation, demonstration effects and investor sentiment. In each case, our application of logic models and complementary methods is described. After detailing our approach to macroeconomic effects, the remaining sections summarise how CA will be applied, present the baseline logic models for direct mobilisation that have been developed and describe how the project will use and manage data.

2.1. Definitions and research questions

2.1.1. Definitions

The distinction between different forms of mobilisation is central to this research. In all cases, we are interested in how much private capital can plausibly be claimed to have been mobilised by CDC, and how this can be increased. We also understand, however, that this total quantum of capital is made up of distinct components, with different drivers, where the challenges of attributing mobilisation differ considerably.

As well as distinguishing clearly between different forms of mobilisation, this section defines other terms that are important for the research.

1. **Mobilisation** is additional private sector investment that is attributable, to some degree, to current or historical CDC activities.

2. **Direct mobilisation** is co-investing with CDC, which can be attributed to CDC's involvement in the investment. This could be membership of a loan syndicate, investment in an equity fund, equity to complement CDC's debt and so forth.

3. **Indirect mobilisation** is private investment that does not involve CDC but can be attributed (to some degree) to previous CDC activities. We distinguish two forms:

   a. **Demonstration effects** are where a private investment takes place because of the example of a specific, observable CDC activity in the past – for example where a CDC investment proves a technology or business model to be viable, or returns obtained from a particular investment to be higher than assumed, leading to increased private investment in similar investments in the future.

   b. **Improved investor sentiment** is where market sentiment towards a country or sector improves as a result of CDC's activities – for example where the ability of CDC to operate successfully in a sector and/or location changes perceptions of risk-adjusted returns, attracting new investors or encouraging existing investors to increase their general activities.

4. **Macroeconomic effects** are those that occur at the aggregate level, such as growth, investment, inflation or unemployment.[4]

5. **Logic models** capture the set of factors that influence an outcome or set of outcomes. Similar to a theory of change, a logic model may describe the causal links between activities and intended outcomes (*ex ante*), or capture how particular outcomes were caused by a set of preceding activities (*ex post*).

6. **Contribution Analysis (CA)** is a methodological framework for assessing the degree of contribution of different causal factors to a particular outcome.

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[4] These are similar to 'catalytic effects' as defined by IFC. For IFC, catalytic effects are 'beyond/after project effects of private financing activities not captured by mobilisation'. A difference is that our focus is somewhat narrower, concentrating purely on economic effects. This can therefore be thought of as a subset of the broader IFC definition. Source: IFC (2018).

7. **Investment mode** refers to a particular category of investment such as direct equity, intermediated equity, or loans, within which the drivers of mobilisation are broadly consistent, in terms of both the causal factors themselves and their relative importance.

8. **Investment context** refers to the political, economic, cultural, historical and locational factors that influence the process of mobilisation, and so potentially change the relative importance of causal factors described above, or introduce (or remove) causal variables.

2.1.2. Research questions

The original ToR for the project posed the following research questions:[5]

1. To what extent have CDC investments been effective at directly mobilising private sector investment? What contexts in relation to investor type, geography, sector, instrument and development outcome are most conducive, and why?

2. What, if any, have been the systemic impacts of CDC on the private sector investment market, including their influence (if any) on investor sentiment and behaviour, as well as broader indicators of activity such as macroeconomic data?

During the Inception Phase, these have been unpacked and elaborated in light of discussions with CDC and DFID. The key issue to be addressed in this process has been to establish a clearer distinction between different forms of mobilisation, to enable the evaluation to consider analytically distinct and internally coherent categories. As well as direction mobilisation, we have therefore differentiated between demonstration effects and investor sentiment. The resultant questions, and sub-questions, that will guide the post-inception research are:

1. What are the determinants of direct and indirect mobilisation in CDC's target markets, what is their relative importance and how does this vary by investor, geography and sector?

   a. What are the determinants of direct mobilisation in CDC's target markets, what is their relative importance and how does this vary by investor, geography and sector?

   b. What are the determinants of demonstration effects in CDC's target markets, what is their relative importance and how does this vary by investor, geography and sector?

   c. What are the determinants of market sentiment in CDC's target markets, what is their relative importance and how does this vary by investor, geography and sector?

2. How important are CDC's activities for direct and indirect mobilisation in target markets, what is their relative importance and how does this vary by investor, geography and sector?

   Sub-questions a, b and c as above.

3. How much direct and indirect mobilisation can be attributed to CDC at the project level, and how does this this vary by investor, geography and sector?

   Sub-questions a, b and c as above.

4. How much direct and indirect mobilisation in total can be attributed to CDC per year?

5. How could CDC increase direct and indirect mobilisation, and how does this vary by investor, geography and sector?

   Sub-questions a, b and c as above.

6. What could DFID do to complement and amplify CDC's direct and indirect mobilisation efforts, and how does this vary by investor, geography and sector?

   Sub-questions a, b and c as above.

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[5] Paragraph 19 of DFID ToR: CDC Longitudinal Study: To what extent does CDC activity crowd-in private sector investment?

7. Does CDC, and/or DFIs as a group, generate observable macroeconomic effects in target markets?

8. How large are observed macro effects, and how does this this vary by investor, geography and sector?

9. How could CDC, and/or DFIs as a group, generate stronger macro effects?

10. What could DFID (and others) do to complement and amplify CDC (DFIs') ability to generate positive macro effects, and how does this vary by investor, geography and sector?

The following sections, and sub-sections, describe the approach to methods, sampling and data that will be used to answer these questions.

2.2. Methodological overview

This research focuses on questions of causality. Our equivalent to the 'dependent variable' is mobilised capital of various forms, or observable macroeconomic effects. The most important 'independent variables' from the perspective of this research are the activities of CDC, but this does not mean that the causal influence of other factors will be ignored, or that CDC is always assumed to be the most important cause of mobilisation. In some cases, CDC may not exert any influence at all. In others it may be significant, but not more so than other factors. In particular circumstances, CDC is likely to be the dominant cause.

Figure 1: Mobilisation, attribution and sampling
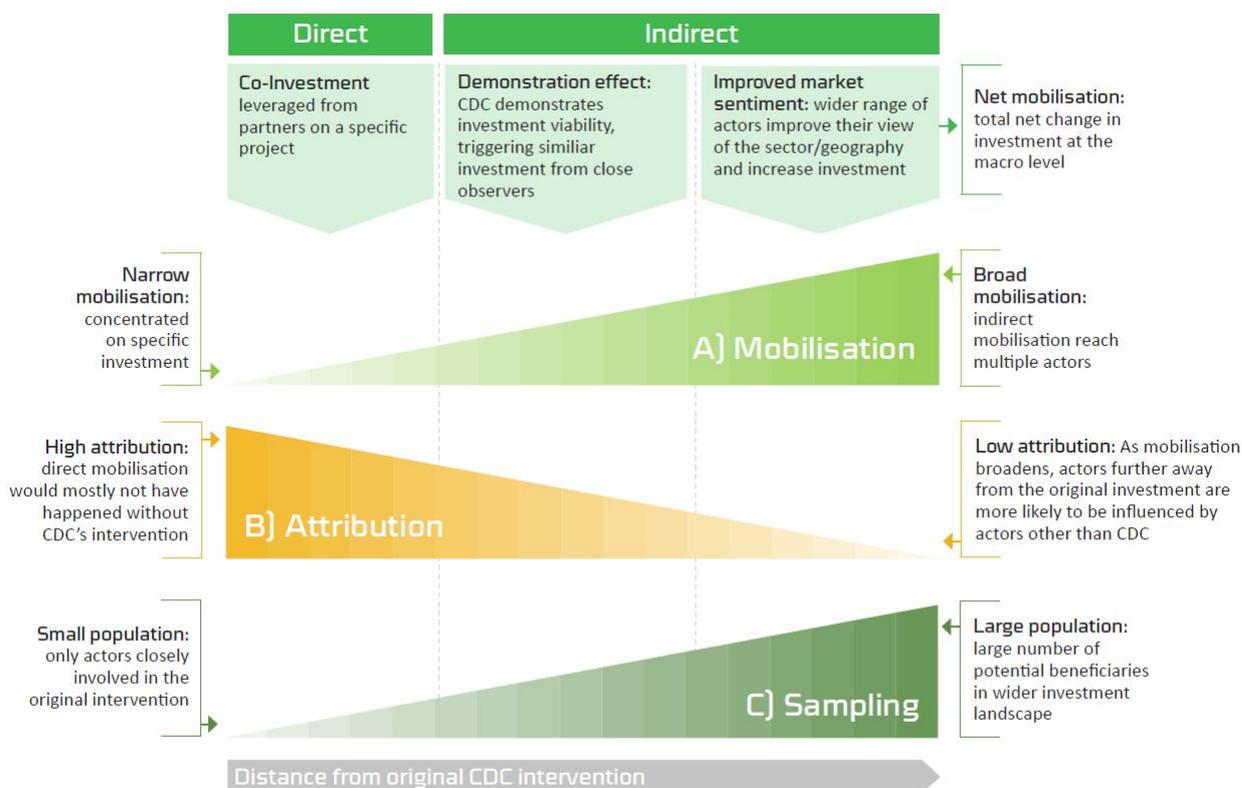
As the set of investors that CDC could influence increases, and the potential for mobilisation grows, it becomes more difficult to attribute impacts to CDC. This is illustrated in Panel B of Figure 1. Direct mobilisation is clearly linked to CDC, as the investment comes from partners involved in the same deal. We know that for direct mobilisation that CDC contributed, however this does not mean that CDC is always the crucial factor, but the potential for high attribution is there. The task in these situations is therefore to determine how much responsibility for this mobilised capital should be attributed to CDC relative to the other actors involved in the deal. Specifically, our choice to utilise contribution analysis for direct mobilisation is less concerned with whether CDC made contributions (we know that it *does* in these cases) but to understand *how* this occurs, understand in what circumstances, and by what magnitude.

Moving to the right, mobilisation that is not directly attributable to CDC activities we refer to as 'indirect mobilisation'. We have distinguished indirect mobilisation between demonstration effects and improved market sentiment (whereby the market refers broadly to investors in an investment context). In reality this may not be so discrete but it is important to maintain a category differentiating between the two. Demonstration effects are harder to attribute to particular actors, but not impossible. We may be able to recognise, for example, the replication of specific business models or technologies, or to identify a clear link from a successful CDC investment to subsequent, similar investments. Broader shifts in investor sentiment towards markets or general sectors are likely to be the result of multiple factors coming together. CDC (and/or other DFIs) may be one of these, and an important one in some circumstances. Isolating such effects, however, is the most challenging form of mobilisation to capture.

As distance from a particular CDC activity increases, therefore, the number of other potential explanatory factors expands, making attribution to CDC more difficult. Our overall methodological approach, including a graded scale within indirect mobilisation (demonstration effects and market sentiment), and use of complementary methods and data sources are designed to address these challenges.

Panel C of Figure 1 illustrates how sampling requirements relate to different forms of mobilisation. As we move from direct to indirect mobilisation, sample size expands. For direct mobilisation, the sample is the small group of public and private co-investors who already invest with CDC. For demonstration effects, the population is a larger set of investors with potential interests in similar deals to CDC but who have not necessarily already invested in these, or have done so only to a limited extent. Assessing investor sentiment requires a yet larger sample. The boundaries of this population will be determined by looking at whether investors have the potential to invest in the sectors and markets with which we are concerned and have some interest in doing so. This does not mean they currently make such investments, as we are also interested in whether new investors are being attracted, and what would be required for them to be so.

Box 1: Our Approach to Sampling

There are 3 samples. 1) CDC co-investors; 2) investors who do or could invest in the same types of deal as CDC; 3) investors who are potentially interested in the markets/sectors where CDC operates (though the type of deal could be quite different). For overlap, 1 is a subset of 2, and 2 is a subset of 3. While we will have a different set of 3 samples for SS Africa and South Asia, there could be some overlap in terms of emerging market investors who operate in both areas.

For case studies, DM come from sample 1 and are identified as described (to be representative of the general logic model or one of its most important contexts - this will vary over the course of the study to get full coverage. DE come from sample 2 and will be identified through a) identification of potential DEs based on characteristics in baseline logic models, and b) confirmation that DE have occurred from surveys - again, we would seek to vary these over time to capture different contexts and different forms of demonstration effect. Case studies on investor sentiment are quite different. Here we identify significant shifts in sentiment towards target markets using the mechanisms described - i.e. movement of investor sentiment index beyond threshold; media monitoring; investor focus group. We then undertake case studies to explore the reasons for the change, including any role that CDC (or other DFIs) have played.

Sentiment case studies do not use formal contribution analysis for the reasons given above, and because we are not trying to estimate the weight of CDC's contribution to the change as is the case with both DM and DE. Investment sentiment is not just about mobilisation, and in many/most cases CDC's contribution may be negligible. We need to understand the forces driving these shifts, however, because they are likely to have a strong influence over CDC's ability to mobilise investment (i.e. this is much easier when sentiment is positive and vice versa), and it may also be that CDC/DFIs can do things

As we move from direct to indirect mobilisation, the population of investors expands. For direct mobilisation, the population is a small group of public and private co-investors who already invest with CDC. For demonstration effects, the population is a larger set of investors who have potential interest in similar deals to CDC but who have not necessarily already invested in these or have done so only to a limited extent. For investor sentiment it becomes much larger still: including investors that have the potential to invest in the

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sectors and markets with which we are concerned and have some interest in doing so (including new investors who currently do not make such investments).

These populations – and the samples we will draw – are summarised in Table 1.

For direct mobilisation, we will have a dataset of all investments and CDC's co-investors, which provides (in effect) a census of the total population. The sample of Contribution Analysis (CA) case studies will be drawn on the basis of representativeness against the Logic Models for each financial instrument and context (sector/market and geography). The aim is not to capture the full variation, but in consultation with CDC, to focus on a few critical variants.

For indirect mobilisation, we will use an adapted form of the Castalia approach to purposively gather a population of investors who have invested due to CDC's demonstration effect (from the inside-out). A sample of CA cases will be drawn from this population on the basis of their representativeness against the Logic Models (financial instrument, sector/market and geography). Alongside this, every two years we will survey investors from a wider population of current and likely future investors (from the outside-in). The boundaries of this population are difficult to precisely determine, so we will use our partners (OCA and Intellecap) to establish a long list of like-minded and potential investors. This database will provide the population from which we will sample. It is estimated however that the database for Africa and Asia may be around 500–750 investors, so with a potential 20% response rate, we are likely to survey all – with protocols used to minimise selection bias by one sub-group or another.

For investor sentiment, we will use the Investor Sentiment Index to identify key peaks or troughs in particular markets. Where this falls above or below certain thresholds then we will conduct simplified case-based enquiries (not the CA cases) to better understand how sentiment has changed and its influence on mobilisation. These cases will be responsive to more dramatic shifts in the market.

To be clear, for direct mobilisation and demonstration effects, we will sample 2 case studies for each of the investment modes: direct equity, debt, and intermediated equity (6 in total). As we will sequence work on direct mobilisation and demonstration effects alternately each year, there will be a total of 6 cases studies per round for each of direct mobilisation and demonstration effects, where we will liaise closely with CDC to obtain information on deals that reflect both categories.

We therefore have three nested sample populations:

- Sample 1: CDC co-investors
- Sample 2: Potential investors in same or similar deals to those previously undertaken by CDC
- Sample 3: Potential investors in CDC's target markets and sectors

Table 1 describes these in more detail.

Table 1: Samples for CDC mobilisation study

Sample	Boundary	Composition	Engaged in which aspects of study	Nature of engagement	Frequency of engagement
S1	Participation in CDC deals	Actual	CA studies	Participation in CA studies of direct mobilisation (2 case studies per investment mode: direct equity, debt, and intermediated equity). At least 6 case studies per round on direct mobilisation.)	Biennial
S2	Potential participation in CDC-type deals	Proportional to investor type in CDC-type deals	Demonstration effects initial survey; biennial investor surveys; CA studies	Surveys; participation in CA studies of demonstration effects	Biennial

				(2 case studies per investment mode: direct equity, debt, and intermediated equity). At least 6 case studies per round on demonstration effects.)	
S3	Potential participation in CDC target markets and sectors	Proportional to investment patterns in CDC target markets and sectors	Investor sentiment analysis; CA studies; Investor Focus Group[6]	Indirect (i.e. existing surveys and media); participation in CA studies of sentiment shifts; participation in Focus Group meetings	On-going sentiment monitoring; periodic CA studies of major shifts; biannual Focus Group meetings

The methodological approach to the research comprises four core elements, which draw upon these samples in different ways. First, we will use Logic Models to capture the determinants of direct mobilisation and demonstration effects, and their relative importance in different contexts. Second, we will apply CA to estimate CDC's role in mobilising capital directly and via demonstration effects and generate estimates of the mobilisation that can plausibly be attributed to CDC. In both cases, these draw upon Samples 1 and 2, respectively. Third, we will identify significant changes in market sentiment towards target markets with a complementary set of techniques, and undertake CA studies to assess the key drivers of change, and any influence of CDC (or DFIs as a group) in this regard. This aspect of the research entails Sample 3. Fourth, we will use econometric techniques to capture the impact of CDC (and DFIs as a group) at the macroeconomic level. While not directly related to the samples in Table 1, this obviously entails the largest set of potential investors in target markets and sectors and is therefore analogous to Sample 3.

Accuracy and credibility of the study. Understanding the determinants of CDC's contribution to mobilisation is intrinsically challenging to evaluate. This is in part because investor behaviour is complex, influenced by a range of factors including both actual risks and perceptions. Indeed, in the literature there are few noteworthy studies that have robustly tried to understand drivers of DFI mobilisation, particularly beyond direct mobilisation. This is for good reason.

Our approach is to be realistic rather than privilege false precision, while at the same time improving the accuracy (and therefore credibility) over time. This is inherent in the Logic Model approach, which at baseline is built up from publicly available case studies and validated with CDC investment teams. Then, the ten-year time horizon of the study provides the opportunity to iteratively test the Logic Models as more empirical evidence is gathered (cases, surveys, data), thus incrementally increasing accuracy. Alongside this, the proposed Bayesian approach provides a systematic way to assign probabilities to causal claims (hypotheses), including weighing the evidence to update the researcher's confidence in these claims being true or false. This provides a systematic and transparent way to demonstrate our on-going confidence in the study's findings.

The following sections describe each of these elements of the research in turn.

2.2.1. Baseline logic models and direct mobilisation

An important part of the research is the role of 'investment contexts'. As described in the definitions section, we understand this as types of investment where the drivers of mobilisation are similar, in terms of both the causal factors and their relative importance. Contexts are therefore internally coherent categories, which differ from other contexts. We would expect the drivers of mobilisation of different projects in category x to be reasonably consistent, but distinct from projects in category y or z.

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[6] See the section 2.2.3 on investor sentiment for details of the Investor Focus Group.

There are many ways that investments could be organised, and numerous systems have been developed to group countries into different types according to historical, cultural or socioeconomic factors. While these are clearly important distinctions, they do not capture what we need. We are interested in why investors make the decisions they do, or fail to do so. Consequently, our categories need to reflect how investors themselves think, including distinctions between different groups of investors. To this end, we believe that the natural choice is to organise investments according to the type of financing used.

For CDC this is debt, direct equity and intermediated equity. It seems plausible that the activities needed to successfully mobilise debt finance are different to direct equity investment, and that equity fund mobilisation is also different. Interviews with CDC investment directors, as well as discussions with other stakeholders, have confirmed this intuition. We have therefore developed Baseline Logic Models in each of these three areas, which capture the most important causal factors and provide an initial ranking of their importance. We present the Baseline Logic Models below. The methodology used to create them, as well as how they will evolve through the course of the research, is also described in detail.

While we believe there to be sufficient consistency within these baseline models, organised by investment mode for them to function as useful tools, each model will also require a number of variants, reflecting the influence of different contextual factors. It seems very likely, for example, that the determinants of direct mobilisation of debt finance for a renewable energy project in India will differ in their relative importance to an ostensibly similar project in a small, post-conflict African state. Other potential variants might be sub-sector. In our interviews with CDC investment managers, for instance, it was noted that debt provided in the construction phase had a greater mobilising effect than latter stage financing for future investments in infrastructure projects. While relevant for infrastructure debt, this is obviously not the case for financial institutions or corporate debt, suggesting that variants of the baseline model might be appropriately organised according to these categories. The process of developing the Baseline Logic Models has suggested potential variants for the direct and intermediated equity models as well. Rather than take this decision now, however, we propose to use the baseline models as the starting point for discussions with CDC investment teams to finalise the choice of variants.[78]

Having developed the Baseline Logic Models, the next step is to apply CA studies to (i) modify and refine causal factors and rankings/weights and (ii) estimate the proportion of mobilised funds that can be attributed to CDC.[9] CA studies require significant resources. Clearly, it is not possible to do this for every CDC project. To address this, we propose to identify representative projects from CDC's current portfolio in each context. As well as the activities of CDC and other DFIs, causal factors will include features of the investment climate plus internal drivers of private investors.

The results of these studies will form the basis of contribution templates, which identify and weight the key determinants of mobilised co-investment in each of the contexts identified. Once we know what activities have been performed, and adjust to take account of market conditions and other factors, the templates will enable us to estimate CDC's contribution to directly mobilised capital. During the latter half of the inception phase, the study team has researched and developed draft templates, but this will be further refined in the implementation period. Annex 6 provides an example of a deal sheet for CDC's deals in intermediated equity. We have developed further draft deal sheets for direct equity and debt. These

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[7] Variants of this variety will add more to our understanding of "contexts". Understanding the distinctions between two similar types of equity based on geography, sector, investment horizon, level of risk, governance etc. to name a few. These features (and additional ones brought forward by CDC), will be structured into conversations with them. Two key variants of direct and intermediated equities, respectively, that are already clear are the Impact Accelerator and the Impact Fund. While both share core features with mainstream equity and fund investments, there are also important differences in the type and depth of impacts being targeted. Impact mechanisms also seek to mobilise 1:1 private capital on their investments. Rather than generate separate logic models for these instruments, we propose to develop variants of the baseline models that reflect the distinct goals of these mechanisms.

[8] External contextual considerations will also be brought up with the investment teams. We are aware in the scope of this evaluation that CDC will rarely be the main causal factor in determining private sector investment selection. These external factors will also come through in the sentiment analysis and the macroeconomic study, discussed later in this report.

[9] The resultant estimate should not be seen as a competitor to other mobilisation estimates produced with the OECD Development Assistance Committee and multilateral development bank methodologies. These are produced for different purposes – for example to ensure international consistency in mobilisation claims and avoid double counting. Our approach, and the estimates it generates, is designed to understand how and why CDC mobilises private capital in different markets and sectors, and how this can be increased.

deal sheets will allow us to track what activities have been performed which stem directly from the Logic Models that we developed for each investment mode and will further refine. This information will be crucial as it will allow the study team to understand factors that CDC deem relevant ex-ante, and will help in developing the contribution templates further. The use of contribution analysis will allow us to unpack different activities and their relative importance. As a by-product of estimating CDC's contribution, we will also generate estimates of the contribution of other DFIs.

To operationalise this approach going forward, it is important that the collection of relevant information is built into CDC's investment process. For each project, this means collecting information on CDC's role in the activities identified as important for each deal – these are the activity categories described in section 5 below. This should be as light-touch as possible – that is, a short survey for each deal, which identifies CDC's (and other DFIs') role in specified activities and captures some key features of the investment climate. The weightings of the different activities will then be translated into an overall CDC contribution to the mobilised finance for each project and summed across the portfolio.

To ensure contribution templates take account of changing investment and country conditions, we propose repeating the contribution studies every two years. Studies will be of new investments (i.e. rather than returning to those already analysed), and will be selected to allow deeper investigation of the influence of an important contextual factor that has not previously been considered, and/or to allow refinement of core logic models for different investment modes. The purpose of these studies will be to update and improve the contribution estimates for different DFI activities, and the adjustment factors relating to the investment climate, as well as to identify any new factors that have emerged as important.

The Logic Models will therefore evolve over time, capturing the determinants of direct investment mobilisation in different contexts with increasing accuracy.

The preceding description of the development of the Logic Models applies specifically to direct mobilisation. While there are many overlaps, the development and use of Logic Models for demonstration effects differs in important respects, as described below.

2.2.2. Baseline logic models for demonstration effects

Logic Models for demonstration effects will also be organised according to the three financial investment modes described above: debt, direct equity and equity funds. A starting point for developing Logic Models for demonstration effects might be to assume that the type of deal that successfully mobilises direct co-investment in each of these areas will also have the potential to create a demonstration effect. Such projects are more likely to be more commercially successful than those where it was difficult – or impossible – to mobilise co-investment, and therefore more likely to create positive demonstration effects in the future. This will not always be the case, however. Given its greater appetite for risk than private investors, CDC will make investments they would not. Some will be more successful than private actors had assumed, either because technology or a business model was previously unproven, or because risk-adjusted returns exceed market expectations. In these cases, demonstration effects will be created by projects where there was little or no direct co-investment by private investors. As well as identifying observable demonstration effects, our methodology will also enable us to track 'ripples' from original CDC projects, which may not necessarily be strong enough to trigger a demonstration effect, but may have a positive, and discernible impact on market sentiment more broadly.

This suggests that the variants of Baseline Logic Models for demonstration effects should capture the different type of demonstration effect that is generated, as well as the influence of external contextual factors. While CDC staff may have a good sense of the types of projects that are likely to generate demonstration effects, we clearly cannot rely on them alone to generate the Baseline Logic Models, as was the case with direct mobilisation. Deals fostered because of demonstration effects by definition do not involve CDC. To understand the determinants of these investments, therefore, we need to engage much more with non-CDC investors. Table 2 describes the sequence of activities that will be used to develop these baseline models.

Table 2: Developing Baseline Logic Models for demonstration effects

Steps	Activity	Sample	Supporting material
Step 1	Survey CDC staff to create long-list of projects that they believe have created demonstration effects	Investment teams	DFI Focus Group inputs
Step 2	Filter long-list following approach adapted from Castalia (2013		DFI Focus Group inputs
Step 3	Analyse short-list to identify characteristics of projects that create the potential for demonstration effects, and the market conditions and other factors needed to realise this potential. Rank relative importance		Characteristics identified by IFC (based on Castalia study) Focus Group inputs
Step 4	Survey investors to identify characteristics of CDC projects (*ex ante* and *ex post*) that would potentially lead them to undertake similar projects, and the market conditions and other factors needed to realise this potential. Rank relative importance. Biennial surveys will also allow us to identify and track 'ripples' resulting from previous CDC activities, which may not be strong enough to trigger demonstration effects but have a positive impact on market sentiment more generally.	Sample 2	Focus Group inputs Media monitoring inputs
Step 5	Combine findings from steps 3 and 4 to create Baseline Logic Models for each investment type (debt, equity, funds)		
Step 6	Create variants of baseline models for different forms of demonstration effect (e.g. proof of business model), and changes to key contextual factors		
Step 7	Reality-check baseline models in CDC/DFI seminar		
Step 8	Undertake CA studies for core baseline model to modify and refine causal factors and weights (as with direct mobilisation).		

The steps described in Table 2 will generate a series of demonstration effects Baseline Logic Models, which capture the following features:

- The characteristics of CDC projects of this mode (and variant) that have strong potential to generate demonstration effects.

- The features of the investment climate that influence whether this potential is realised.

- The market conditions that foster this potential.

- Other external contextual factors (e.g. interventions by domestic or donor agencies) that affect whether a demonstration affect is created in each context and variant.

As with all Logic Models, the outcome of this stage of the research will be a chronologically sequenced 'map', starting with an initial CDC investment and ending with a private investment that was influenced by the original CDC activity, as well as by external contextual factors. This has three purposes. First, by weighting the importance of the initial CDC investment and subsequent causal factors, we can estimate the proportion of the ultimate investment that can be said to have been mobilised by CDC. Second, if we understand the characteristics of projects that influence whether demonstration effects occur, CDC projects can be designed to increase the probability that they do. Third, while not much can be done about general market conditions, it may be that particular interventions can be timed to increase the chances of creating demonstration effects. This may be useful for DFID, as well as other agencies with similar goals, that wish to make complementary interventions.

The Baseline Logic Models will enable us to identify hypotheses – for example that projects with a particular set of characteristics are likely to generate demonstration effects under supportive market conditions, in certain investment contexts. Having identified these hypotheses, the longitudinal nature of the project allows us to test them. The first step is to identify indicators we would expect to see if a demonstration effect were to take place – for example increased capital flows or improved market sentiment towards particular sectors. The second is to establish mechanisms to detect these indicators (e.g. from our measures of market sentiment described below).

The outcome will be estimates of the capital mobilised by CDC through demonstration effects as they happen. These estimates will capture the proportion of mobilised capital that can plausibly be attributed to CDC, as well as the roles played by other factors. This is a bottom-up process, wherein we identify CDC projects we have reason to believe could create a demonstration effect and track whether this in fact happens. A risk is that demonstration effects are created in ways that differ from the past, and we therefore miss them and underestimate CDC's real contribution. To mitigate this, we will survey investors with the potential to invest in similar deals to CDC (i.e. sample 2), with an explicit focus on whether and how they have been influenced by the example of earlier CDC activities.

As with direct mobilisation, we would also aim to repeat the CA studies every two years to improve accuracy and adjust to market developments – that is, one set of studies per investment type.[10] These would take the form of detailed case studies of particular investments, designed to (i) test whether demonstration effects have been created, (ii) improve our understanding of the drivers of these effects in different contexts and (iii) modify and refine the causal weights in the Baseline Logic Models for demonstration effects.

2.2.3. Investor sentiment

Investor sentiment towards developing markets and regions is influenced by many interacting factors, including investor psychology, movements in commodity prices and 'push factors' from source markets. While 'pull factors' from the developing markets themselves matter, they are not always the key factor. In this environment, attempting to develop a useful Logic Model that effectively links CDC's activities with shifts in broad investor sentiment seems unlikely to succeed.

We propose a different approach. The real focus of interest is major shifts in investor sentiment in a positive direction, how they can be encouraged and what role CDC might play in this regard. This is somewhat different to the goal with direct mobilisation and demonstration effects, where we are trying to understand the general determinants, including non-CDC factors. It is plausible to think that DFID, or similar actors, could intervene to remove obstacles to particular types of investments, thus increasing mobilisation and CDC's ability to mobilise. It is less plausible to think that they could exert the same influence over generalized market sentiment towards a country or region. Understanding what drives major improvements in this sentiment is important for two reasons. First, it is a key contextual factor that will influence mobilisation efforts: in times of positive sentiment it will be far easier to mobilise private investment than during negative periods. Rather than looking at CDC success in mobilisation over time in isolation, it needs to be placed in this context. Modest mobilisation during a downturn may in fact be more of a success than larger mobilisation success during a boom. Second, understanding the triggers for major positive shifts also helps identify policy priorities for those seeking to sharply increase investment in LICs, both domestically and internationally. Rather than try to capture the drivers of investor sentiment in general, therefore, we will seek to understand the drivers of significant positive shifts in sentiment, and to identify the role – if any – that CDC (and other DFIs) has played, or potentially could play, in these shifts. In the process, we will also identify other causal factors, including those that could potentially be influenced by donor governments and agencies.

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[10] We propose to undertake two studies for each form of investment – one for the central type of investment as captured in the core Baseline Logic Model and one for a key variant. The type of variant studied would change in each round of studies, ensuring that all variants are covered over the course of the project. In total, therefore, we would envisage six studies taking place every two years.

Shifts in sentiment will be identified, and contextualised using four sources:

1. Investor Sentiment Index: To capture investor sentiment, we propose to develop a series of indices of investor sentiment towards CDC target markets. There are many ways that this could be done, but we propose following general industry practice by combining indirect measures of risk appetite, with more specific measures of actual investment activity. An important strand of the finance literature looks at global 'push' factors, and domestic 'pull' factors, such as macroeconomic policy or the investment climate.[11] Both are found to be important empirically, with the relative importance depending on the relevant context. At the height of a major financial crisis, for example, contagion between countries is likely to be strongly influenced by changes to global risk appetite (i.e. push factors), though the relative intensity of effects at the national level may also be influenced by domestic policy and institutional soundness (pull factors).

As the relative importance of pull and push factors are likely to change over time, it is not sensible to assign fixed weights to the component of an index. A more sensible approach is to apply equal weightings, but to ensure that the key components are included, and that there are not so many elements as to drown out the effects of any one of these. Based on this logic, the indices would be based on the following components:
A measure of global risk appetite (e.g. The Chicago Board Options Exchange Volatility Index (VIX)) – common to all country indices

   a. A measure of national risk appetite (i.e. spreads on benchmark government bonds over the risk-free rate, relative to countries with comparable risk profiles) – country-specific

   b. Key commodity price indices – common to all indices, but specific commodities may vary according to importance for different countries

   c. Net foreign portfolio outflows – country-specific

   d. Exchange rate movements, relative to historical averages and comparable current rates – country-specific

These variables are designed to capture key aspects of investor sentiment, enabling a composite picture to be built up. The global volatility measure captures risk appetite in a general sense (i.e. push factors), where increased appetite is associated with increased investment flows to emerging markets. Another key driver of sentiment to these markets, particularly in Africa, is commodity prices, where rising prices are associated with increased appetite for emerging market investments. The remaining measures capture actual shifts in sentiment, where positive net foreign portfolio flows, falling bond spreads and appreciating exchange rates reflect improving sentiment and increased investment. Although similar indices have been created for some markets (e.g. South Africa), this is not the case for most of CDC's target markets. While we will follow best practice in terms of index construction, it is necessary to create our own country-specific indices.

Having developed an Investor Sentiment Index for each market, we will establish thresholds to identify major positive shifts in sentiment.

Figure 2: Momentum Investor Confidence Index at June 2012

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[11] For a discussion of the literature in the context of the 2008 global financial crisis, see: Fratzscher, Marcel, (2011). "Capital Flows, Push versus Pull Factors and the Global Financial Crisis", ECB Working Paper 1364.

Figure 1: Momentum Investor Confidence Index at June 2012
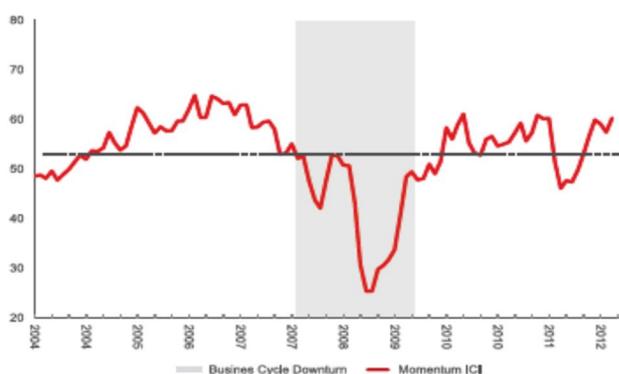
Source: CBOE; ETM Analytics; JSE; Reuters

It is not possible to say with certainty how frequently the examples of positive shifts in sentiment will occur. Figure 2 illustrates sentiment towards South Africa between 2004 and 2012, constructed using some of the same variables.[12]

If we take examples of positive change as periods when sentiment exceeds the historical average, there would be 4–5 such instances in a period of eight years. Were this to be repeated, this would be broadly in line with our contribution analysis studies for direct mobilisation, although it is highly unlikely that these would occur neatly every two years. It is important that indices of this form are not used in isolation but take full account of context – what might look like a large shift in sentiment under benign conditions, could be an unremarkable shift during times of turbulence. To ensure this, our analysis of movements in markets sentiment, and particularly the identification of major shifts, will be augmented by three further elements.

2. **Existing investor surveys:** There are numerous surveys of investor sentiment that are relevant for our target markets and sectors – for instance publicly available surveys of African investors from EY, The Financial Times, AVCA, Private Equity Africa, Infrastructure Consortium for Africa and others. For non-publicly available surveys, we will look at sources such as the HedgeNews Africa Investor Survey, as well as surveys from the Grow Africa Investment Forum. In total, we have identified a database of roughly 30 investor surveys that we would use for the African market alone and will develop a similar database for South Asia. We will complement the Investor Sentiment Indices by analysing these surveys.

3. **Media monitoring and analysis:** A second complementary source of information will be analysis of media reporting in major financial centres and the countries where CDC operates. Media monitoring will provide a means by which the Study Team can continually assess how market sentiments are reported in the media, as well as sense-check changes in market sentiment in Africa and Asia. Specifically, this component will pick up any deals or activities that in any way involve the CDC Group.

We anticipate a high number of media articles will likely be picked up over the lifetime of the study and that the usability and quality of these will differ significantly. In addition, we recognise that it is important that a more methodical approach is developed as opposed to relying on a continual stream of news articles. In the Inception Phase, the Study Team has tested a number of tools that can be used to collect and collate media articles. This includes Vuelio and Google Alerts:[13]

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[12] The Momentum Index differs in that it incorporates credit default swap (CDS) rates and spreads on US dollar/rand currency transactions. In most of the markets that CDC operates in there is not a functioning CDS market for sovereign debt. Also, currency markets are not liquid or open enough for spreads to provide a good measure of sentiment. We prefer to use the simpler and more transparent measure of the exchange rate, where a significant appreciation would indicate an improvement in sentiment.

[13] Additionally, the Study Team has engaged with other media outlets that already conduct activities looking at CDC activities, such as Africa Capital Digest, which collates news reports on investment deals conducted by CDC, and Pitchbook, which is a private equity deal database formed

a. **Vuelio** is a media monitoring tool used to track media coverage across a range of multimedia platforms including news websites, blogs, social media sites, newspapers, magazines, trade and industry publications, television and radio. It does this by article tagging certain phrases and using that search term to sift and pick up relevant articles relating to the tag term. For our CDC study, the platform will be picking up relevant news articles. From there, Vuelio creates a database of all associated articles, providing the search date, the outlet, a link of the report, a copy of the relevant text and a measure of article sentiment. In order to capture the importance of the news article, Vuelio also picks up relevant metrics associated with the publication body (such as monthly visits, circulation and audience). The database is fully searchable within one's parameters as long as it has the appropriate tag term.

b. **Google Alerts** is a simpler tool than Vuelio but provides the same media coverage with somewhat less precision and range. For example, there are limits on how many news articles are collated in a single day. Google Alerts will be used primarily to supplement Vuelio but is in itself a useful tool for tracking media coverage as it can also tag relevant media articles involving CDC.

The tools for media monitoring will provide a continual stream of news articles that we will analyse and use to distil key findings for inclusion in the Annual Report on Sentiments in Key Target Markets. In order to do this, we have allocated resources for a researcher's time to assess the articles on a quarterly basis. This will involve searching the database of articles from Vuelio and Google Alerts and analysing the qualitative content of articles, specifically to assess important trends in CDC country markets. On their own, media articles may not provide much information, but a collective and longitudinal approach will track shifts in sentiment towards key markets and sectors, including how this is manifested in investment flows. As well as informing our understanding of drivers of market sentiment, we will monitor media reports of CDC (and DFIs more generally), linking these as appropriate to the drivers of market sentiment.

4. **Investor interviews and Investor Focus Group:**[14] The final source of information on investor sentiment research is the Investor Focus Group, and interviews with key investors of different types. While we intend to continue regular key informant interviews through the course of the project, an initial series of interviews will be used to (i) obtain market intelligence on sentiment towards key markets and sectors and the most important drivers, (ii) elicit market perceptions on CDC, particularly how its activities influence sentiment and the propensity to invest and (iii) identify suitable participants for the Investor Focus Groups.[15] The intention is to organise two Focus Groups: one each for Africa and South Asia. Focus Groups would meet every six months (where appropriate), as well as at times of major shifts in sentiment. The purpose of the groups, in both their regular and their *ad hoc* meetings, would be to provide background context and insight on the determinants of shifts in market sentiment, including any role that CDC has, or could, play.

These four elements will enable us to identify and contextualise major shifts in market sentiment, and to begin to understand the drivers of these from the perspective of investors. The next stage of the research will be to analyse these events in depth. To this end, we will again use CA studies to (i) identify and weight the main causal factors, (ii) identify how these interact with contextual elements such as external market conditions or the domestic investment climate and (iii) identify the role played – if any – by CDC and other DFIs. We understand that, particularly in the larger markets, it is unlikely that CDC will have a significant

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through a proprietary media monitoring software and awareness of other deals. Plus, CDC is engaging with the Emerging Markets Private Equity Association (EMPEA) to see if it can give the Study Team access to its underlying data. Additionally, the Study Team may look at engagement with the Africa Venture Capital Association, which also collects data and insight on deals conducted in Sub-Saharan Africa.

[14] As well as current investors in target sectors and markets, the group should include potential investors, and its composition would thus be that of sample 3 in Table 1. Discussions have begun between members of the Study Team and representatives of major financial institutions in the City of London – for example Citigroup and Standard Chartered. There is interest in participating in the proposed focus group as 'cornerstone' members. Initial models from the investor survey and media analysis will be presented to this group and refined in light of feedback.

[15] 'Cornerstone' members of the African Focus Group who have agreed to participate are Razia Khan, Chief Economist for Africa and the Middle East at Standard Chartered, and David Cowan, Chief African Economist at Citigroup. Both have offered to host meetings and to engage their investment teams in these meetings. We will be seeking similar members in other sectors, particularly private equity and sovereign wealth funds. The Indian Focus Group will be developed in partnership with our South Asian partners. We are currently in discussions with Intellecap.

effect, though they may in certain conditions and also may in smaller markets. As well as identifying where these effects have taken place, therefore, we will seek to understand what CDC and other DFIs could do differently to positively influence market sentiment. Our approach to the CA studies in all elements or the research is set out in section 4, below.

2.3. Macroeconomic effects

Advancing the analysis of the macroeconomic effects of CDC, we propose a phased approach where in phase 1, we will undertake descriptive statistical analysis as a stepping stone for the econometric analysis in phase 2. This component of the evaluation is more of a 'freestanding' component and is not interdependent on the contribution case studies. It is more concerned with higher level macroeconomic impacts of DFIs as a group rather than CDC specifically.

It is fairly established that estimating the causal macroeconomic impacts of CDC (and DFIs generally) is a very challenging task, owing to endogeneity issues that arise from unobserved heterogeneity (or omitted variable bias), and reverse causality. While we advocate for two broad approaches: (i) an Instrumental Variable (IV) approach in a cross-country framework and (ii) quasi-experimental estimations at country levels, including time-series analyses (notably structural VAR), we believe it would be premature to dive into the econometrics straight away. Hence, our approach for phase 1 is to examine if with relevant and appropriate cross-country and within-country data, the identification assumptions around these models are met.

In phase 1, we propose to compile relevant datasets and undertake a robust descriptive analysis of CDC investments that will be worthwhile in the absence of any such in-depth descriptive analysis. This analysis will also be a valuable first step before proceeding with a sophisticated econometric analysis of the macroeconomic impacts of CDC. The descriptive analysis will focus on five areas: (i) Characteristics of CDC investments; (ii) Co-evolution of CDC investments and the economic and political environment; (iii) Within-country allocation of CDC investments; (iv) Measuring Project Characteristics, summarising observable data; and (v) Minimum (threshold) expected returns for CDC and the private sector. It is important to note that we will focus only on CDC investments in phase 1. There will be the effort to examine the possibility of a wider DFI analysis where relevant, as we do recognise that this could be useful, but comprehensive work on this would also require substantially more resources.

Phase 2 will be preceded by an academic review of the results from phase 1. At the end of phase 1, we will also take stock of the feasibility of the econometric methods in light of the descriptive results and peer review feedback.

In phase 2, where feasible, we expect to undertake cross-country and within-country econometric analysis. For cross-country, we will extend the work in the current literature by implementing an IV approach instead of the GMM approach used in the literature and extend to other macro outcomes that have not been typically examined for DFI investments, such as innovation, socio-economic development and state capacity. For within country (sub-national), we will explore the opportunity to inform macro outcomes based on underlying micro work at the level of geographical areas, firm networks and trade relationships. While technical feasibility is already demonstrated in existing work, some amount of scoping work will be required to examine the feasibility of pursuing the current within-country options from a resources point of view. Analyses at the subnational level allow us to account for time-varying unobserved heterogeneity at the country-level by including a set of country-year fixed effects and will allow us to harness more extensive and finer-grained data to support the quasi-experimental econometric than possible with countries as the unit of analysis.

2.4. Contribution Analysis and Process Tracing

2.4.1. What are Contribution Analysis and Process Tracing?

Our methodology draws on two theory-based evaluation approaches that have a long track record in the international development and political science fields: Contribution Analysis and Process Tracing. See Box 2 for a brief description of each.

Box 2: Explaining Contribution Analysis and Process Tracing

Contribution Analysis is a theory-based evaluation approach that provides a systematic way to arrive at credible causal claims about an intervention's contribution to change (Mayne 2012). The approach involves six steps, including developing a Logic Model or Theory of Change (ToC) for an intervention, and gathering evidence in order to explore the intervention's contribution to observed outcomes. By verifying the ToC that the intervention is based on, and taking into consideration other factors that may have influenced outcomes, CA can provide evidence that the intervention did or did not make a difference (Mayne 2008). CA provides a helpful and intuitive framework, but is not a prescribed set of methods and processes for assessing a ToC. In practice, examples of CA can fall down somewhat when it comes to robustly establishing the strength of the causal links in the ToC and the importance of other factors. For example, Schmitt and Beach (2015) criticise the approach for 'relegating' causal processes to assumptions, which are frequently not studied empirically and therefore are not tested in a robust way.

Process Tracing is a theory-based evaluation approach that provides a method for assessing causal inference within a single case design. Process Tracing was originally used to provide theoretical explanations of historical events, and has a long track record in the political science field (Falleti 2006). The evaluator articulates and collects data on all the causal steps between an intervention and an outcome, and then analyses to update the evaluator's confidence that the intervention has caused or contributed to a particular outcome in a particular way (Punton and Welle 2014). Process Tracing employs four tests (straw in the wind, hoop, smoking gun and doubly decisive), to systematically and transparently weigh and test qualitative and quantitative evidence. These tests are one of the key hallmarks of the approach. They are based on Bayesian probability logic, which means the researcher weighs up evidence according to how much the findings increase the probability that a hypothesis is true (or how much *not* finding the evidence decreases the probability that the hypothesis is true).

The CDC approach will combine the intuitive logic of CA and its six steps as overarching guidance, with elements of Process Tracing to help guide decisions about what kinds of evidence to look for, and what criteria to use to judge the strength of that evidence. This combination of approaches has been discussed in the evaluation literature under the term 'contribution tracing' (Befani and Mayne 2014; Befani and Stedman-Bryce 2016).

2.4.2. Steps in the approach

We will employ four iterative steps, drawing on the literature on contribution tracing (Befani and Stedman-Bryce 2016).

1. **Develop a testable causal claim.** The emphasis is on developing a precise and detailed (rather than vague) claim, where it will be possible to identify evidence that can confirm or disconfirm it. A claim takes the form of a set of linked hypotheses, which outline how the intervention is thought to have contributed to a specific change. Developing and revising the claim will usually require a process of consultation and exploratory data collection, to help move from a vague claim to a more specific one that can be more easily tested. For the CDC study, this will involve developing Baseline Logic Models (debt, private equity, equity funds) into more specific causal claims within each case study.

2. **Design data collection,** in order to test the contribution claim. This involves deciding which evidence is required to update the evaluators' confidence in the claim, to the largest possible extent, which requires thinking about the 'probative value' of particular pieces of evidence (its ability to alter our initial confidence in a causal hypothesis or claim). This can be assisted through asking three questions, which link to the four tests from Process Tracing:

    a. **What evidence would we expect to see if the causal claim were true?** This evidence is necessary to keep the hypothesis under consideration: if we don't see it, the hypothesis can be discarded. This is

known as a 'hoop test' in Process Tracing (evidence must 'jump through the hoop' in order for the hypothesis to not be disregarded).

b. **What evidence would we love to see?** This evidence is sufficient to prove the hypothesis beyond reasonable doubt. This is known as a 'smoking gun' in Process Tracing.

c. **What evidence would we like to see?** This evidence is not enough on its own to prove a hypothesis, but, when considered alongside other independent sources of evidence, can increase the evaluator's confidence that the hypothesis is true. This type of evidence is known as 'straw in the wind' evidence in Process Tracing.

Data collection tools are then developed and refined in order to look for these pieces of evidence.

3. **Conduct data collection and update confidence about the claim.** This involves gathering data, specifically looking for the evidence identified under step 2 (while also remaining open to other evidence that has not been identified in advance, and seeking disconfirmatory evidence that would disprove the causal claim). Data is analysed to verify whether the expected evidence was observed or not. The evaluators then apply Bayes' formula to calculate the probability of the contribution claim being true in light of the new evidence. This is done by quantifying the researchers' levels of confidence as a subjective probability (see worked example in Box 3 below).

4. **Put the claim and findings up for challenge.** Because the strength of the process depends on the probabilities assigned to pieces of evidence, it is important to make sure those probabilities are as robust as possible. This step involves consulting a wider group of stakeholders, who discuss and exchange information until a consensus on estimations is reached.

Box 3: A worked example of developing and assessing a contribution claim

This box provides a simplified worked example, based on a case study of CDC's investment in the Global Environment Facility's Africa Sustainable Forestry Fund (ASFF) based on CDC's Annual Review (CDC 2010). In 2008, CDC issued a request for proposals for a forestry-focused fund in Sub-Saharan Africa, and selected a fund manager. In 2010, CDC provided cornerstone investment to get the fund started. The fund was able to attract substantial further investment and is shared as a *'good example of how CDC's robust approach and strong reputation can catalyse other investors to commit their capital'.* How might Process Tracing principles be applied in this case, to robustly assess CDC's contribution?

Step 1: Develop a contribution claim

An initial contribution claim is developed, based on a review of available documents.

CC1. *CDC's anchor investment in ASFF attracted other investors owing to CDC's robust approach and strong reputation.*

Through consultation, the claim is then further refined, to provide more detail about precisely how CDC's investment is thought to have attracted other investors. This will incorporate the behavioural 'COM-B' framework, reflecting on how CDC has influenced capability, opportunity and/or motivation in order to influence behaviour. Also, because we are interested in both *how* CDC contributed and the *strength of this contribution*, the statement is divided into two claims to be tested, such as:

CC2. *Part I. CDC's anchor investment in ASFF <u>reduced</u> the perceived risk of investing in the forestry sector among investors (DEG, IFC, Proparco, FinnFund, MAEC), owing to CDC's robust approach and strong reputation. As a result, these investors were motivated to commit capital to the fund.[16]*

CC3. *Part II. CDC's anchor investment in ASFF was <u>the most important</u> driver of reducing perceived risk. It was more important than activity Y, and activity Y was more important than activity Z (but all had some influence).*

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[16] Note, this example is relatively simplistic for demonstration purposes – in practice, the contribution claim may be unpacked into several linked hypotheses.

The evaluators then determine the *prior probability* of *CC2* and *CC3* being true, before any evidence is collected. With no prior information about the claim, and no reason to believe it is more or less valid, the evaluators might set the prior probability at 0.5, which is the 'no information' situation in Bayesian statistics.

Step 2: Design data collection

The evaluators consider what data they need to collect to evaluate the contribution claim, thinking about the probative value of particular types of evidence and prioritising evidence with higher probative value. Particular attention is paid to 'expect to see' evidence and 'smoking gun' evidence.

Examples of 'expect to see' or 'hoop' evidence: This is evidence that must be found in order to keep *CC2* under consideration. For example:

E1 *[Monitoring/media?] data confirms that DEG, IFC, Proparco, FinnFund and MAEC made limited (or considerably smaller) investments in the forestry sector prior to their investment in ASFF.*

This is 'expect to see' evidence because: if the investors were already investing significant amounts in the forestry sector before ASFF was established, it does not make sense to claim that ASFF reduced the perceived risk of investment.

'Smoking gun' evidence: This type of evidence is harder to find but is the 'holy grail' for evaluators. It has the ability to dramatically increase the evaluator's confidence in a hypothesis, because it is very unlikely that the evidence will be found unless the hypothesis is true.

E2. *Written evidence (e.g. meeting minutes) from DEG, IFC, Proparco, FinnFund and/or MAEC investment committees link decisions to invest in ASFF to CDC's anchor investment reducing the risk of investing in forestry.*

This is smoking gun evidence because: it is unlikely that written documentation would cite the influence of CDC and link it to the reduction in risk, unless this was in fact true.

'Straw in the wind' evidence: This type of evidence is not enough on its own to prove the causal claim but can increase the evaluator's confidence in the claim when considered alongside other independent sources of evidence.

E3. *Investors in ASFF confirm that historically they have perceived the forestry sector as a risky area for investment, until CDC invested.*

E4. *Investors in ASFF confirm that CDC is perceived as having a robust approach and strong reputation and that this influenced their decision to invest.*

Each of these pieces of evidence, on their own, are not enough to confirm the contribution claim – as investors may have various incentives to exaggerate CDC's influence, or may overstate it because of confirmation bias. However, if both are found together, or in combination with E1 and/or E2, this helps increase confidence in the contribution claim.

Step 3: Conduct data collection and weight evidence

Data collection is conducted, and analysis confirms whether evidence E1–E4 was found. During analysis, the evaluators then determine the *sensitivity* and *type 1 error* values for specific pieces of evidence.

5. **Sensitivity:** The probability of finding evidence x if CC2 is true.

6. **Type 1 error:** The probability of finding evidence x if CC2 is false.

Each of these values can be quantified, as a subjective probability between 0 and 1. For example, E1 might be assigned a sensitivity value of 0.95, as it is very likely that investment in forestry prior to ASFF was considerably smaller, if CC2 is true. The evaluators might assign a type 1 error of 0.6, because it is also more likely than not that investments prior to ASFF were smaller even if CC2 is false – as investors may have been attracted to invest in ASFF for some reason other than CDC reducing the perceived risk.

After assigning these values, the evaluators then apply Bayes' formula to each piece of evidence, in order to calculate the *posterior probability* of CC2 being true. From a starting point of 0.5 ('no information about whether CC2 is true'), applying Bayes' formula will provide a new probability based on the evidence collected.

If we find evidence E1, and apply Bayes' formula (with a prior of 0.5, a sensitivity of 0.95 and a type 1 error of 0.6), this results in a posterior of 0.61 – in other words, this has increased our confidence (but not hugely) that CC2 is true. If other pieces of evidence (E2–E4) are also found, the calculations can be combined to further increase our confidence in the contribution claim.

Step 4: Put the claim and findings up for challenge.

The value of the contribution tracing process rests on the validity of the subjective probability estimates, particularly around sensitivity and type 1 errors for given pieces of evidence. Step 4 therefore involves a constructive conversation with key stakeholders, including other members of the evaluation team and CDC stakeholders knowledgeable about the case under investigation, in order to discuss, challenge and reach consensus on the probative value of evidence. This step might be conducted after the preceding three, but where possible should take place earlier to help identify 'expect to see', smoking gun and straw in the wind evidence in advance of data collection.

As well as understanding whether a particular activity has made a contribution, and increasing our confidence in this, a core aspect of the research is to quantitatively estimate the importance of this activity relative to other factors.

2.5. Baseline Logic Models

As described above, we intend to develop Baseline Logic Models for direct mobilisation and for demonstration effects. As well as the core models, we will also develop a small number of variants. For direct mobilisation, these will capture important differences in investment context (e.g. the level of fragility of a country), sector or type of financing (e.g. project or corporate financing for the baseline debt model). For demonstration effects, variants will be organised around different forms of demonstration effect (e.g. business model proof, or higher risk-adjusted returns).

Section 2.2 described the process to develop these models for the demonstration effect aspect of the research. The remainder of this section focuses on direct mobilisation. First, we describe the methodology used to construct three Baseline Logic Models – debt, direct equity and equity funds. Following this, we then present these three Logic Models. Finally, we describe how they will evolve from this point onwards.

2.5.1. Methodology

The three models presented below have been developed from three sources. In each case, we have systematically sought evidence of activities undertaken by CDC, as well as other causal and contextual factors, that have had an influence on mobilisation. Having identified these activities, we have also sought to assess their relative importance, and examined how this is affected by different investment contexts. The three sources and approach used in each case are as follows:

Analysis of CDC's publicly available documents

CDC produces many documents relating to its deals. The main public sources used were case studies, press releases and annual reports. Our first task was to organise these by the three types of investment: debt, equity and equity funds. The documents were then systematically analysed to capture:

- Claims that a particular activity was important for initiating, accelerating or closing a deal
- Claims that a particular activity was important for mobilising private investment
- Documentary evidence to support claims

In each case, claims were organised to capture the following:

- Context: location, sector, etc.
- Weight: estimate of the importance of activity

Analysis of CDC's internal project documents

As well as what is publicly available, CDC generates numerous internal documents throughout the investment process. The most important stages of this process are (i) Screening Investment Committee; (ii) Interim Investment Committee; and (iii) Final Investment Committee. Each of these has an associated presentation and/or memo. Minutes highlighting important issues are also documented. It should be noted that these presentations and/or memos are themselves collated from different sources, such as the Environmental and Social Responsibility or Development Impact teams. CDC also records relevant information through its term sheet, distributions and governance once an investment has been made. Where appropriate, email documentation is also saved on CDC databases, including correspondence with the investee or fund.

At this stage of the research, we first identified all relevant documents, linking these to a timeline of the investment process. Second, we selected a number of representative cases for the three types of instrument and analysed these on the same basis as above.

Interviews with CDC investment directors

Much of the information about the determinants of direct mobilisation is tacit knowledge held by CDC staff, particularly investment directors and members of their teams. To begin to tap into this, two sets of interviews were held at CDC. CDC staff present were:

- David Easton, Director and Head of Consumer Businesses team

- Geoffrey Manley, Investment Director in the Debt team

- Maria Largey, Director and Head of Financial Institutions

- Chirantan Patnaik, Investment Manager in Intermediated Equity Asia

- Will Buchan, Investment Executive, Intermediated Equity

- Adam Fegan, Investment Manager, Intermediated Equity (Asia Funds)

Additional meetings were held with Setor Lassey, Investment Manager, Intermediated Equity, while our researcher was collecting data at CDC.

Interview questions focused on:

- The most important things CDC does with respect to mobilisation

- The most important things others do

- How the external and domestic factors environment affects mobilisation

- How all of these elements vary by context

These three activities were used to create a database of activities – that is, instances where an activity of CDC had some influence over the completion of a deal and the mobilisation of private investment. This created a dataset with around 500 stated activities/actions, linked to context as described above, and weighted in terms of importance. The database was then analysed and different activities grouped into 12 activity categories. Table 3 lists these activity categories for each of the three types of instrument.

Table 3:   **Identified core activities of CDC**

Adapting investment terms	Help establish funds/support first-time managers
Anchor investor	Market signalling and CDC reputation
Co-investor selection, introductions and references	Patient, counter-cyclical, timely investor
De-risking	Post-investment advisory
Due diligence	Pre-investment advisory
Environmental Social Governance (ESG) and impact	Technical assistance; trainings and workshops

As can be seen, some activities apply to some instruments and not others. The reasons for this are self-evident.

Having grouped the activities in this way, the next step is to rank them in terms of importance. The following formula was used to achieve this.

Mobilisation Score =Average Importance attributed to activity*Average Quality of Source Material[17][18]

The next stage of the process was to link these activities to mobilised investment through a Baseline Logic Model. CDC's activities do not lead directly to private investment. Rather, they influence investor behaviour in some way. More specifically, they cause (to varying degrees) investors to take decisions to invest that they otherwise would not. Recent work on ToCs has explicitly sought to incorporate this behavioural element, and this has proved useful for the development of our own Logic Models (Mayne 2017).

Figure 3: COM-B model of behavioural change (Mitchie et al. 2011)
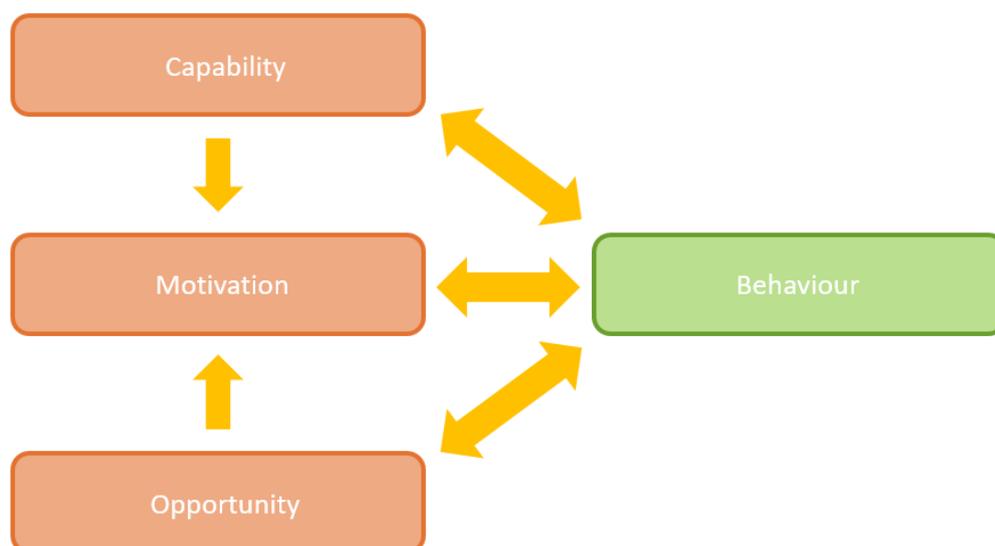
Figure 3 depicts the COM-B model of behavioural change developed by Susan Mitchie and colleagues at University College London. Within this framework, behaviour change – such as a decision to invest – is a function of three interacting components: the capability to take the decision; the motivation to do so; and

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[17] We prioritised average importance through a weighting process on a 1-3 scale, based on whether it was stated to be fundamental to deal closure or not. We prioritised quality of source based on a similar scale. Higher priority was given to direct documents received by CDC, and from interviewees. Lower quality data was given to CDC articles online, or when there was just a passing reference to an associated activity.

[18] This mechanism of prioritisation based on opinion of staff members and from this mix of public/privately available sources is a first stage to filling a knowledge gap, and to be put up to debate regarding composition/contextual factors from CDC staff. It is to serve as a first initial understanding to the logic models, and therefore, until put under challenge, cannot be reviewed as a robust process.

the appearance of an opportunity. All need to be in place for a decision to occur and taken together they describe the *capacity* to make this decision. While we have found this framing to be useful in developing the Logic Models, we will periodically reflect on how it is applied and adapted going forwards (as part of the Logic Model updates). This is in recognition that there is a risk in applying it too mechanistically as either an analytical or presentational tool.

Having identified CDC and ranked activities in terms of importance, we then asked the following three questions:

- To what extent would the activity affect an investor's capacity to invest?

- To what extent would the activity affect an investor's motivation to invest (e.g. through affecting expected returns, risks, or perceptions of these)?

- To what extent would the activity affect the opportunity an investor has to invest?

This enabled us to break down the determinants of investor decision-making in a useful way, and to construct the Baseline Logic Models contained in the next section. The following sections present our Baseline Logic Models for direct mobilisation for equity funds, direct equity and debt.

2.5.2. Baseline Logic Models for direct mobilisation

We have developed a logic model for each of equity funds, direct equity and debt, and these are presented below in depth. An overview of the Logic Models (representing all three in one place) is presented directly below.

Figure 4:   Overview of Logic Models
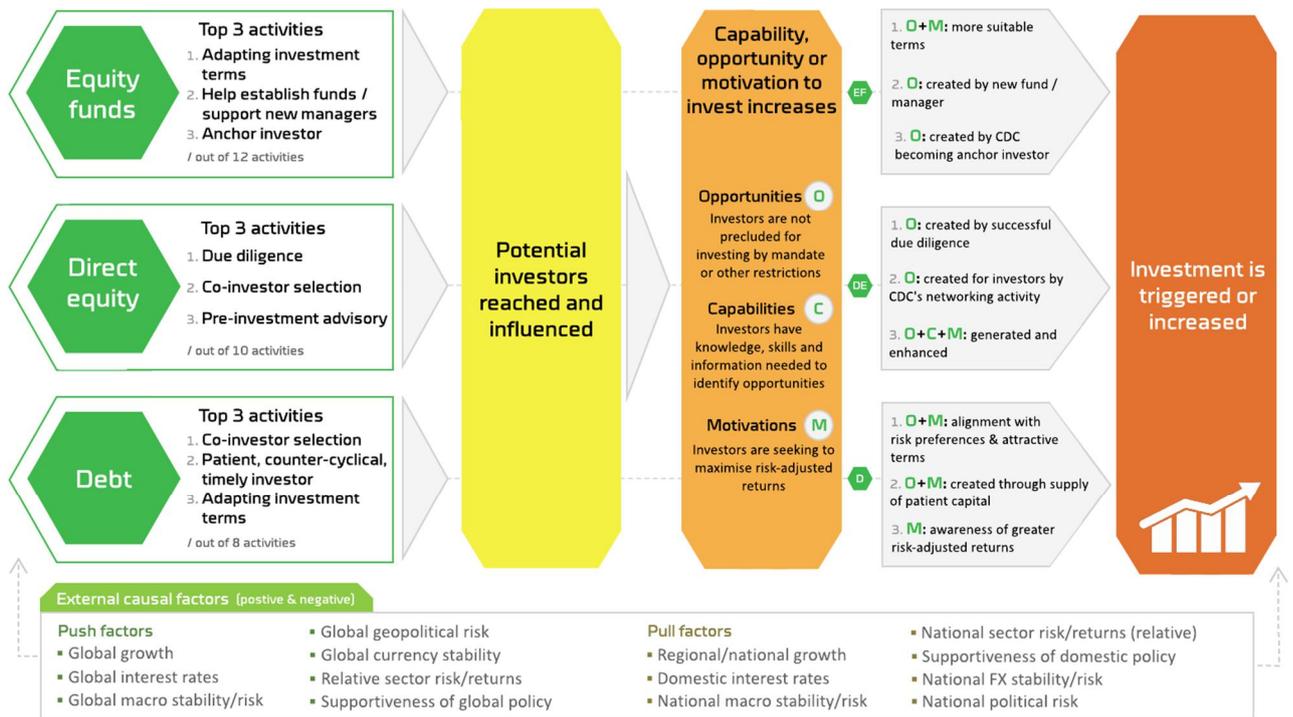
Baseline Logic Model for equity funds

The first Logic Model presented below is for equity funds. As can be seen, this has the full set of activity categories. The order of these activities reflects their ranking derived through the process described above. The first of these is 'adapting investment terms'. In the context of equity funds, this means inputs to the design and structure of the funds to increase their attractiveness to investors. The second most important activity is helping establish funds and/or support first-time managers. The subsequent activities follow the ranking of importance. For readability, the model is split across two pages.

Equity Funds (cont.)

Activity	Details		
7. Pre-investment advisory	CDC provides useful advice to fund manager and co-investors prior to investment CDC has a reputation in this area		
8. Market signalling & CDC reputation	Investors aware of CDC's role (true for all activities) CDC has reputation for identifying growth markets/sectors		
9. Patient, counter-cyclical, timely investor	CDC sticks with funds in downturns This ensures/helps fund survival Fund performance improves in time Investors are aware of this and take a sufficiently long-term view		
10. Post-investment advisory	CDC provides market-useful advice to fund managers and co-investors		
11. TA; Trainings & Workshops	CDC provide useful training Beneficiaries are aware and participate Co-investors are aware		
12. ESG & Impact	Investors care about ESG and impact Fund managers care about ESG and impact Investors know CDC likely to improve fund focus		

Potential investors reached and influenced

Capability, opportunity or motivation to invest increases

Opportunities O
Investors are not precluded for investing by mandate or other restrictions

Capabilities C
Investors have knowledge, skills and information needed to identify opportunities

Motivations M
Investors are seeking to maximise risk-adjusted returns

7 — **C:** enhanced **O:** generated **M:** increased

8 — **M:** to invest increases because of awareness of greater risk-adjusted returns

9 — **O:** to invest is retained through business cycle downturns

10 — **C:** of fund managers and co-investors is enhanced

11 — **C:** of fund managers and co-investors is enhanced

12 — **C:** of fund managers and investors on importance of ESG and impact issues increases
M: to invest increases in line with awareness of importance of ESG issues

Investment is triggered or increased

External causal factors (postive & negative)

Push factors
- Global growth
- Global interest rates
- Global macro stability/risk
- Global geopolitical risk
- Global currency stability
- Relative sector risk/returns
- Supportiveness of global policy

Pull factors
- Regional/national growth
- Domestic interest rates
- National macro stability/risk
- National sector risk/returns (relative)
- Supportiveness of domestic policy
- National FX stability/risk
- National political risk

Baseline Logic Model for direct equity

The second Logic Model is for direct equity. As we can see, the activities overlap with funds but the ranking is different. In this case, due diligence is the most important activity, followed by the identification and selection of co-investors that are most suited to the particular investment. Again, the following activities proceed in a decreasing rank of importance. For readability, the model is split across two pages.

Direct Equity (cont.)

Activity	Output	Outcome (COM)		Impact

6. TA; Training & workshops
- CDC provides useful training
- Beneficiaries are aware
- Beneficiaries participate

7. Market signalling & CDC reputation
- Investors aware of CDC's role (true for all activities)
- Companies aware of CDC's role
- CDC has reputation for identifying successfully equity investments

8. Post-investment advisory
- CDC provides market-useful advice to firms and co-investors

9. Adapting focus of business
- Changed focus increases alignment with most suitable set of potential investors
- Terms more attractive to suitable set of investors
- Investors know about new focus

10. ESG & impact
- Investors care about ESG/impact issues
- Firms care about ESG/impact
- ESG/impact issues affect counter-party risk
- ESG/impact issues affect CDC and co-investor reputation

Potential investors reached and influenced

Capability, opportunity or motivation to invest increases

Opportunities O
Investors are not precluded for investing by mandate or other restrictions

Capabilities C
Investors have knowledge, skills and information needed to identify opportunities

Motivations M
Investors are seeking to maximise risk-adjusted returns

6 — **C:** of firms and co-investors enhanced

7 — **M:** to invest increases because of awarness of greater risk-adjusted returns

8 — **C:** of firms and co-investors is enhanced

9 — **M:** increases because of better focus

10 — **C:** of firms and investors on importance of ESG and impact issues increased
— **M:** increases with awareness of importance of ESG issues

Investment is triggered or increased

External causal factors (postive & negative)

Push factors
- Global growth
- Global interest rates
- Global macro stability/risk
- Global geopolitical risk
- Global currency stability
- Relative sector risk/returns
- Supportiveness of global policy

Pull factors
- Regional/national growth
- Domestic interest rates
- National macro stability/risk
- National sector risk/returns (relative)
- Supportiveness of domestic policy
- National FX stability/risk
- National political risk

Baseline Logic Model for debt

The final Logical Model is for debt. Here, the most important activity is the selection of co-investors. Unlike direct equity, where this relates primarily to knowledge and experience in markets and sectors, the activity in the debt model is focused on the type of finance needed to support and complete the deal. Relatedly, the next most important activity is CDC's ability to provide long-term patient capital.
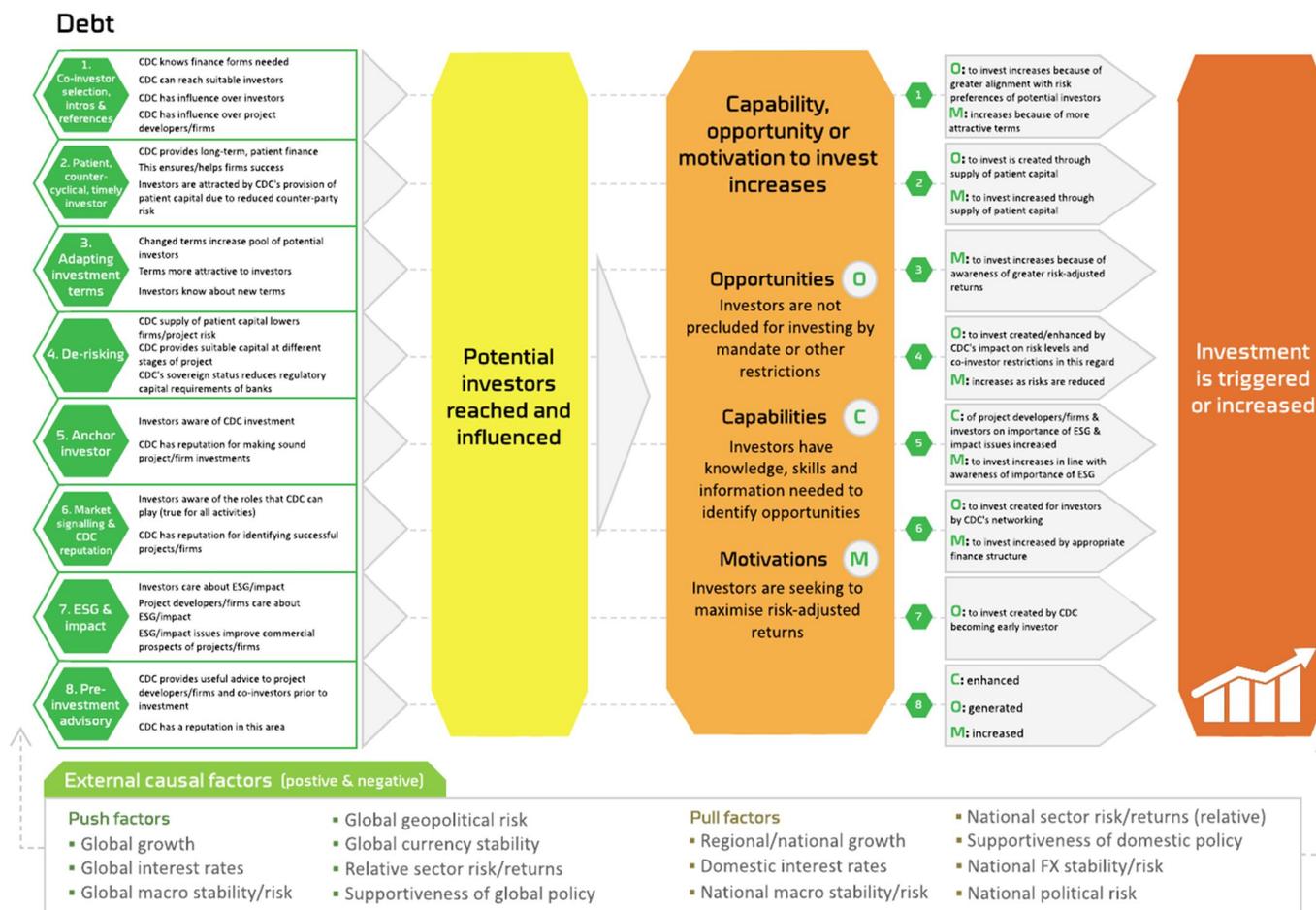
2.5.3. Evolution of Baseline Logic Models

We do not claim that these Baseline Logic Models are the finished article. Although they have been developed with information from CDC as described above, we believe there is more that can be accessed in this respect. In particular, while we believe that the CDC activities that have been identified are the right ones, and that the relative importance of these activities is broadly correct in normal circumstances, further work is required.

What requires more work is variants to these models. To complete this, we propose the following two sets of activities:

1. Workshops with relevant CDC investment teams to identify key variants, and to adjust weights in each case.

2. Workshop with DFI Focus Group to validate Baseline Logic Models.

The first workshop would take place in October 2018 and the second in November 2018.

The direct mobilisation (DM) models were constructed using a range of inputs from CDC - interviews; analysis of 500 public documents; analysis of internal documents during one of our study team's secondment. The aim was to identify the factors for each type of investment that seemed to be important with respect to mobilisation, including their relative importance and the role of context. By definition, DM projects involve CDC as co-investor, and it is therefore reasonable to draw on CDC information to construct baseline logic models. Demonstration Effects (DE) models, in contrast, are subsequent projects where - again by definition - CDC is not involved as a co-investor. As a result, while CDC may have useful inputs into the types of projects that are likely to lead to demonstration effects based on experience, they do not allow insights into the decision-making processes of the investors who have actually made these decisions, including what the most important factors were. A central goal of the investor surveys is to access this information, both in terms of constructing the initial baseline models (combined with inputs from CDC), and to refining these models over time. The baseline DE models will therefore be developed in the light of these activities in year one. We will consider condensing the delivery of logic models for DE in year one if possible. For investor sentiment, as the contribution claims move further away when not directly involving CDC, it is more difficult to create a logic model given that the number of explanatory factors increases as distance from CDC increases. The complexity in the 'system' therefore becomes unmanageable analytically.

2.6. Study on DFI mobilisation

At the time of the Mid-Inception Report, the intention was to do an initial analysis of CDC mobilisation data to identify patterns and trends, and also provide an early output that would be useful for CDC, as well as the study team. Following discussions with CDC, it became clear that a more valuable product from their perspective, would be do undertake an analysis of other DFI's approach to mobilisation. This would also be useful background for the evaluation, and we therefore propose a paper to address the following questions:

- How do other DFIs define mobilisation?

- How do they measure mobilisation?

- How do they report mobilisation?

- What steps, if any, have they taken to try and increase mobilisation?

- What is the record of other DFIs with respect to mobilisation, and what trends, if any, can be found in the available data in terms of the key drivers, including how they vary by context.

As well as reviewing relevant documents and publicly available date, we would conduct interviews with key informants in selected DFIs. As well as IFC, we propose to undertake interviews with FMO, DEG and Norfund, and will also discuss with CDC other potential participants that they think would add value.

2.7 Timing of Evaluation

While section 1.1. and 1.2 outline the rationale for this study, and subsequent sections have outlined the methodologies used, additional focus needs to be taken to understand the longitudinal nature of the study (10 years). This is for several reasons:

1) The factors influencing mobilisation could can change and vary over time (hence the adaptive logic models), and as a result, the value added by CDC in influencing private sector investment needs to be adaptive to those changes.

2) Investment mobilisation can occur through the life-cycle of an investment (typically 7–10 years for private equity for instance), a longitudinal study has the ability to track those features over time.

3) The study has the potential to capture seminal shifts in market sentiment (an exogenous factor), which ultimately affect CDCs ability to mobilise private sector investment and can be considered disruptive to the logic models.

4) It provides evidence towards CDCs 2017–21 strategy and beyond, by providing critical evidence of how CDCs propensity to mobilise private capital can be tracked alongside its evolving portfolio composition.

5) It allows for emergent findings to be delivered in order to help deliver best practice to public financial institutions, and other DFIs in order to support the 2030 agenda.

Annexes:

- Annex 1: Bibliography
- Annex 2: Macro-economic study

Annex 1: Bibliography

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Annex 2: A further note on the CDC Macroeconomic Study[19]

2 September 2018, version 3

The purpose of this note is to engage key stakeholders within CDC and DFID, to both agree a way forward and prioritise next steps for the analysis of the macroeconomic effects of CDC. Based on the feedback received, we have now identified a set of options that we recommend being pursued immediately to set out concrete options. Options will need to be fully costed, and subsequent agreement reached on what can be undertaken within the CDC Study of CDC's Mobilisation (given its scope, other elements of the study, resources and timeframes).

This note clarifies what we believe are the most promising econometrics options for the estimation of the effects of CDC. Second, it develops a plan for a descriptive statistics analysis which will serve as a stepping stone for the econometrics phase. This note is based on feedback given by CDC and DFID.

It is important to note that we only refer to CDC investments in the document. While looking at other DFIs would make sense, it would also require substantially more resources. That is why we recommend focusing on CDC to begin with.

1. Introduction

Both the Approach Paper[20] and the CGD working paper "The Elusive Quest for Additionality" (CGD, 2018 henceforth) establish that estimating the causal macroeconomic impacts of CDC (and DFIs generally) is a very challenging task. The main issue is twofold: (i) CDC investments may be driven by unknown factors which are associated with the macroeconomic climate and (ii) CDC investments may be a response to the macroeconomic climate in addition to (or instead of) being one of its causes. The first challenge is the unobserved heterogeneity (or omitted variable bias), which CGD (2018) discusses at length. The second challenge is reverse causality, which is described in the Approach Paper. Both are distinct sources of endogeneity that need to be tackled in their own right.[21]

Based on the Approach paper, CGD (2018) and previous discussions, we believe that two broad approaches can be pursued to assess the causal effects of CDC investments on macroeconomic outcomes. These are: (i) an Instrumental Variable (IV) approach in a cross-country framework (relying on Bartik's instruments) and (ii) quasi-experimental estimations at country levels, including time-series analyses (notably structural VAR). Dynamic Panel Data methods (e.g. GMM) are unlikely to be valid (CGD 2018) and are thus dropped from the list.

Each of these methods rely on specific identification assumptions. At the moment, there is little information as to whether these assumptions would be met for an analysis of CDC (or DFI) investments. CGD (2018) unpacks what the identification assumptions are at a theoretical level for dynamic panel data methods and IV method, and then set out to confront these with a stylized model of DFI investments. However, these investments are not comprehensively described using actual data and a similar analysis has not been done for country-level analyses.

Following discussions between the Study team, CDC and DFID,[22] we suggest that a robust descriptive analysis of CDC investments (and perhaps DFIs) would be worthwhile for two reasons. First, to the best of

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[19] Written by Amrita Saha, Jean-Pierre Tranchant and Stephen Spratt, with feedback from Chris Barnett.
[20] Tranchant, J.P. and Saha, A. 2018. *Approach Paper 4: Estimating the Macroeconomic Effects of CDC*. Internal document, 2nd February 2018. CDC Mobilisation Study.
[21] For example, whist it is possible to deal with reverse causality by lagging the endogenous variable, such a strategy fails in the presence of unobserved heterogeneity. Conversely, whilst it is possible to account for unobserved heterogeneity by controlling for LL the relevant confounding variables, such an approach does not deal with reverse causality.
[22] Meeting held at CDC's offices on 6th July 2018.

our knowledge, such an in-depth descriptive analysis does not currently exist in a public format. Massa et al. (2011) only provides a light touch description and then moves on to a causal analysis. Yet, being able to describe investment trends across time, countries, and sectors (and possibly across DFIs) would constitute a contribution in its own right. Second, such an analysis would be a valuable first step before proceeding with a sophisticated econometric analysis of the macroeconomic impacts of CDC. This is because econometric methods are only valid under a certain set of assumptions and it is difficult to assess these assumptions without a robust understanding of CDC investments. Hence, this note summarises potential descriptive statistics that can advance our understanding of CDC investments. It focuses on drawing a description of characteristics of CDC investments and their correlations with development outcomes.

Section 2 presents the econometric approaches we believe are most promising and section 3 develops a descriptive analysis plan. Section 4 lists the next steps.

2. Econometric analysis of the macroeconomic effects of CDC Investments: Current and Future Options

We begin by briefly describing our summary assessment of possible ways forward.

(Note: For ease, we have highlighted in grey those assessments that seem more technically feasible)

- **Cross-country options**
These outline existing possibilities for cross-country data that can be pursued immediately and with easily accessible cross-country datasets. Current literature on DFI investments examine impact of DFI on Growth, Investments and Labour using dynamic panel data methods (Massa, 2011; Te Velde, 2011; Dalberg, 2010; Massa et al., 2016; Massa, 2013; Jouanjean and te Velde, 2013; IFC, 2013; Ebert and Posthuma, 2010).

We propose to extend this work in two directions:

1. We suggest implementing an IV approach instead of the GMM approach used in the literature. CGD (2018) demonstrates that the latter is probably fatally flawed to identify the causal impact of DFI. However, the Bartik's IV strategy looks much more promising, provided we can proxy the economic climate with enough accuracy.

2. The impact of DFI investments can be examined on other macro outcomes that have not been typically examined for DFI investments, such as innovation (Saha & Ciarli, 2018), socio-economic development (Faye et al., 2013; Cochran et al., 2015) and state capacity (Vervinckt, 2014). Aggregate CDC/DFI investments (country-year) with World Bank datasets on aggregate investments, employment data, FAOSTAT, etc. makes these cross-country options feasible from a technical and resources point of view.

- **Sub-national analyses options**
Next, we outline potential subnational (or within-country) options that present the opportunity to inform macro outcomes based on underlying micro work at the level of geographical areas, firm networks and trade relationships. While technical feasibility is already demonstrated in existing work, some amount of scoping work will be required to examine the feasibility of pursuing the current within-country options from a resources point of view.

The idea is to leverage the uneven geographic allocation of investments within subnational units in a country to estimate the impact of these investments. Analyses at the subnational level allow us to account for time-varying, country-wide, unobserved heterogeneity at the country-level by including a set of country-year fixed effects. This is an important improvement with respect to cross-country estimations.

Obviously, CDC investments are still likely endogenous at the subnational level. To deal with this, we can use standard econometrics methods such as (matched) difference-in-difference approach (DID) or GMM. The main attraction of within-country approaches is not that they solve all endogeneity issues (they do not) but that they eschew the problem of over-aggregation of data, ensures comparability of measurements and constructs across observations, and that they allow researchers to harness richer and finer-grained data to support the econometrics than is possible with using countries as the unit of analysis.

Chauvet and Ehrhart (2014), Bitzer & Gören (2018) and Crivelli et al. (2018) are recent examples of such studies on the effect of foreign aid. To the best of our knowledge, such an approach has not been implemented to assess the role of DFI. We propose to first undertake this type of study in one country where CDC investments are substantial, data is available, and which displays sufficient scope for within-country variations.

It is worth noting within-country estimations can be done at the level of firm networks. Firms are not only spread spatially but are also increasingly seen as part of networks in the production space. With production increasingly seen from the lens of global value chains, it is possible that a specific CDC investment leads to further investments for firm networks. Using the concept of a lead firm or lead product (financed by CDC investments), one could examine correlation with increasing economic activity for other firms or products within networks. However, firm network analyses would require substantial resources and are considered a future option at this stage.

A complementary approach consists in investigating the dynamic relationships between CDC investments and macroeconomic outcomes. One advantage of using time-series approach is that it can be used separately for each individual country. We can estimate a Vector Autoregressive (VAR) model to assess whether CDC investments Granger-cause economic outcomes and reciprocally. A variable is said to Granger-cause another variable Y if the lags of the CDC investments explain the current level of Y whilst also controlling for the lags of Y. We can also test for co-integration based on this VAR model, for instance by using Johansen's methodology. Examples of using these methods in a single country in a panel of countries abound (see Lof, Mekasha and Tarp (2015) and Crivelli et al (2018) for investigations of the effects of foreign aid).[23]

3. What characterises CDC investments? Proposed Descriptive Analysis Plan

Before embarking on the econometric investigations proposed in section 2, we suggest to first assemble the required data (harnessing as many sources as possible) and then to describe these data in depth. The descriptive statistics plan will be done in five areas, detailed below.

3.1. CDC investments across countries, years and sectors

In a first stage, we will describe the investments across sectors, time and space. For example:

- What sectors have witnessed increasing CDC investments? Which are sectors where CDC investments dropped off? How the patterns of sectoral investment vary across countries and time?

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[23] We can also resort to structural VARs, which estimate the average response of the model variables to a given one-time structural change. They allow the construction of forecast error variance decompositions that quantify the average contribution of a given structural change to the variability of the data. They can be used to provide historical decompositions that measure the cumulative contribution of each structural change to the evolution of each variable over time. Finally, structural VAR models allow the construction of forecast scenarios conditional on hypothetical sequences of future structural changes.

- What characterises sectors that have witnessed increasing CDC investments?
- What country-sector pairs witnessed increasing CDC investments?
- Have CDC investments increased or decreased where private sector investments fluctuated (increased or decreased)?
- Have CDC investments dropped off where private investments have risen/remained consistent?
- What explains some sectors witnessing increasing CDC flows?

As an illustrative example only, the OECD data for CDC investments to all recipient countries between 1990 and 2011, reports average CDC investments (Million USD) in aid sectors as shown in Table A3.1. *Banking and financing, energy generation* and *construction* sectors appear to have witnessed increasing CDC investments in recent years, while *Agriculture* and *Communications* have witnessed clear declines in average investments directed to these sectors.

Table A3.1: CDC Commitments across Aid Sectors 1990-2011

| Sector Name	1990-1995	1996-2000	2001-2005	2006-2011
Agriculture	3	5	9	1
Banking and financing	3	9	7	8
Basic health			7	4
Communications	1	17	21	3
Construction			0	6
Energy generation	7	21	26	9
Forestry		2	0	5
Industry	2	6	9	2
Mineral resources	1	29	6	1
Other social infrastructure	31	6	0	3
Trade policy and related		0	8	
Tourism	1	0		3
Transport and storage	0	8	2	1
Water supply and sanitation	0	9		2
Total	**4**	**8**	**8**	**5**

Note: Average commitment amount in Millions (constant) USD in each period. The sectors are AidData Sectors (3-digit) that the project is meant to foster. This field is usually generated from the purpose code assigned to the project through the AidData Activity Coding methodology. Before a project is activity coded though, this field can be generated from the CRS purpose code, a donor-provided sector, or the title of the project.

Some trends in CDC investments can be explained by identifying the purpose of CDC investments within sectors. For instance, a change in policy focus can led to higher investments in banking and finance, with an increasing need for SME credit and microfinance. In fact, a closer look reveals that "*Formal sector financing of intermediaries*" reported as project purpose, witnessed a steady increase (only 29 projects prior to 2000 to about 160 projects after 2000) in recent years. Further, a quick examination of countries where the

banking and finance projects have focused on reveals that majority of these (about 41%) are in Sub-Saharan Africa.

Figure A3.4: Regional distribution (%) of Banking & Financing CDC projects since 2000
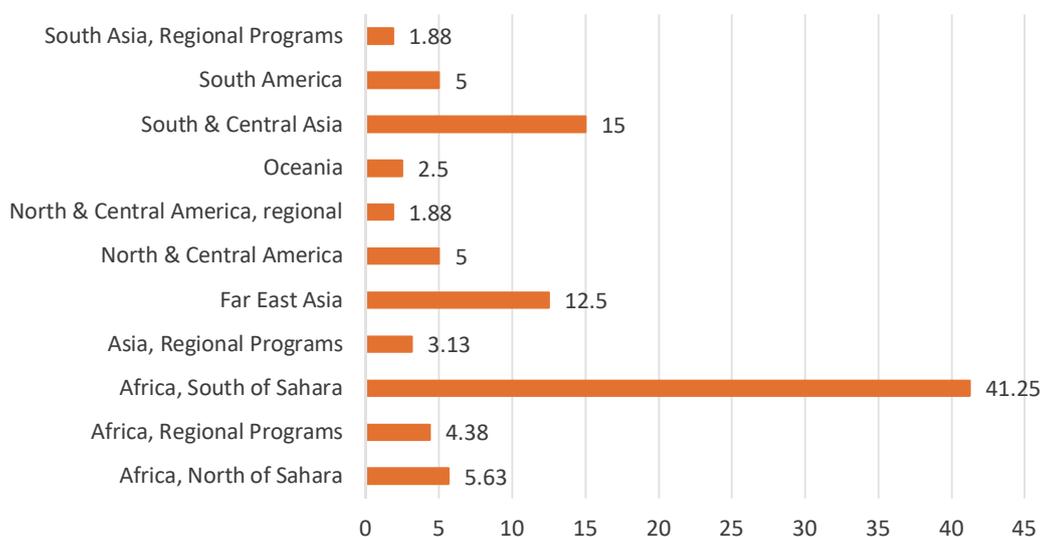
3.2. Co-evolution of CDC investments and of the economic and political environment

In a second stage, we propose to examine the relationships between CDC investments and the economic and political environments. For instance, we can look at the association between the temporal profile of CDC investments and the evolution of governance and economic environment (private sector investments, commodity process) etc.[24] One key area of investigation will be to see whether CDC investments precede, follow (or are unrelated with) private sectors investments.

We can also examine the correlation between CDC/DFI investments and trade (export) flows to examine if CDC investments help diversify the export structure of a country. CDC investment can also support firms, which have both forward and backward linkages-that is, manufacturers need inputs from suppliers (backward linkages) but can also sell their products to distributors (forward linkages). By supporting growth in 'lead firms' (top of Global Value Chains), CDC investments may produce both forward and backward effects, which in turn will also affect employment. If a sub-sample of such CDC investments are known (say a few firms in a given country), one could examine correlations with forward and backward linkages.

3.3. Within-country allocation of CDC investments

In a third stage, we propose to look at the within-country profile of CDC investments. The possibility to obtain geo-coded CDC investments is promising (see applications in other literature such as Bitzer & Gören, 2018; Ichino et al, 2018). If the geographical coordinates of CDC investments are available, one can examine the spatial concentration of CDC investments. Using the geo-coded investments (geographical coordinates for location of firms), one could draw a descriptive account of household and firm characteristics that are likely correlated with CDC investments in specific locations. One may examine for instance, the importance or impact of CDC investment supported services in household budgets (household data), on firm performance (firm-level data), or on general economic activity in geographical areas (night lights).

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[24] Databases such as the Penn World Tables (growth and development), the UNIDO (for productivity) and World Development Indicators (WDI) provide a wide range of relevant economic indicators. Governance indicators can be readily downloaded from the WDI (including the CPIA index), the Worldwide Governance Indicators (WGI), the Country Risk Guide and others.

We propose to that in a few select countries for which CDC investments are substantial.

3.4. Measuring project characteristics

CGD (2018) outlines a *'project characteristics'* variable described as summarising observable data about specific projects such as the sector and geography of the project, and management's track record. One useful way forward would be to attempt to *unpack these project characteristics*, based on actual data and identify differences by countries, types of markets and sectors. Another possible aspect could be project characteristics by geographical areas.

These project characteristics may include for example market size, market access, human capital, transportation infrastructure, institutional quality, and sector-specific productivity considerations (e.g. Agricultural investors generally prefer locations with fertile soil and high levels of rainfall). One potential method to discern project characteristics could be a simple cluster analysis or clustering whereby one could group a set of CDC projects by country in such a way that projects in a same group (cluster) are more similar (in some sense) to each other than to those in other groups (clusters).

Unpacking project characteristics will depend both on available data and possibility to match with other sector, company and datasets with geographical information.

3.4. Measuring Thresholds of Expected Return

It has been said that DFIs and private investors each have a minimum (threshold) expected return, below which they will not invest. So, the private sector and CDC will invest in some projects and not in others. It is also possible, that CDC investments may crowd-out/crowd-in private investors. To account for the fact that the impact of these expected returns in enhancing investments is likely to differ across projects, such an impact will be non-linear with some threshold. One can estimate panel threshold models with endogenous variables, allowing the data to endogenously select a sample split, to simultaneously test the *presence of threshold expected returns* each for private investors and DFI investors. Estimating a quantitative indicator of threshold returns can help inform future investment decisions.

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