

Measuring Indirect Employment Effects: a Methodology for Private Sector Investments in Developing Countries

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Abstract

This paper describes a methodology developed by CDC Group PLC and Steward Redqueen to measure the total number of jobs and livelihoods that are likely to be supported and created by businesses in a large and diverse investment portfolio in Africa and South Asia. The methodology is driven by the fact that private sector investment, as provided by development finance institutions (DFIs), helps a business to grow. This growth requires more inputs. The additional inputs, be they direct labour or intermediary products and services, result in additional employment opportunities. Outputs such as power and loans also enable other businesses to grow. The methodology is a 'lean data' approach: basic headcount and financial data from the business are fed into a set of multipliers derived from social accounting matrices (SAMs) and labour force data to yield an estimate of the total number of jobs and livelihoods likely to have been supported by the business in a given year. The change year on year gives the measure of job creation. Data quality at both national and corporate level in Africa and South Asia is not all it might be, and employment multipliers derived from SAMs cannot take account of structural changes. Despite these and other caveats, the methodology can help measure and report on indirect employment effects, at a time when the private sector and its investors are increasingly expected to demonstrate their impact in meeting the global goal of decent work and economic growth. The paper highlights some significant changes in the labour- and capital-intensity of different sectors in Africa and South Asia over the past decade that have important implications for policy-makers and investors trying to identify the optimum targets for job creation.

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Introduction

CDC Group PLC, the UK's development finance institution (DFI), has the mission of supporting the building of business throughout Africa and South Asia to create jobs and make a lasting difference to people's lives in some of the world's poorest places.

CDC has an extensive portfolio of over 1,000 private sector investments across multiple sectors in 38 African and South Asian countries. The investments are a mix of direct equity, debt and indirect equity through local fund managers. This is a large and diverse portfolio.

To meet its job creation mission, CDC directs its capital towards labour-intensive sectors such as food processing and towards infrastructure and financial institutions that support labour-intensive businesses. Steward Redqueen, an economic impact consultancy, helped CDC and DFID identify these sectors by amalgamating national-level social accounting matrices (SAMs) and labour force surveys, an approach they had previously developed for multinational clients (Kapstein & Kim, 2011).

CDC collects annual data from its investee companies on their direct workforce, and has reported year-on-year changes in the total headcount (Lerner *et al.*, 2015). However, the jobs literature suggests that direct employment is a fraction of the indirect employment effect in supply chains and the induced effect from the spending of wages (IFC, 2013). There is also a large economy-wide effect from electricity and financial services (ODI, 2015). Measuring direct employment alone, therefore, is an unsatisfactory response.

In 2014-16, CDC worked with Steward Redqueen to develop a methodology to measure the indirect employment effects of businesses, with the constraint that the methodology would need to work across a large portfolio of businesses where each business could not be burdened by more than with minimal data requirements. The headline results of this methodology have been published in CDC's *Annual Reviews* (CDC, 2015; CDC, 2016). This paper explains the methodology in greater detail.



Methodology

The theory of change behind the methodology is simple: a financial investment allows a business to grow. The additional output requires more direct employment and intermediary inputs. This in turn leads to expansion among existing and new suppliers, thereby supporting and/or creating jobs. Some products and services – notably electricity and finance - remove constraints for other businesses, enabling them also to expand and again support and/or create jobs. Estimating this effect, while it is likely to be significant, is not covered in this paper.

The total employment effects that the methodology is intended to capture are three-fold³:

1. *Direct job effects*: at investee-level, i.e. the company or project that CDC has invested in (directly or through a fund);
2. *Supply chain effects*: within the investee's direct and indirect suppliers;
3. *Induced effects*: due to the spending of wages earned by employees of the investee and its direct and indirect suppliers; and
4. *Economy-wide effects*: due to i) consumption of energy provided by power investments, and ii) increased loans provided by financial institutions.

In order to measure these employment effects, there are two options. The first is by direct observation. This works for one-off studies of individual business studies where the researcher has access to detailed personnel and supplier information, and can make site visits to suppliers (IFC, 2013). For larger portfolios, however, the approach is considered to be impractical (KfW, 2015a).

The second option is by developing a set of generic multipliers. Various methods have been proposed for this; this paper describes a method based on input-output models, where the results may be less precise than through direct observation but where results can be aggregated across a large portfolio and applied regularly for impact monitoring.

The multiplier-based methodology developed by CDC and Steward Redqueen relies on the social accounting matrix (SAM), which describes the financial flows of all economic transactions that take place within an economy. Using the SAM, money can be traced as it flows through an economy. The literature on SAMs originated in developed nations (Leontief, 1951), but recent I-O tables are now available for 120 countries, including developing countries ranging from Benin to Zambia.⁴

Employment multipliers are now deployed in a wide range of applications, from responses to economic depressions and understanding the impact of computers on employment to global trade negotiations (GTAP, 1996), the immigration and climate change debates, and regional development (Bess & Ambargis, 2011). Job creation models have also been used to inform decisions on large public infrastructure and sporting projects, and for corporate policy (Kapstein & Kim, 2011; BT PLC, 2015). Most recently, the approach has been trialled by development finance institutions to forecast or monitor their indirect employment effects (IFC, 2013; KfW, 2015a, 2015b; FMO, 2015).

³ This methodology does not attempt to measure the employment effects of tax payments by the business, nor the effects of knowledge spillovers.

⁴ Global Trade Analysis Project, www.gtap.agecon.purdue.edu/databases/regions.asp?Version=9.211, accessed 4/8/2016.



The disadvantages of the approach are well recognized in the literature (Miller & Blair, 2009). Fiona Tregenna outlines the following caveats, alongside possible mitigations:

“Technical coefficients of production are assumed to be fixed (although these could always be ‘manually’ altered in the base data should there be valid reasons for doing so). This implies no change in returns to scale and a fixed production structure with no substitution of inputs. It is also assumed that prices do not change. Employment multipliers are thus most accurate for projecting the employment effects of relatively small and short-term changes in demand. Furthermore, the simplest way of computing employment multipliers assumes that there are no supply or capacity constraints, although these could be built into a model. Another consideration in the calculation of employment multipliers is that, unless imported intermediates are separated out, the backward linkages and thus the employment multipliers are not confined to the domestic economy, and may thus be overstated (with this being uneven across sectors depending on how much of a sector’s intermediate inputs are imported). Finally, it should be noted that, unlike for example a computable general equilibrium (CGE) model, IO or SAM analysis does not deal with monetary policy, savings, innovation, and so on. Employment multipliers thus do not account for the effect of changes in demand for the output of a given sector on employment through such channels” (Tregenna, 2015).

Since such mitigants would be extremely hard to implement across a large investment portfolio, indirect employment effects by DFIs will always be subject to these caveats.

Relevant SAMs were accessed from the Global Trade Analysis Project (GTAP), which include 31 African and South Asian countries. These SAMs cover 57 sectors, across three reference years: 2004, 2007 and 2011. From the GTAP resource, we produced four national and eight regional SAMs to cover Africa and South Asia (see Table 1).

Table 1: National and regional SAMs

Country or region	Social Accounting Matrices used (SAMs)
Africa	
Kenya	Kenya
Nigeria	Nigeria
South Africa	South Africa
Africa: Central Africa	Rest of central Africa (Central African Republic, Chad, Congo, Equatorial Guinea, Gabon, Sao Tome and Principe), South Central Africa (Angola, DRC)
Africa: East Africa	Ethiopia, Rwanda, Tanzania, Uganda, Rest of Eastern Africa (Burundi, Comoros, Djibouti, Eritrea, Mayotte, Seychelles, Somalia, Sudan)
Africa: Indian Ocean	Mauritius, Madagascar
Africa: North Africa	Egypt, Morocco, Tunisia, Rest of Northern Africa (Algeria, Libyan Arab Jamahiriya, Western Sahara)
Africa: Pan- Africa	All African countries
Africa: Southern Africa	Botswana, Malawi, Namibia , Mozambique, Zambia, Zimbabwe, Rest of South African Customs Union (Lesotho, Swaziland)
Africa: West Africa	Burkina Faso, Cameroon, Cote d'Ivoire, Ghana, Senegal, Rest of Western



	Africa (Cape Verde, Gambia, Guinea-Bissau, Liberia, Mali, Mauritania, Niger, Saint Helena, Ascension and Tristan Da Cunha, Sierra Leone)
<i>Asia</i>	
<i>India</i>	India
<i>Asia: South Asia</i>	Bangladesh, Pakistan, Sri Lanka

The 57 sectors were amalgamated into 16 broader sectors. For each sector, an employment intensity multiplier (jobs per US\$ of output) was developed, based on GDP and employment per sector derived from the 15 countries for which recent economic and labour force data was available.

The methodology then applies these multipliers to data on financial flows generated by each business operating in that country/region and sector, to estimate of the indirect employment effects.



Calculations

As indicated in section 2.1 we distinguish between direct, supply chain, induced and economy-wide effects of electricity and loans. The next sections elaborate on the quantification of the related employment effects.

3.1 Direct effects

The direct employment at the business itself uses hard data reported to CDC annually by the investee business (in full-time equivalents and broken down by gender).

3.2 Supply chain effects

Supply chain expenditure is based on the cost of goods sold (COGS).⁵ The proportion of COGS procured locally is estimated from the SAMs, and ranges from xx% for yy sector to zz% for aa sector. The domestic COGS is routed through the SAM in order to calculate the output generated at its direct suppliers and their suppliers. These outputs are multiplied by the relevant sector-specific employment multipliers to calculate the job effect.

$$\left[\frac{\text{Related indirect output}}{\text{Output}} \right] \times \left[\frac{\text{Employment}}{\text{Output}} \right]$$

3.3 Induced effects

To calculate the induced effects – job opportunities resulting from the spending of wages - the methodology takes business-level data on actual wages paid in the business and prevailing wages earned in the relevant sectors of the supply chain and routes these through the SAM to determine where wages are spent. Multiplying the resulting output by the applicable sector-specific employment multipliers yields in jobs and livelihoods resulting from the spending of wages.

3.4 Economy-wide employment effect from increased consumption of electricity

For electricity generation and supply businesses, we estimate the additional output in GDP associated with the increase in gigawatt hours (GWh) of electricity, on the basis that a 1% increase in electricity consumption leads to a 0.1% increase in the GDP. This ratio is derived from studies in developing countries (Eiffert, 2010; Masduzzaman, 2012; Hossain, 2013). This increase in GDP is allocated across sectors based on their electricity intensity and is multiplied by the GDP-intensity of a sector - which is the amount of output per US dollar of GDP. Once we have determined the additional output we multiply that with the employment intensity to estimate the jobs from increased power production and consumption.

$$\left[\frac{\text{GWh production}}{\text{GWh production}} \right] \times \left[\frac{\text{Relationship between electricity consumption and GDP growth (factor 0.1)}}{\text{consumption and GDP growth (factor 0.1)}} \right] \times \left[\frac{\text{Output}}{\text{GDP}} \right] \times \left[\frac{\text{Employment}}{\text{Output}} \right]$$

⁵ Where COGS in nota available, it is estimated as the residue of sales revenue minus earnings minus wages. The local procurement factor is derived from the SAM.



3.5 Economy-wide employment effect from increased loans

For investments in financial institutions (banks or microfinance institutions), we take the gross loan portfolio by sector and route these financial flows through the relevant SAMs. To estimate the output of the loans, we multiply it by the average capital-intensity in the relevant sector. This is determined by the mix of large corporates and MSMEs in that sector in the relevant region.

$$[\text{Gross loan portfolio by sector}] \times \left[\frac{\text{Employment}}{\text{Output}} \right]$$

The following additional assumptions are made when estimating the employment effects from loans:

- a) Micro finance investments are treated as investments in the trade sector;
- b) Mortgage finance is allocated 50% to the business services sector and 50% to construction;
- c) Retail finance is equally split between trade, construction and business services.
- d) Labour productivity at micro finance investees is comparable to the informal trade sector in the country when applying employment intensities;
- e) MSMEs are considered 20% less capital intensive than sectoral average, while corporates are considered 27% more capital intensive than average when applying the capital intensity (Bas et al, 2009).

3.6 Total employment effects

The total jobs and livelihoods likely to be supported by the business is then the sum of the direct employment, the supply chain effect, the induced effect and, if a power or financial sector investment, the economy-wide effect.

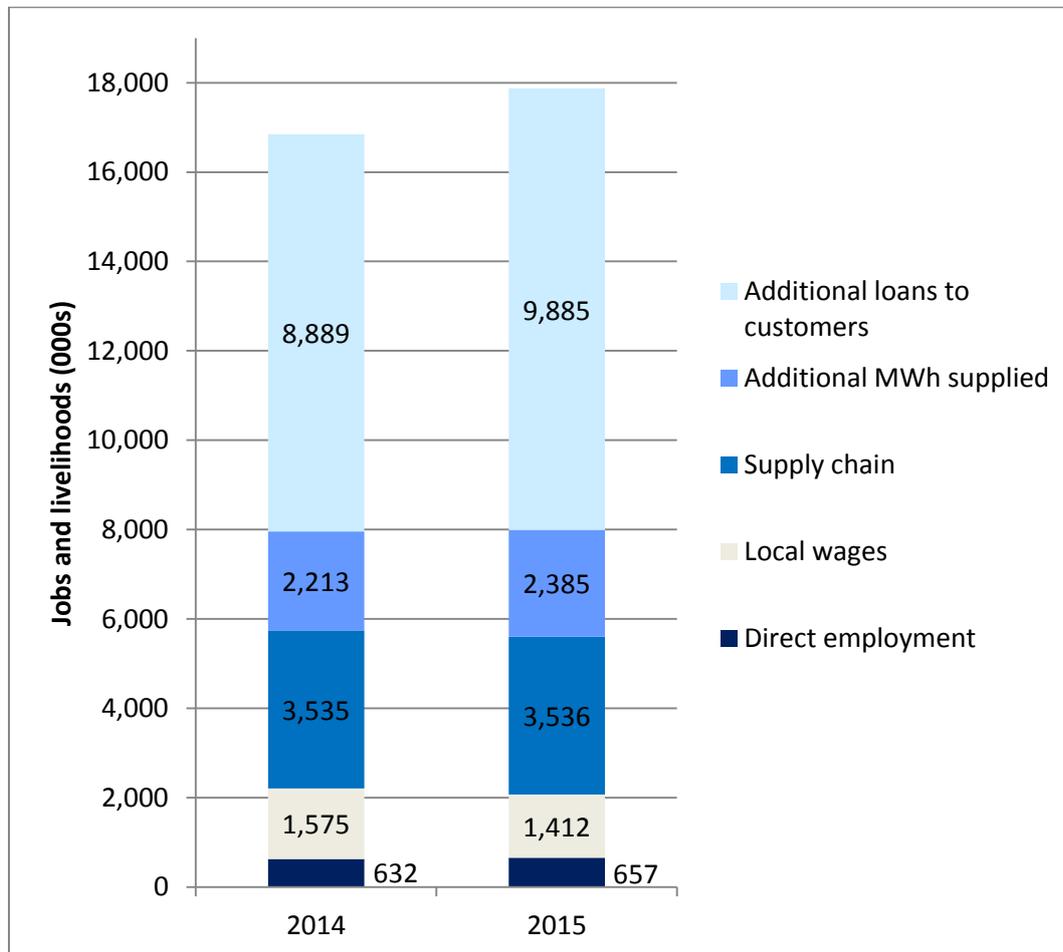
When the exercise is repeated annually, the difference in the total employment effect year-on-year gives one way of estimating 'job creation': the increase in the total jobs and livelihoods footprint of the group of businesses.



Results

As indicated by the literature (IFC, 2013), we discover that the indirect and induced employment effects are substantial in a sample of almost 500 African and South Asian firms. The results for 2014 and for 2015 are shown in Figure 1 below.

Figure 1: Total employment effects of 484 businesses, 2014 & 2015



Job creation and business growth can be explained by many or a combination of factors: increased demand for a product, competitive advantage, increased productivity, as well as an improved business climate due to macroeconomic reasons, for example government policy or national economic growth.

In 2015, the biggest driver of job creation in CDC's portfolio was the indirect jobs created through additional loans to customers. Loans enable businesses to purchase equipment, address working capital needs, invest or refinance their business; 37% of businesses in Sub-Saharan Africa and 27% of businesses in South Asia identify access to finance as a major constraint to business growth (*World Bank Enterprise Surveys*). In CDC's results, all banks excluding one increased their loan books in local and in USD terms (net of loans past due or impaired, which are unlikely to create jobs), enabling loan recipients to increase their output. In addition, policy has created a supportive business environment for financial institutions – for example, the Reserve Bank of India granted banking licenses under the category of Small Finance Banks to eight microfinance banks, which allows them to increase their loan books and products.



The indirect forward job calculations assess the power produced by the portfolio companies as a proportion of national consumption, and link this with output. Power supply to an economy can be increased through additional generation capacity or efficiency improvements, be they at the generation plant itself or via transmission and distribution networks.⁶ Generally injecting additional power generation capacity tends to lead to greater employment effects than improvements at existing plants, although this is dependent on plant size. In 2015, businesses in CDC's power portfolio mainly increased their supply via efficiency improvements, creating 172,000 indirect jobs and livelihoods. Once operational, greenfield power projects in CDC's portfolio will contribute to even greater job creation.

The 484 businesses created a marginal number of jobs in the supply chain (+342) and decreased induced jobs from corporate and supply wages by 163,000 jobs. This is mostly explained by currency effects, notably the Nigerian Naira and Indian Rupee, which at times have led to decreased spending in USD but not in local terms. However CDC believes that the minimal or reduced job creation effect is likely to exist even if the companies are spending more in local currencies, as the reduced purchasing power will result in employees and corporations contracting and trying to cut costs and spend less, resulting in indirect job losses.

46% of CDC's businesses created 24,673 direct jobs in 2015. 25% reduced their workforce and the remainder of businesses continued to sustain the same level of jobs. Over half of the direct jobs created were in the financial services, supporting the previously mentioned growth in the sector. On a net basis, CDC companies in Ghana and Zimbabwe reduced their overall headcount, with companies experiencing average growth rates of 2% and -1% respectively, compared with the CDC's overall growth rate of 6%. This likely reflects the economic difficulties both countries are facing: in 2015, GDP growth fell from 4.0% to 3.7% in Ghana and from 3.8% to an estimated 1.5% in Zimbabwe.⁷ However job fluctuations can also be ascribed to corporate decisions: for example, two companies in the healthcare sector investing in hospital expansions at existing and greenfield locations created 4,963 jobs.

Discussion

As noted, the methodology enables the aggregation of direct and indirect employment effects across investment portfolios that encompass many businesses across multiple regions and sectors. DFIs are among the organizations that may wish to aggregate results in this way for impact monitoring and reporting.

It is important to note the following limitations inherent in the methodology:

- a) Employment effects are driven by the total productivity of the business, deriving from capital, labour and residuals. DFI investment is one among many inputs to business growth and so the results cannot be attributed to a given DFI alone;

⁶ See "What are the links between power, economic growth and job creation?", *ODI*, March 2016); and "What is the link between power and jobs in Uganda", *Steward Redqueen*, to be published in late 2016

⁷ See African Development Bank Group's *Economic Outlook* for Zimbabwe and Ghana ([link](#))



- b) Business growth impacts on the inter-relationships between sectors within an economy (eg through competitive effects and displacement), but this methodology is not dynamic and does not take into account likely changes in employment intensity;
- c) Supply chain impacts are calculated using sectoral averages. In reality, each business has a unique way of procuring its goods and services, and businesses backed by DFIs are unlikely to be typical of their sectors (they may be more capital intensive, for example);
- d) Other firm-level development impacts (e.g. from tax contributions, product innovations, foreign exchange savings from exports, knowledge spill-overs) are not accounted for, even though they probably create further employment impacts; and
- e) The methodology is dependent on the quality of firm-level data and national statistics, both of which can be unreliable in Africa (Jerven, 2013) and South Asia. The results in this paper are generated from 484 businesses, which is 83% of the eligible businesses in the portfolio.

Further research and development are clearly required to increase both understanding of the results and to identify potential ways to mitigate the above challenges. As the methodology is refined and the results cover more years and more companies, we will publish more analysis on what we are learning, and make refinements to the approach. In the meantime, we invite critique and comment on the methodology.



References

- Bas, Muradoglu & Phylaktis (2009), 'Determinants of capital structure in developing countries', accessible at: https://www.researchgate.net/publication/228465937_Determinants_of_Capital_Structure_in_Developing_Countries
- Bas, Tugba (2012) 'Capital structure and debt maturity choices of firms in developing countries.' Unpublished Doctoral thesis, City University London, accessible at: <http://openaccess.city.ac.uk/1073/>
- Bess, R. & Ambargis, Z. (2011) 'Input-Output Models for Impact Analysis: Suggestions for Practitioners Using RIMS II Multipliers', presented at the 50th Southern Regional Science Association Conference, March 23-27, 2011, New Orleans, Louisiana.
- BT PLC (2015) 'The Social Study 2015 – the Economic Impact of BT across the UK', Regeneris for BT, accessible at: <http://www.btplc.com/Thegroup/BTUKandWorldwide/BTRegions/Factsandfigures/SocialStudy2015/SocialStudy.htm>
- CDC (2013) 'Investment Policy for the period from 1 January 2012 to 31 December 2016' CDC Group plc, accessible at: http://www.cdcgroup.com/Documents/Transparency%20and%20reporting/CDC%20Investment%20Policy%202012_16.pdf
- CDC (2015) 'CDC Group PLC Annual Review 2014', accessible at: <http://www.cdcgroup.com/Corporate-information/annual-review-2014/>
- Eiffert, B.P.O (2010), 'Essays on the Performance of Manufacturing Firms in Developing Countries', accessible at: <http://escholarship.org/uc/item/9621d3w7#page-1>
- FMO (2015) 'FMO Impact Model: Methodology', accessible at: https://www.fmo.nl/l/en/library/download/urn:uuid:d85800f8-607a-4118-bb7a-059392b8c869/fmo+impact+model+%26+methodology.pdf?format=save_to_disk&ext=.pdf
- Hossain, S., (2013) "Energy consumption nexus economic growth: a dynamic co-integration and causality analysis", www.scholarsworld.net, Volume I, Issue III, November 2013.
- IFC (2013) 'IFC Jobs Study: assessing private sector contributions to job creation and poverty reduction', Washington, accessible at: http://www.ifc.org/wps/wcm/connect/0fe6e2804e2c0a8f8d3bad7a9dd66321/IFC_FULL+JOB+STUDY+REPORT_JAN2013_FINAL.pdf?MOD=AJPERES
- IFC (2010) 'Scaling-Up SME Access to Financial Services in the Developing World', accessible at: <http://www.ifc.org/wps/wcm/connect/bd1b060049585ef29e5abf19583b6d16/ScalingUp.pdf?MOD=AJPERES>
- ILO (2002) 'Women and Men in the Informal Economy: a statistical picture', accessible at: <http://www.ilo.org/dyn/infoecon/docs/441/F596332090/women%20and%20men%20stat%20picture.pdf>



- Jerven, M (2013) 'Poor Numbers: how we are misled by African development statistics and what to do about it', Cornell.
- Kapstein, E. & Kim, R. (2011) 'The Socio-Economic Impact of Newmont Ghana Gold Limited', Steward Redqueen, Haarlem, June 2011, accessible at:
http://www.stewardredqueen.com/uploads/cases/socio_economic_impact_of_newmont_g_hana_gold_july_2011.pdf
- KfW (2015a) 'Employment Effects of Financial Cooperation: An Estimation Model', KfW Position Paper, accessible at: https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente-Positionspapiere/2015_01_22_PP_-Besch%C3%A4ftigungsmodell_EN.pdf
- KfW (2015b) 'Employment Effects of Financial Cooperation: Results of an Estimation Model', KfW Position Paper, accessible at: <https://www.kfw-entwicklungsbank.de/PDF/Download-Center/PDF-Dokumente-Positionspapiere/2015-01-Besch%C3%A4ftigungswirkung-der-FZ-EN.pdf>
- Leontief, W. (1951) 'Input-output economics' in: *Input Output Economics*, Oxford University Press, 1986.
- Lemma, A., Massa, I., Scott, A. & te Velde, DW (2016) 'What are the links between power projects, economic growth and job creation? A review of the evidence', ODI for CDC Group, London.
- Lerner, J., Leamon, A., Dew, S. & Lee, D.I. (2015) 'The Impact of Funds: An Evaluation of CDC 2004-12', Harvard Business School working paper.
- Masduzzaman, M. (2012) 'Electricity consumption and economic growth in Bangladesh: co-integration and causality analysis', accessible at:
https://globaljournals.org/GJMBR_Volume12/4-Electricity-Consumption-and-Economic.pdf
- Miller, R. & Blair, P (2009). 'Input-Output Analysis: Foundations and Extensions', Cambridge University Press.
- Tregenna, F. (2015) 'Sectoral dimensions of employment targeting ', International Labour Office, Employment Policy Department, Employment and Labour Market Policies Branch, Geneva: accessible at: http://www.ilo.org/public/libdoc/ilo/2015/115B09_18_engl.pdf



Appendix A - Sources

Investment-related data are retrieved directly from CDC which in turn are collected either by the client or CDC itself, but macroeconomic data are retrieved from various public sources. See Appendix B for background information on the data used by the tool per indicator.

<i>Source</i>	<i>Description</i>
GTAP Data Base	The Global Trade Analysis Project (GTAP) is a global database describing bilateral trade patterns, production, consumption and intermediate use of commodities and services consisting of over 100 tables for individual countries or a group of countries and 57 sectors. The database uses input from a global network of institutes, researchers and policy makers conducting quantitative analysis of international policy issues. It is coordinated by the Center for Global Trade Analysis in Purdue University's Department of Agricultural Economics.
World Bank Development Indicators Databank	These are the primary World Bank collection of development indicators which are compiled from officially-recognised international sources. It presents the most current and accurate global development data available, and includes national, regional and global estimates.
National Statistics	Country-based statistical information are compiled and produced by National Statistical Offices and Central Banks.
IEA Energy Statistics	The International Energy Agency (IEA) coordinates a database with statistical information on energy production, consumption and prices across various regions and countries.

Appendix B - Macroeconomic data from external sources used by the tool

GTAP

Data	Base year	Input to
Firms' domestic purchases (in mln USD)	2011	SAM
Household & government domestic purchases, exports (in mln USD)	2011	SAM
Firms' expenses on endowments (in mln USD)	2011	SAM, capital intensities
Corporate income tax, payroll tax, import duties, commodity tax, consumption tax, other taxes (in mln USD)	2011	SAM
Firms' imports (in mln USD)	2011	SAM
Total capital stock (in mln USD)	2011	Capital intensities

WORLD BANK DEVELOPMENT INDICATORS DATABANK

Data	Base year	Input to
Gross fixed capital formation, private sector, per country (% of GDP)	2007-2011	Capital intensities
Gross fixed capital formation, per country (% of GDP)	2007-2011	Capital intensities
Electric power consumption, per country (in kWh)	2007-2013	Forward effects
Electric power transmission and distribution losses (% of output)	2007-2013	Forward effects
Total GDP , per country (in current USD)	2007-2013	Forward effects

NATIONAL STATISTICS

Data	Base year	Input to
Total employment per sector for Algeria, Angola, Bangladesh, Egypt, Ghana, India, Kenya, Nigeria, Pakistan, South Africa, Sri Lanka, Tanzania, Uganda, Zambia	2012-2014	Employment intensities
Total GDP per sector for Algeria, Angola, Bangladesh, Egypt, Ghana, India, Kenya, Nigeria, Pakistan, South Africa, Sri Lanka, Tanzania, Uganda, Zambia	2012-2014	Employment intensities
Credit to private sector, per sector for Ghana, India, Kenya, Nigeria, Tanzania, Uganda (in %)	2012-2014	Sector breakdown of loan portfolio of FIs

IEA ENERGY STATISTICS

Data	Base year	Input to
Total electricity net consumption, per country (in bln kWh)	2010-2011	Forward effects

SECONDARY LITERATURE

Data	Source	Input to
Overall leverage ratio debt/ total assets for SMEs and corporates, total developing world	Bas, Muradoglu, Phylaktis, 'Determinants of capital structure in developing countries', 2009	Capital intensities for corporates and SMEs
Labour productivity of formal SMEs and corporates, total developing world	IFC, 'Scaling-Up SME Access to Financial Services in the Developing World', 2010, p. 6	Employment intensities for corporates and SMEs
Labour productivity of informal sector, for North & Sub-Saharan Africa, Latin America, Asia	ILO, 'Women and men in the informal economy', 2002	Employment intensities for formal sector
Relationship between electricity consumption and GDP growth	Hossain, S., "Energy consumption nexus economic growth: a dynamic co-integration and causality analysis, 2013 M. Masduzzaman, "Electricity consumption and economic growth in Bangladesh: co-integration and causality analysis", 2012 Eiffert, B.P., "Essays on the Performance of Manufacturing Firms in Developing Countries", 2010	Forward effects



Appendix C - Definitions

Term	Definition
Capital-intensity	The amount of output per US \$ 1 of capital.
Direct employment	Total FTEs at the investee business/end-beneficiary of CDC's investment.
Employment-intensity	The number of jobs per US \$ 1 of output.
Forward employment	Jobs that are supported at direct consumers of electricity that can be related to CDC's investments.
Full-time equivalent (FTE)	The equivalent of one person working full time as defined by local laws.
GDP- intensity	The amount of output per US \$ 1 of GDP.
Induced employment	Total FTEs related to the re-spending of salaries earned by employees of the CDC investee/end-beneficiary investee and its (in)direct suppliers that are related to CDC's investment.
Job multiplier	The number of jobs per US \$ 1 million invested.
Jobs created	The difference of jobs supported between two years, indicating a net or incremental change.
Jobs supported	Total number of jobs supported in a specific year.
Supply-chain employment	Total FTEs at the investee/end beneficiary's direct and indirect suppliers that are related to CDC's investments.
Total employment	Sum of all jobs related to CDC investment at a particular moment in time per annum. Expressed in full-time equivalent (FTE).



Appendix D - Assumptions

In order to have a consistent methodology, the tool uses a number of assumptions. However, to make it fit the full range of CDC's portfolio there also some exceptions required.

Assumptions

Employment

1. Country-specific employment intensities are used for India, Kenya, Nigeria and South-Africa. For all other countries we make use of employment proxies specific to the region in which the country resides.
2. Employment intensities differ per formal/informal investee type as the formal sector is considered to be 70% more productive than country average of the formal and the informal sector.⁸
 - Rule is applied to Manufacturing, Construction, Trade, Communication, Transport and Other services
 - Mining, utilities and financial and business services are considered to employ only formal jobs
 - Agriculture is considered to employ only informal jobs
3. Formal SMEs are considered to generate 33% and formal corporates 67% of formal GDP. Distinction between SMEs and corporates based on output per employee.
4. Formal SMEs are considered to employ 45% and formal corporates 55% of formal employment.
5. CDC investees are considered to operate in the formal sector meaning the following intensities per round of impact:
 - Direct based on formal intensities per investee type (exc. Micros)
 - Indirect based on country average
 - Induced based on country average

Spending patterns

6. Micros/SMEs and corporates in the same sector and country/region have the same spending patterns.
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⁸ Source: IFC SME Access to Finance in Developing World