



Methodology

www.mdgscan.com

NCDO & Sustainalytics
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This document provides an overview of the Methodology, assumptions and limitations of the MDG Scan www.mdgscan.com, developed by NCDO and Sustainalytics, document version 4, April 2010.

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Input variables used in the MDG scan

variables and multipliers

ageRatio	[country]
workingPoor	[country]
povertyElasticity	[region]
childmortalityElasticity	[region]
maternalmortalityElasticity	[region]
enrolmentElasticity	[region]
employmentMultiplier	[region,sector]
backwardJobDivision	[sector]
forwardJobDivision	[sector]
PercPopulationUnder5	[country]
enrolmentRatio	[country]
schoolagePopulation	[country]
maternalMortalityRate	[country]
birthRate	[country]
childMortality	[country]
population	[country]
householdsUnderPoverty	[country]
gdpCapita	[country]

Input provided by the company

annual_turnover	[company,country]
number_of_employees_local	[company,country]
costs_of_inputs	[company,country]
share_of_inputs	[company,country] - percentage local sourcing
share_of_products	[company,country] - percentage local sales
consumers_profit	[company,country,goal,sector]
people_nonprofit	[company,country,goal,sector]

Explanation of some Key Variables

Employment Multipliers

Companies are integrated in a value chain of suppliers and consumers. For example, if a company increases production, it will lead to increased production demand at the supply side of the company. Similarly, increased output will generate more work on the distribution and retail side. A production increase does, therefore, lead to job increases elsewhere in the value chain. The jobs created in the value chain are called indirect jobs. The number of indirect jobs created for every direct job is dependent on both the sector and region in which the company operates.

The MDG Scan calculates indirect employment by applying employment multipliers. These employment multipliers give the number of indirect jobs created for every direct job. The values used are sector-dependent. The multipliers used in the MDG Scan are based on various input-output studies from different countries (see sources below). The specific values used were obtained by eliminating extreme values and computing the median of the remaining figures.

Although the values used vary per sector, the same multipliers are used for every region. This implies a major simplification. In reality, less developed economies tend to have larger indirect employment effects than more developed economies.

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The 1997 Washington Input - Output Model, Office of Financial Management, State of Washington. <http://www.ofm.wa.gov/economy/io/default.asp>

World Bank, HNP Stats (Health, Nutrition and Population data), demographic projections. <http://devdata.worldbank.org/hnpstats/dp.asp>

<http://www.scotland.gov.uk/Topics/Statistics/Browse/Economy/Input-Output/Multipliers>

Working poor

This regional variable shows the percentage of employed persons living in a household whose members are estimated to be below the 1-dollar-a-day poverty line. In the MDG Scan, this value is used to estimate the number of people that benefit from the direct and indirect jobs created by the company. This estimation does not take into account the possible differences between rural and urban areas and differences between countries within the same region.

Source: ILO, Key Indicators of the Labour Market, 6th Edition

Age-dependency ratio

The *age-dependency ratio* gives the number of non-working age-dependents (children, elderly) with respect to the working age population. This variable is used to estimate the indirect beneficiaries of employment creation, as well as beneficiaries of products, services and community investments. E.g. if a parent is treated in a hospital, his or her child benefits from this indirectly.

Source: UN Population Division.

Elasticities

The MDG Scan contains different elasticities. An elasticity shows the degree to which a change in one variable (e.g. income/ capita) results in a change in

another variable (e.g. poverty ratio). It is used to determine the (proportional) relationship between two or more factors/variables. The MDG Scan uses regional elasticities of poverty with respect to income/capita (Besley & Burgess, 2003), elasticities of child mortality and maternal mortality with respect to income/capita (Tandon, 2005), (UN, 2008) and elasticities of enrolment in primary education with respect to income/capita (UN, 2008). The exact use of these elasticities is explained in greater detail in the section entitled, 'Calculations.'

Sources:

Besley, T. & S. Burgess (2003), Halving Global Poverty. *The Journal of Economic Perspectives*, Vol 17, No 3, p. 8

Meller, P. & M. Marfán (1981) "Small and Large Industry: Employment Generation, linkages, and Key Sectors" *Economic Development and Cultural Change*, Vol. 29, No. 2. (Jan., 1981), pp. 263-274

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Calculations

Calculations: Indirect Employment effects

An important component of the calculations made by the MDG Scan is the estimation of the number of potential indirect jobs created by a company's operations. This estimation of indirect employment is primarily based on the employment multipliers that are used.

Multiplying the number of direct jobs by an employment multiplier gives the number of indirect jobs that a company could create.

$$\text{potentialIndirect} = \text{number_of_employees_local} * \text{employmentMultiplier}$$

However, the total number of indirect jobs can be negatively affected by the effects of imports and exports.

Import and export effects

Imports and exports have a significant negative impact on the creation of local indirect jobs. To take these effects into account, the MDG Scan distinguishes between forward and backward created jobs. Whether most indirect jobs are created forward or backward is dependent on the sector. The division between jobs created forward and backward is based on P. Meller & M. Marfan's (1981) study of an input-output model for Chile. The MDG Scan simplifies that calculation by assuming that the input-output data for Chile can be used for all other regions.

$$\text{potentialForward} = \text{potentialIndirect} * \text{forwardJobDivision}$$

$$\text{potentialBackward} = \text{potentialIndirect} * \text{backwardJobDivision}$$

Having distinguished potential forward and backward jobs, the MDG-scan corrects the created indirect jobs effect for imports and exports. The company provides data on what share of its inputs is purchased within the developing region and what share of its products or services is sold within the region. If a company purchases 100% of its inputs in the region, 100% of all potential backward jobs are created. If the company does not purchase all inputs from the region, the number of backward jobs is reduced linearly. In the same way, forward jobs are dependent on what share of the company's products and services are sold locally.

$$\text{forwardJobs} = \text{potentialForward} * \text{percRegionalSold} / 100$$

$$\text{backwardJobs} = \text{potentialBackward} * \text{percRegionalPurchased} / 100$$

Poor people benefiting from jobs

Job-creation implies income generation. By providing poor people with an income, job-creation contributes to the achievement of MDG 1: the reduction of extreme poverty.

An estimation of the number of poor people benefiting from employment provided by the company or its supply chain is found by multiplying the total number of jobs created with the percentage of employed persons living under the poverty line (source: ILO). In order to include positive effects on non-working children and elderly people who are dependent on the people who have these jobs, the

number of jobs is multiplied by (1 + age-dependency ratio) (source: UN Population Division).

$\text{indirectFTE} = \text{forwardJobs} + \text{backwardJobs}$

$\text{totalFTE} = \text{number_of_employees_local} + \text{indirectFTE}$

$\text{employmentBeneficiaries} = (\text{ageRatio} + 1) * (\text{totalFTE} * \text{workingPoor} / 100)$

Note: jobs in the informal economy

In developing countries a significant proportion of economic activities take place in the informal economy by street vendors, small shops, farmers, craftsmen, etc. These individuals are not registered, they do not pay taxes and they may sometimes be involved in illegal activities. For example, it is estimated that the informal sector accounts for 89% of Ghana's total employment (source: ILO). According to the system of national accounts 93 (SNA 93), published by the Commission of the European Communities, the IMF, the OECD, United Nations and the World Bank, the informal sector must be included in the National Accounts. As the employment multipliers used in the MDG Scan are based on national input-output tables, Sustainalytics assumes that job creation in the informal sector is included. Exact estimations of the informal sector are, however, difficult to make. The informal economies of developing countries are often said to be larger than official estimates. This could imply that employment multipliers may be larger in reality than those used by the MDG Scan.

Calculations: Contribution to GDP leading to a Reduction of Poverty, Child Mortality and Maternal Mortality and to increased enrolment in primary education.

The calculation of a company's contribution to the GDP of a country is based on the value added by the company. For a single enterprise, value added by the production activity is measured as: Gross output minus inputs from other business minus inputs from abroad. However, GDP is a measure defined at purchaser's (market) price and not at the producer's price. Therefore, in order to go from total value added (producer's price) to GDP (purchaser's price), taxes must to be added and eventual subsidies subtracted in the calculation.

The MDG Scan measures the contribution to GDP by subtracting the total inputs from the total gross turnover (purchaser's prices). Purchaser's prices accounts for both taxes and subsidies.

$\text{valueAdded} = \text{annual_turnover} - \text{costs_of_input}$

$\text{valueAddedCapita} = \text{valueAdded} / \text{population}$

$\text{gdpCapitaRate} = \text{valueAddedCapita} / ((\text{gdp} / \text{population}) - \text{valueAddedCapita})$

Poverty effect

Different studies suggest that GDP per capita growth is directly related to poverty reduction. T. Besley & S. Burgess (2003) calculated elasticities of poverty (people living on less than 1 \$ a day) with respect to income per capita for 6 geographic regions. The MDG Scan applies these elasticities as follows:

$$\text{PovertyEffects} = -1 * (\text{povertyElasticity} * \text{gdpCapitaRate}) * (\text{population} * \text{householdUnderPoverty} / 100)$$

Child mortality effect

GDP per capita growth leads to more than the reduction of poverty. Various studies show that GDP per capita growth is also closely related to the reduction of under-5-mortality. The MDG Scan calculates the reduction of child mortality in a country as a result of the company's contribution to the GDP of that country, making use of region-specific elasticities of under-5-mortality with respect to income per capita (Tandon, 2005), (UN, 2008). The calculation is similar to the formula for poverty reduction:

$$\text{childMortalityEffects} = -1 * (\text{childMortalityElasticity} * \text{gdpCapitaRate}) * (\text{populationUnder5} * \text{childMortalityRate} / 1000)$$

Maternal mortality effect

In addition to the relationship between GDP per capita growth and a reduction of child mortality that is described above, a similar relation has been found between GDP per capita growth and the reduction of maternal mortality rates. The MDG Scan estimates the reduction of maternal mortality, making use of an elasticity of maternal mortality with respect to GDP per capita (UN, 2008). The calculation used is as follows:

$$\text{maternalMortalityEffects} = -1 * (\text{maternalMortalityElasticity} * \text{gdpCapitaRate}) * (\text{numBirths} * \text{maternalMortalityRate} / 100000)$$

Primary enrolment

Several studies suggest that an increase in GDP per capita also positively influences children's enrolment in primary education. This relationship is captured in an elasticity of net primary enrolment ratio with respect to GDP per capita (UN, 2008). The MDG scan uses the following calculation to estimate the effects of GDP per capita growth on the enrolment of children in primary education:

$$\text{educationEffects} = (\text{enrolmentElasticity} * \text{gdpCapitaRate}) * (\text{enrolmentRatio} / 100 * \text{schoolagePopulation})$$

References:

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ILO (2007), *Key Indicators of the Labour Market*, 5th Edition

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Interpreting Results

Company Results

Graphs displayed by the MDG scan show the following impacts:

Core Business - this category gives an estimation of the number of people in developing countries that benefit from the company's core business for each MDG. This includes: A. Beneficiaries of products or services that contribute to the MDGs; B. Beneficiaries of employment creation and the company's contribution to a country's GDP.

Community investments - this category gives an estimation of the number of people that benefit from community investments (such as donations, projects, campaigns, employee benefit programs, etc.) in developing countries that are organised or supported by the company.

Error margins and the reliability of results

Graphs provided by the MDG Scan are rough estimations. They do not represent exact values. This means that exact results may be higher or lower in reality than displayed by the MDG Scan.

The results for a company's employment and economic effects include complex indirect effects. These indirect effects are estimated based on generic or region-specific multipliers and variables. Specific differences between countries and companies are thereby overlooked. Furthermore, the MDG Scan broadly defines sectors. In reality, these sectors are comprised of numerous varying industries and sub-industries. The indirect employment effects of different sub-industries may also vary. Due to the uncertainty of the employment multipliers used, an error margin should be considered when examining a company's results. In a preliminary sensitivity analysis carried out by Sustainalytics, error margins of 25% were found.

The error margins caused by uncertainties with regard to the elasticities and other variables are not provided, as they are unknown. However, compared to the elasticities used, employment multipliers have a larger effect on the results displayed by the MDG Scan. The likelihood that the regional elasticities and variables used are representative of the reality is higher for companies that enter data for several developing countries than it is for companies that only provide data for operations in one or two developing countries.

For the interpretation of the results, it is important to note that the MDG Scan is not a complete method. There are many other ways in which companies can contribute to the MDGs that are not estimated. A company having relatively poor results in the MDG Scan is not necessarily underperforming in comparison to its peers. It is possible that contributions are made that the MDG Scan does not take into account.

Limitations of the MDG Scan

The MDG Scan is designed as a quick and easy-to-use model. It therefore contains some major simplifications and limitations. Below is a summary of the MDG Scan 's most significant limitations and simplifications:

1. The MDG Scan does not compare the situation of a company's presence with a situation in which the company would be absent in a country. In other words: substitution effects are not taken into account.
2. The MDG Scan produces rough estimations, *not* exact measurements.
3. The MDG Scan was designed for medium and large sized companies with operations in developing countries. Outcomes for companies that have less than 50 employees in developing countries may be less accurate.
4. Controversies or negative impacts on the achievement of the MDGs related to a company's operation are not taken into account.
5. The MDG Scan assumes homogeneity over time: variables used are taken from sources published in different years.
6. The employment multipliers used in the calculations are sector-specific. Differences between countries and companies are thus overlooked.
7. The elasticities that are used in calculations are region-specific. Differences between countries are also overlooked.
8. The estimation of the amounts of poor people that benefit from employment creation by the company is rough. It does not account for differences between poverty ratios in rural and urban areas and differences between countries in the same region.
9. Effects of taxes on public spending are not taken into account.
10. Lobbying activities for MDG-related issues organised by companies are not taken into account
11. The supply-chain effects of operations in high-income countries are not included in the model. Sales or production facilities in high-income countries are often sourcing from developing countries. These effects are not included in the MDG Scan model. Especially for retailing companies, real effects might be much larger in reality than reflected by the outcomes of the MDG Scan.

Background Literature & Sources

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