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Sebastian Buckup
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ILO Employment Sector Working Paper No. 43, "The price of exclusion: The economic consequences of excluding people with disabilities from the world of work

Abstract
A crossroads has been reached internationally in terms of the status of people with disabilities in society. Countries worldwide are reviewing laws, policies, programmes and services for people with disabilities with a view to promoting their inclusion in all sectors of society and enhancing opportunities for them to earn a decent living, to contribute to the income of their families, or to make a contribution in the workplace. In parallel, there is a growing recognition that the exclusion of people with disabilities from the labour market has been at great cost to societies.

To contribute to the information base used by decision-makers in allocating resources to programmes relating to the employability and employment of people with disabilities, the ILO commissioned an exploratory study of the macro–economic costs of excluding people with disabilities from the world of work. Building on previous research, this study developed a new approach that takes two drivers of economic losses into account: the gap between the potential and the actual productivity of people with disabilities; and the difference between unemployment and inactivity rates of non-disabled people and people with disabilities. Together, these drivers yield the costs that society has to bear for excluding people with disabilities from the world of work. The approach was tested using data from a selection of ten countries in Asia (China, Thailand, and Viet Nam) and Africa (Ethiopia, Malawi, Namibia, South Africa, Tanzania, Zambia, and Zimbabwe). The overall losses and the relative importance of factors underlying these losses – disabling environment, unemployment and inactivity – are estimated for each country. The study
shows that by combining reasonable assumptions and adequate modeling, it is possible to generate data on the costs of exclusion, even for countries where reliable primary data are generally scarce, and suggests that these data are more robust than those generated by a global extrapolation approach.
It is hoped that the exploratory study will be useful to governments in setting
priorities and in ensuring that people with disabilities are included in measures to tackle the effects of the global financial and economic crisis. It will hopefully stimulate debate and further research on the inclusion of people with disabilities from an economic viewpoint. Comments on the pilot study and its findings will be welcomed.

Sebastian Buckup was the author of this working paper. The research, carried out with financial support from the ILO/Irish Aid Partnership Programme, was guided by Barbara Murray, Senior Specialist on Disability, and comments were received from Sara Elder, Economist, Employment Trends Unit, Ferdinand Lepper, formerly of the ILO Department of Statistics, and Debra Perry, Senior Disability Specialist. Anna Kealy edited the manuscript and Jo-Ann Bakker prepared it for publication.

Keywords
disabilities, policies, programmes, services, inclusion, sectors, workplace, resources, employability, environment, unemployment, productivity, case studies

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Geneva

Employment Sector
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2009

The price of exclusion:

The economic consequences of excluding people with disabilities from the world of work

Sebastian Buckup

Skills and
Employability
Department

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Preface

The primary goal of the ILO is to contribute, with member States, to achieve full and productive employment and decent work for all, including women and young people, a goal embedded in the ILO Declaration 2008 on *Social Justice for a Fair Globalization*,[1] and which has now been widely adopted by the international community.

In order to support member States and the social partners to reach the goal, the ILO pursues a Decent Work Agenda which comprises four interrelated areas: Respect for fundamental worker's rights and international labour standards, employment promotion, social protection and social dialogue. Explanations of this integrated approach and related challenges are contained in a number of key documents: in those explaining and elaborating the concept of decent work,[2] in the Employment Policy Convention, 1964 (No. 122), and in the Global Employment Agenda.

The Global Employment Agenda was developed by the ILO through tripartite consensus of its Governing Body's Employment and Social Policy Committee. Since its adoption in 2003 it has been further articulated and made more operational and today it constitutes the basic framework through which the ILO pursues the objective of placing employment at the centre of economic and social policies.[3]

The Employment Sector is fully engaged in the implementation of the Global Employment Agenda, and is doing so through a large range of technical support and capacity building activities, advisory services and policy research. As part of its research and publications programme, the Employment Sector promotes knowledge-generation around key policy issues and topics conforming to the core elements of the Global Employment Agenda and the Decent Work Agenda. The Sector's publications consist of books, monographs, working papers, employment reports and policy briefs.[4]

The *Employment Working Papers* series is designed to disseminate the main findings of research initiatives undertaken by the various departments and programmes of the Sector. The working papers are intended to encourage exchange of ideas and to stimulate debate. The views expressed are the responsibility of the author(s) and do not necessarily represent those of the ILO.

José Manuel Salazar-Xirinachs
Executive Director
Employment Sector

[1] See http://www.ilo.org/public/english/bureau/dgo/download/dg_announce_en.pdf

[2] See the successive Reports of the Director-General to the International Labour Conference: *Decent work* (1999); *Reducing the decent work deficit: A global challenge* (2001); *Working out of poverty* (2003).

[3] See http://www.ilo.org/gea. And in particular*: Implementing the Global Employment Agenda: Employment strategies in support of decent work, "Vision" document*, ILO, 2006.

[4] See http://www.ilo.org/employment.

Foreword

A crossroads has been reached internationally in terms of the status of people with disabilities in society. Countries worldwide are reviewing laws, policies, programmes and services for people with disabilities with a view to promoting their inclusion in all sectors of society and enhancing opportunities for them to earn a decent living, to contribute to the income of their families, or to make a contribution in the workplace. In parallel, there is a growing recognition that the exclusion of people with disabilities from the labour market has been at great cost to societies.

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Contents

Page

Preface iii

Foreword v

Abbreviations xi

1. Introduction 1
   - The World Bank study: A bottom-up approach 1
     - *Limitations of the World Bank study* *2*
   - Conceptual framework 4
     - *Building disability level groups* *5*
     - *Example calculation: Canada* *7*

2. Country case studies 9
   - Viet Nam 12
   - Thailand 17
   - China 21
   - Malawi 25
   - Namibia 29
   - Zambia 31
   - Zimbabwe 34
   - Ethiopia 36
   - South Africa 38
   - Tanzania 41

3. Summary of the results 43

4. Conclusions and recommendations 51

Annex 1: Gathering statistics on the employment situation of people with disabilities 53
   - *Gathering labour market data* *53*
   - *Measuring disability* *54*
   - *Disability measuring: Linking design and purpose* *56*
   - Estimating growth functions – A top-down approach 57
   - *Applicability of the top-down approach to the current study* *58*

Annex 2: Detailed country calculations for *Price of exclusion* study 61
   - *China, based on Viet Nam prevalence rate* *61*
   - *China (2), based on CDPF data* *62*
   - *Thailand, based on Viet Nam prevalence rate* *63*
   - *Thailand (2), based on NSO data* *64*
   - *Viet Nam* *65*
   - *Ethiopia, based on Zambia disability data* *66*

Malawi, based on ILO data *67*
Malawi (2), based on SINTEF data *68*
Namibia, based on ILO data *69*
Namibia (2), based on SINTEF data *70*
South Africa *71*
Tanzania *72*
Zambia, based on ILO data *73*
Zambia (2), based on SINTEF data *74*
Zimbabwe, based on ILO data *75*
Zimbabwe (2), based on SINTEF data *76*

References 77

List of Tables

Table 1: Average productivity at different disability levels ("betas") (per cent) 5
Table 2: Creating disability level groups based on SINTEF questions 6
Table 3: Washington Group (WG) questions as implemented by SINTEF in Zambia 6
Table 4: Creating disability level groups based on Washington Group questions 7
Table 5: Canada - Working age population (15-64), by labour market status and calculated disability level 7
Table 6: Canada - Economic losses related to disability, 2001 (million US$) 8
Table 7: Case studies - Country data (2006) 9
Table 8: Data availability for case studies – GDP, Labour Market (LM), disability prevalence and level 10
Table 9: Viet Nam – Disability prevalence rates, by type of disability (per cent) 13
Table 10: Viet Nam - Disability prevalence rates, by disability level (per cent) 14
Table 11: Viet Nam - People with disabilities of working age (15-59), by disability level (millions) 14
Table 12: Viet Nam - Labour market status - Total population and persons with disabilities 15
Table 13: Viet Nam - Working age population (15-59), by labour market status and disability level (per cent) 15
Table 14: Viet Nam - Economic losses related to disability, by disability level (million US$) 16
Table 15: Viet Nam - Economic losses related to disability, by source and disability level (million US$) 16
Table 16: Thailand - Total population and working age population (15-64), by disability status 17
Table 17: Thailand - Assigning disability levels to people with disabilities 18
Table 18: Thailand - Grouping persons with disabilities, by disability level (millions) 19
Table 19: Thailand - Labour market status - Total population and people with disabilities 19
Table 20: Thailand - Working age population (15-64), by labour market status and disability level (per cent) 20
Table 21: Thailand - Economic losses related to disability, using NSO data (million US$) 20
Table 22: Thailand - Economic losses related to disability, by source and disability level, using NSO data (million US$) 21
Table 23: Thailand - Economic losses related to disability, by source and disability level, assuming Viet Nam prevalence rates (million US$) 21

Table 24: China - People with disabilities, by type of disability (2006) 22
Table 25: China - Labour market status of people with disabilities (15+) (2006) 22
Table 26: China - Labour market status - Total population and persons with disabilities (15 +) (2006) 23
Table 27: China - Working age population (15+), by labour market status and disability level (per cent) 23
Table 28: China - Economic losses related to disability, by disability level, using CDPF data (million US$) 24
Table 29: China - Economic losses related to disability, by source and disability level, using CDPF data (million US$) 24
Table 30: China - Economic losses related to disability, by source and disability level, assuming Viet Nam prevalence rates (million US$) 25
Table 31: Malawi - Sample size of disability study 25
Table 32: Malawi - Labour market data, by disability status (per cent) 26
Table 33: Malawi - Working age population (15-64), by disability status and level 26
Table 34: Malawi - Working age population (15-64), by labour market status and disability level (per cent) 27
Table 35: Malawi - Economic losses related to disability, by disability level, using ILO data (million US$) 28
Table 36: Malawi - Economic losses related to disability, by source and disability level, using ILO data (million US$) 28
Table 37: Malawi - Economic losses related to disability, by source and disability level, using SINTEF data (million US$) 29
Table 38: Namibia - Working age population (15–64), by disability status and level 29
Table 39: Namibia - Working age population (15-64), by labour market status, disability status and level (per cent) 29
Table 40: Namibia - Economic losses related to disability, by disability level, using ILO data (million US$) 30
Table 41: Namibia - Economic losses related to disability, by source and disability level, using ILO data (million US$) 30
Table 42: Namibia - Economic losses related to disability, by source and disability level, using SINTEF data (million US$) 31
Table 43: Zambia - Working age population (15-64), by disability status and level 32
Table 44: Zambia - Working age population (15-64), by labour market status and disability level (per cent) 32
Table 45: Zambia - Economic losses related to disability, by disability level, using ILO data (million US$) 33
Table 46: Zambia - Economic losses related to disability, by source and disability level, using ILO data (million US$) 33
Table 47: Zambia - Economic losses related to disability, by source and disability level, using SINTEF data (million US$) 34
Table 48: Zimbabwe - Working age population (15-64), by disability status and level 34
Table 49: Zimbabwe - Working age population level (15-64), by labour market status and disability level (per cent) 35
Table 50: Zimbabwe - Economic losses related to disability, by disability level, using ILO data (million US$) 35
Table 51: Zimbabwe - Economic losses related to disability, by source and disability level, using ILO data (million US$) 36

Table 52: Zimbabwe - Economic losses related to disability, by source and disability level, using SINTEF data (million US$) 36
Table 53: Ethiopia - Economic losses related to disability, by disability level, based on Zambia disability data (million US$) 37
Table 54: Ethiopia - Economic losses related to disability, by source and disability level (million US$) 38
Table 55: South Africa - Working age population (15+), by disability status and level 39
Table 56: South Africa - Working age population (15+), by labour market status and disability level (per cent) 39
Table 57: South Africa - Economic losses related to disability, by disability level (million US$) 40
Table 58: South Africa - Economic losses related to disability, by source and disability level (million US$) 40
Table 59: Tanzania - Working age population, by labour market status and disability level (per cent) 41
Table 60: Tanzania - Economic losses related to disability, by disability level (million US$) 42
Table 61: Tanzania - Economic losses by source related to disability, by disability level (million US$) 42
Table 62: Overview of disability prevalence rates in the workforce (per cent) 43
Table 63: Unemployment and labour market inactivity - Total population and people with disabilities, by disability level (per cent) 45
Table 64: Indicators of labour market disadvantage, by disability level (per cent) 46
Table 65: Overview of economic losses related to disability, by source 48
Table 66: Comparing economic losses from current study with the findings of Metts (2000) 50
Table A.1: Different approaches in calculating disability prevalence rates 55
Table A.2: Disability questions 57

List of Boxes

Box 1: Equation A - The disability impact factors (DI) 2
Box 2: Calculating economic losses related to disability for Germany in 1996 2
Box 3: Linear relationship between unemployment and productivity losses according to Metts (2000) 3
Box 4: Equation B - Economic losses related to disability 4
Box 5: Estimating labour market data for different disability level groups 12
Box A.1: Economic growth model of the ILO/AIDS study 58

Abbreviations

ADL	Activities of Daily Living
CDPF	China Disabled Persons Federation
CSO	Central Statistical Office
DI	Disability impact factor
DRPI	Disability-Related Participation Impediment
FFO	Norwegian Federation of Organizations of Disabled People
GDP	Gross Domestic Product
GDPCA	Gross Domestic Product per capita
GSO	General Statistical Office (Viet Nam)
IADL	Instrumental Activities of Daily Living
ICF	International Classification of Functioning, Disability and Health
ICIDH	International Classification of Impairment, Disabilities, and Handicaps
ILO	International Labour Office
IPEC	ILO International Programme on Eliminating Child Labour
INESOR	Institute for Economic and Social Research
KILM	Key Indicators of the Labour Markets (ILO)
LM	Labour Market
MCNV	Medical Committee Netherlands–Vietnam
MOET	Ministry of Education and Training (Viet Nam)
MOH	Ministry of Health (Viet Nam)
MOLISA	Ministry of Labour, Invalids and Social Affairs (Viet Nam)
NGO	Non-Governmental Organization
NSO	National Statistical Office
OECD	Organisation for Economic Co-operation and Development
PPP	Purchasing Power Parity
SAFOD	Southern Africa Federation of Disabled People
SENSA	Population and Housing Census (Tanzania, 2002)
SNNP	Southern Nations, Nationalities and People region (Ethiopia)
TSLS	Two-Stage Least Squares Technique
UNESCAP	United Nations Economic and Social Commission for Asia and the Pacific
UR	Unemployment Ratio
VHLSS	Vietnam Household Living Standards Survey

WDI	World Development Indicators
WHO	World Health Organization
ZAFOD	Zambia Federation of the Disabled

1. Introduction

Calculating macroeconomic losses related to disability helps in understanding the scope of disability-associated concerns , and serves as an important basis to calculate the opportunity costs of inactivity, e.g. in the context of a cost–benefit analysis. Nonetheless, in the past only one empirical study published by the World Bank has tried to estimate losses in Gross Domestic Product (GDP) related to disability (Metts 2000). This section discusses the methodology of the World Bank study and uses it as foundation for a conceptual framework reflecting new developments in the definition and measurement of disability.[5]

The World Bank study: A bottom-up approach

The Roeher Institute (Toronto, Canada) developed a 'bottom-up approach' to calculate the annual GDP loss related to disability in Canada, using 1993 data (see Rioux 1998 and Health Canada 1997). The approach involved multiplying the number of individuals living with a disability, the amount of time these individuals are affected by this disability, the level of the disability and the average value of labour force work, adjusted for wage supplements and unpaid work.

The study differentiated between people with long-term and short-term disabilities. People with long-term disabilities were separated into two populations: "household disabled" and "institutionalized disabled". The latter group consisted of persons who stay in long-term healthcare facilities. They were assumed to achieve only 10 per cent of the productivity of an average worker. The group of household disabled was assumed to achieve 90 per cent of the average productivity of an average worker in Canada in 1993.

For people with short-term disabilities, the study distinguished between those who need to rest in bed (10 per cent of average productivity) and those whose activities are restricted (50 per cent of average productivity). Overall, the study estimated that in 1993 US$ 3.1 billion of GDP was lost in relation to institutionalized long-term disability, and US$ 35.2 billion was lost in relation to household long-term disability. The loss related to short-term disability was estimated to be US$ 17.5 billion. In sum, this makes US$ 55.8 billion, or 7.7 per cent of Canada's 1993 GDP. Sensitivity analyses which vary the percentage losses of GDP suggested a range of US$ 48.6 to 63 billion in 1993 dollar values, or respectively 6.7 to 8.69 per cent of Canadian GDP.

An often-cited calculation of worldwide economic losses related to disability has been provided by Metts (2000) and published by the World Bank. Metts estimates that the total annual value of global GDP lost in relation to disability lies between US$ 1.37 and US$ 1.94 trillion. The technique employed by the author is a variation of an approach developed by the Roeher Institute to extrapolate the results obtained in the above-mentioned study to the economic circumstances of Latin America and the United States (see Rioux 1998 and Health Canada 1997). The extrapolation technique sets the assumption that GDP losses related to disability are: a positive function of the incidence of exclusion of people with disabilities, because those who are excluded do not contribute; and an inverse function of the general unemployment rate, because a lower unemployment rate infers a higher probability of labour market activity.

This assumption yields a simple extrapolation technique. Based on the data from the Canadian study, which suggests an annual GDP loss (%GDP lost) between 8.7 and 6.7 per

[5] See Annex 1 (p. 53) for some background on the current state of defining and measuring disability.

cent, and the 1993 Canadian unemployment rate (%UR) of 9.5 per cent, the bandwidth for a factor DI (disability impact factor) is calculated:

Box 1: Equation A - The disability impact factors (DI)

$$DI_{\min} = \frac{\%GDPlost_{\min}}{\%UR} = \frac{6.7\%}{9.5\%} = 0.71 \ , \ DI_{\max} = \frac{\%GDPlost_{\max}}{\%UR} = \frac{8.7\%}{9.5\%} = 0.92$$

The Canadian DI factor is subsequently multiplied with the GDP and the unemployment rate of each of the 207 low, middle and high-income countries to calculate annual GDP losses (see Box 2 below for an example).

Box 2: Calculating economic losses related to disability for Germany in 1996

With the *disability impact factors* gained from the Canadian study (DI_{min} and DI_{max}), the calculation of economic losses in other countries is straightforward once their unemployment rate (UR) and GDP is known.

<u>The German case is calculated as follows</u>:

Unemployment rate: $UR_{Germany\ (1996)}$ = 8.2%
GDP (Germany): $GDP_{Germany\ (1996)}$ = US$ 2,046 billion

$$GDPlost_{\min} = GDP_{Germany(1996)} * UR_{Germany(1996)} * DI_{\min} \approx 119 \text{ Billion US\$}$$

$$GDPlost_{\max} = GDP_{Germany(1996)} * UR_{Germany(1996)} * DI_{\max} \approx 154 \text{ Billion US\$}$$

Limitations of the World Bank study

This extrapolation technique applied in the paper by Metts (2000) is based on two assumptions: (1) that the structural circumstances in Canada reflect those in the rest of the world; and (2) that the unemployment rate is an appropriate variable to adjust the Canadian DI to the rest of the world.

Regarding the first assumption, it can be taken for granted that economic losses related to disability which are estimated to lie between 6.7 and 8.7 per cent of GDP in Canada will not be similar in other places. This has to do with different reported disability prevalence rates, as well as with different relationships between activity limitations and restrictions to participation: one and the same physical impairment, for example, weak eyesight, may limit participation in one country, whereas it does not elsewhere. Also, social security nets or specialized education and training facilities constitute important factors.

It could be assumed, for instance, that in developing countries the impact of activity limitations on productivity is potentially higher than in most high-income countries. Yet, even if this were the case, it is likely that aggregated figures would not show this, since disability

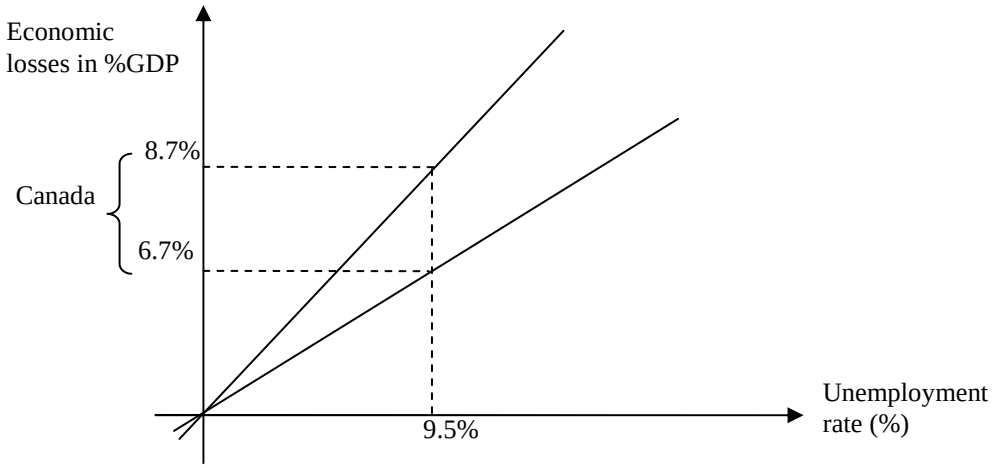
prevalence rates tend to be lower in developing countries than in the OECD (Organisation for Economic Co-operation and Development) world. Whereas Canada has prevalence rates between 13.7 and 31 per cent, depending on what measure one takes, many African countries only report rates between 4 and 6 per cent. Many would argue that this has various reasons stretching from different cultural perceptions of what is considered a disability to differences in measurement techniques. Others, however, would hold that these differences are not merely a statistical phenomenon. They point out that living conditions in developing countries often impede the survival of people with physical or mental impairments, and that this is then reflected in lower prevalence rates.

While the latter is a significant argument, relatively low economic losses rooted in low disability prevalence rates are alarming rather than comforting. Overall, such puzzling problems show that there are many reasons to try and develop genuine data on economic losses related to disability in several countries of the developing and the OECD world. They also make clear that aggregated data hardly speak for themselves: they require a context sensitive interpretation.

Another sticking point is the use of unemployment rates to extrapolate the Canadian data to the entire world. Metts (2000) makes the assumption that there is a linear relationship between the unemployment rate and productivity losses (see Box 3 below). This gives rise to both methodological and empirical concerns: firstly, it is important to examine figures on unemployment rates carefully, as some surveys focus only on employment in the formal sector, which in countries with large informal sectors would lead to the overestimation of unemployment rates, and hence to an overestimation of economic losses related to disability.

Secondly, it is not convincing to assume that labour market demand and supply elasticities for people with disabilities are similar all over the world: arguably, the relationship between general unemployment and unemployment in the group of people with disabilities depends on a myriad of factors, such as the institutional framework of the country (education and training facilities, social security systems, health services) and other socio-cultural factors (social networks, kinship, perception of disability).

Box 3: Linear relationship between unemployment and productivity losses according to Metts (2000)



To conclude, there are several reasons to take a fresh look at the calculation of economic losses related to disability. Firstly, the World Bank study uses figures which are now outdated: the Canada figures on disability are from 1993, and the data on unemployment and GDP are from 1996-97. Secondly, the World Bank study builds its calculations on another study that

uses a very specific way of measuring disability in one national context, with limited general applicability. In the meanwhile, new techniques - in particular the Washington Group (WG)[6] questions – have been developed to establish disability prevalence. It would hence make a lot of sense to use these new methods and techniques to recalculate the Canadian base value or, even better, to conduct country level analyses in a broader array of countries.

Conceptual framework

The extrapolation carried out by Metts (2000) is an important effort to develop an accumulated figure that summarizes the worldwide economic costs of excluding people with disabilities from the world of work. However, it is clear that the analysis builds on assumptions which are difficult to defend: certainly the social, cultural, and political structure of Canada does not represent the conditions in the rest of the world; and clearly differences in economic performance between countries cannot be reduced to differences in unemployment rates. In fact, the author himself highlights that the approach needs to be seen as a beginning rather than an end, i.e. as an "embryonic framework for future research" (Metts 2000, p. 6).

In the following, we suggest a simple bottom-up model based on participation restriction and activity limitation scores as suggested by the World Health Organization (WHO)'s International Classification of Functioning, Disability and Health (ICF) framework,[7] some basic assumptions on the link between participation and labour productivity; widely available labour market data (labour market activity, employment-to-population ratio, unemployment rate); and data on average per capita productivity in a given country.

Equation B (Box 4) below is the formula according to which we will calculate the economic losses related to disability. The core idea behind the equation is to focus fully on accumulated productivity losses related to different forms of exclusion.[8] It multiplies the average productivity (P) of a person in the given country with the number of people of working age that have a disability (n_i) with the disability level (i) and a productivity adjustment factor (γ_i) for that disability level. Building this product for all available disability levels i and adding them up yields the economic losses related to disability (L).

Box 4: Equation B - Economic losses related to disability

$$L = \sum_{i=1}^{k} P\, n_i \gamma_i \quad \text{and} \quad \gamma_i = \underbrace{(\beta_i^* - \beta_i)e_i}_{I} + \underbrace{\beta_i^*(u_i - u)}_{II} + \underbrace{\beta_i^*(d_i - d)}_{III}$$

A core element of the formula is the productivity adjustment factor γ. The factor is made up of three parts which describe three different dimensions of exclusion related to disability: (1) people with disabilities who are employed but not able to use their human capital to the

[6] The Washington Group was established by the UN with World Bank support in 2001 to promote and coordinate international cooperation in the area of health statistics (see p. 55).

[7] The ICF, adopted by the WHO in 2001, uses a definition of disability based on activity limitation and participation restrictions, rather than on individual attributes (WHO 2001).

[8] That means other potential costs such as government expenditures (e.g. social security payments), lost wages of caregivers, and so forth, are not factored into the equation.

maximum; (2) people who do not find jobs because of their physical or mental impairment; and (3) people with disabilities who have left the active labour force.

1. Part I of the formula reflects the reduced productivity of persons employed, related to factors such as lower education, lack of transport and physical accessibility. Accordingly, it calculates the difference of the actual productivity level of a person at disability level i - which is written as a percentage of the average productivity P (β_i) - and the potential productivity of a person at that disability level (β_i^*), and multiplies this with the percentage of people employed in the given disability level group (e_i).
2. Part II of the formula takes into account the often higher unemployment rate (u) among people with disabilities compared to those reporting no disability. It does this by multiplying the potential productivity of a person at a given disability level (β_i^*) with the spread between the unemployment level among non-disabled people (u) and the unemployment among people in the given disability level group (u_i).
3. Part III of the formula takes into account the often higher economic inactivity rates among people with disabilities compared to those reporting no disability. It does this by multiplying the potential productivity of a person at a given disability level (β_i^*) with the spread between the inactivity rates among people with no disability (d) and the inactivity rates among people in the given disability level group (d_i).

Core elements of Equation B (Box 4) are estimates of β_i and β_i^*. The betas are the factors which link disability levels with economic costs. In other words, they put price tags on the exclusion of people from the labour market. Using the betas is an important simplification that replaces the complex differentiations made in the study of the Roeher Institute (household disabled vs. institutionalized disabled, long term vs. short term, etc.). A β of 70 per cent for mildly disabled people can hence be interpreted in different ways: as 30 per cent sick leave of a person with average productivity, as 30 per cent less output compared to a person without disability, or (most realistically) as a combination of both sick leave and productivity limitations. Table 1 presents the β values at four different disability levels (mild, moderate, severe, and very severe). Since the values for β are set by assumption, we will carry out sensitivity analyses of L (economic losses related to disability) at different min- and max-values of β_i and β_i^*. However, in addition to these sensitivity analyses, more empirical research should be carried out in the future to construct more robust betas.

Table 1: Average productivity at different disability levels ("betas") (per cent)

Disability level i	β	β (min)	β(max)	β*	β(min)*	β (max)*
None	100	100	100	100	100	100
Mild	75	70	80	95	90	100
Moderate	55	50	60	75	70	80
Severe	25	20	30	55	50	60
Very Severe	5	0	10	25	20	30

Building disability level groups

Information about disability levels is crucial for the economic impact analysis suggested above. Usually this information is not readily available but needs to be calculated. Since countries use rather different methodologies to gather information on disability prevalence, it is not feasible to use the same methodology in order to create disability level groups for the entire sample of countries.

Four out of the ten case studies in this paper are built on survey data generated by the Norwegian research institute SINTEF (Malawi, Namibia, Zambia and Zimbabwe) in a survey of living conditions of persons with disabilities carried out in recent years. At the request of the ILO, the institute re-analyzed figures of its surveys, applying two different grouping algorithms: one for Malawi, Namibia, and Zimbabwe; and another one for Zambia, where a different methodology was used to measure disability.

The disability measurement in Malawi, Namibia, and Zimbabwe is built on two questions: (1) "Does anyone in this household have any difficulty in doing day-to-day activities because of a physical, mental or emotional (or other health) condition?"; (2) "Does anyone in this household need assistance to do day-to-day activities?" Both questions allow for the answers "a lot/often", "a little/sometimes", and "no". A third question ensures that the condition described is not a temporary health problem but a disability: "Has this difficulty lasted, or is it expected to last, six months or more?" Based on these questions, a matrix is used to group the respondents into disability level groups (Table 2).

Table 2: Creating disability level groups based on SINTEF questions

	Difficulty in doing day-to-day activities?		
Needs assistance to do day-to-day activities?	**Often**	**Sometimes**	**No**
A lot	Very severe disability	Severe disability	Moderate disability
A little	Severe disability	Moderate disability	Mild disability
No	Moderate disability	Mild disability	No disability

Table 3: Washington Group (WG) questions as implemented by SINTEF in Zambia

		No	Some	A lot	Unable
a	Do you have difficulty seeing, even if wearing glasses?	1	2	3	4
b	Do you have difficulty hearing, even if using a hearing aid?	1	2	3	4
c	Do you have difficulty walking or climbing steps?	1	2	3	4
d	Do you have difficulty remembering or concentrating?	1	2	3	4
e	Do you have difficulty (with self-care, such as) washing all over or dressing?	1	2	3	4
f	Because of a physical, mental, or emotional health condition, do you have difficulty communicating (for example, understanding or being understood by others)?	1	2	3	4

Source: Eide and Loeb (2006).

In the questionnaire used in the Zambia survey, SINTEF moved from the questions listed in Table 2 to the standardized set of WG questions (Table 3 above).

Responses to these questions have been used to assign people to different disability levels: if they answer at least one of the questions with "unable", they are assigned to the very severe group. If they answer at least one question with "a lot", but none with "unable", they have a

severe disability. If they answer all questions with "no", they are considered to have no disability. The separation between mild and moderate is slightly less clear. In consultation with the author of this paper, SINTEF assigned people to the mild disability group if they answered one question with "some difficulties" and all the other questions with "no". If they answered more than one question with 'some difficulties' but none with "a lot of difficulty" or even "unable", the people were assigned to the moderate disability group (Table 4).

Table 4: Creating disability level groups based on Washington Group questions

Difficulties	Answering behaviour
None	All questions answered with 'NO'
Mild	ONE question answered with 'SOME', none with 'A LOT' or 'UNABLE'
Moderate	MORE THAN ONE question answered with 'SOME', none with 'A LOT' or 'UNABLE'
Severe	At least one question answered with 'A LOT', none with 'UNABLE'
Very severe	At least one question answered with 'UNABLE'

Example calculation: Canada

The approach presented above can be illustrated using the example of Canada. The *Participation and Activity Limitation Survey* (2001) of Statistics Canada offers data on the level of disability of people aged between 15 and 64. In addition, it offers data on the employment status of people with disabilities, unfortunately without reference to the disability level. The figures are as follows: of approximately 1.8 million adults with disabilities, 41.8 per cent are employed, 25.5 per cent are unemployed, 28.7 per cent are not in the labour force, and 4 per cent are not specified. Table 5 breaks the accumulated labour market indicators down for the four different disability level groups. The assumption is made that increasing level of disability is positively correlated with increasing unemployment rates and decreasing activity rates.

Table 5: Canada - Working age population (15-64), by labour market status and calculated disability level

	Employed		Unemployed		Not active		Total
Level of Disability	Per cent	No. ('000)	Per cent	No. ('000)	Per cent	No. ('000)	No. ('000)
None	78.4	11,998	5.1	781	16.5	2,525	15,303
Mild	70.0	453	8.0	52	22.0	142	647
Moderate	47.0	233	35.0	173	18.0	89	495
Severe	25.0	137	50.6	277	24.4	134	548
Very severe	0.0	0	0.0	0	100.0	279	279
		12,821		1,283		3,169	17,272

Source: Calculations based on Statistics Canada (2001).

In addition to the labour market indicators and the disability indicators, a monetary variable is necessary to calculate the macroeconomic costs related to disability. Here, the average labour productivity of a Canadian worker is taken from the ILO databases (KILM) (ILO 2007b). The Canadian labour productivity (GDP per person employed) for 2001 is

US$ 54,679 (constant 1997 US$ Purchasing Power Parity [PPP]). Using Equation 4 (see p. 59) and the labour market data in Table 5, as well as the estimated beta values of Table 1, the following economic losses related to disability in Canada in 2001 can be calculated.

Table 6: Canada - Economic losses related to disability, 2001 (million US$)

	Disability level i			
	Mild	**Moderate**	**Severe**	**Very severe**
No. of people in disability level group in ´000 (ni)	647	495	548	279
Productivity adjustment factor (γi)	0.22	0.33	0.29	0.21
Part I (disabling environment: $(\beta_i^* - \beta_i)e_i$)	0.14	0.09	0.05	0.00
Part II (additional unemployment: $\beta_i^*(u_i - u)$)	0.03	0.22	0.20	0.00
Part III (additional inactivity: $\beta_i^*(d_i - d)$)	0.05	0.01	0.04	0.21
P x ni x γi (mio. US$)	$7,781	$8,911	$8,700	$3,179
Σ Total economic loss (mio. US$)	$28,569			

Table 6 reads as follows: the labour productivity of the people within a disability level group i (mild, moderate, severe, very severe) is lower than the average labour productivity in the workforce, which is expressed by the respective productivity adjustment factor γ_i. The adjustment factor is made up of three components: labour productivity losses related to a disabling environment; labour productivity losses related to higher unemployment; and labour productivity losses related to higher labour market inactivity rates. The productivity losses in the respective disability level group are the product of the number of people in the group, the productivity adjustment factor, and the average labour productivity in the economy.

Summing up the productivity losses in the respective disability level groups yields a total economic loss of US$ 28.6 billion in 2001 for Canada. A sensitivity analysis using the minimum and maximum beta values in Table 1 yields a band of economic losses between US$ 26.6 and US$ 30.6 billion in 2001. These estimates are somewhat lower than the ones offered by Metts (2000). Metts calculates a band of economic losses between US$ 33.3 and US$ 47.2 billion for 1996.

Finally, another important step towards an improvement of the framework offered by Metts and the Roeher Institute would be the development of a more sophisticated extrapolation technique. Metts uses the unemployment rate to extend the Canadian findings to the whole world. This is problematic, since it suggests that institutional, social, cultural and physical conditions are similar around the globe. Alternatives such as the ILO vulnerable employment indicator[9] or variables measuring the poverty level in a country, such as the number of working poor at the US$ 1 level or the US$ 2 level, should be explored. Yet, to be sure, gathering data from as many countries as possible will clearly remain the best solution: no single extrapolation factor will ever be able to translate a Canadian disability figure, for example, to the economy of Mali.

[9] The vulnerable employment indicator measures the proportion of own-account and contributing family workers in total employment.

2. Country case studies

In the following case studies, the methodology suggested above will be applied to a set of ten developing countries in Asia and Africa. The selection of countries is presented in Table 7. In Asia, the focus countries are China, Thailand, and Viet Nam. In the African region, the examined countries are Ethiopia, Malawi, Namibia, South Africa, Tanzania, Zambia and Zimbabwe. Table 7 presents some core figures of these countries which will be necessary for the calculation of economic losses later on.

Table 7: Case studies - Country data (2006)

	(1) GDP current (million US$)	(2) Working age population (15+) (million)	(3) Average productivity*	(4) Persons employed (%)	(5) Persons unemployed (%)**	(6) Persons inactive (%)
Asia						
China	2,644,681	1,023.32	3,540	73.0	3.8	23.2
Thailand	206,338	49.86	5,733	72.2	0.9	26.9
Viet Nam	60,999	61.31	1,356	73.4	1.5	25.1
Africa						
Ethiopia	13,315	45.25	389	75.6	4.3	20.1
Malawi	3,164	7.19	554	79.4	8.1	12.5
Namibia	6,566	1.26	13,824	37.7	17.1	45.2
South Africa	255,155	32.86	17,091	45.4	16.6	38.0
Tanzania	12,784	21.95	697	83.6	4.5	11.9
Zambia	10,734	6.36	2,430	69.5	8.8	21.7
Zimbabwe	3,418	8.07	609	69.5	4.7	25.8

Source:
Column 1: World Bank World Development Indicators (WDI);
Columns 2, 4, 5, 6: ILO Key Indicators of the Labour Market (KILM) (ILO 2007b) - figures from 2006:
Column 2: working age population in the age group 15+ (KILM table 2a);
Column 4: persons employed divided by working age population (KILM table 2a);
Column 5: persons unemployed divided by working age population (KILM table 2a and 1);
Column 6: persons not active in the labour market divided by working age population (KILM table 13).
*Calculated as GDP (current US$) divided by working age population (15+). Source: World Bank WDI, ILO KILM.
** The absolute number of persons unemployed is generated here by subtracting persons employed (KILM table 2a) from persons active in the labour force (KILM table 1).

The first column of Table 7 contains the 2006 GDP expressed in current US$, against which economic losses related to disability will be measured. The second quantifies the working age population of the country, i.e. all people aged 15 or older.[10] The third column

[10] It is important to bear in mind that in many empirical studies "working age" also has a maximum value which is either 59 or 64. Since disability prevalence increases strongly for older people it is important to be always specific about one's definition of "working age".

presents the productivity of the workforce, which is calculated as the country's GDP divided by the number of people employed.[11] Columns 4 to 6 highlight the employment situation, differentiating between people employed and people who are either unemployed or inactive in the labour market.

It is striking that within the Asian countries differences in the labour market situation are rather small; unemployment rates are generally low, and there is a three-quarter/one-quarter division between people who are employed and people who are inactive (e.g. retired people, or discouraged job-seekers). In Africa, on the other hand, differences are very pronounced with regard to both productivity and the labour market situation. Namibia and South Africa are remarkable because of their very high unemployment rates. The same countries also draw attention because of their high labour productivity.

Table 8: Data availability for case studies – GDP, Labour Market (LM), disability prevalence and level

	(1) GDP & productivity	(2) General LM data	(3) Disability prevalence	(4) LM data - disabled persons	(5) Disability level	(6) Disability level-LM cross-ref.
China	**2006**	**2006**	**2006**	**2006**	Viet Nam data	Estimation model
Thailand	**2006**	**2006**	**2007**	**2007**	Viet Nam data	Estimation model
Viet Nam	**2006**	**2006**	**2006**	**2006**	**2006**	Estimation model
Ethiopia	**2006**	**2006**	**1994**	**1994**	Zambia data	Estimation model
Malawi*	**2006**	**2006**	**2004**	**2004**	**2004**	2004
Namibia*	**2006**	**2006**	**2003**	**2003**	2003	2003
South Africa	**2006**	**2006**	**2006****	**2006**	**2006**	Estimation model
Tanzania	**2006**	**2006**	**2002**	Zambia data	Zambia data	Estimation model
Zambia*	**2006**	**2006**	**2006**	**2006**	**2006**	**2006**
Zimbabwe*	**2006**	**2006**	**2003**	**2003**	**2003**	**2003**

* Complete country information provided by SINTEF.

** These figures are not representative; the latest representative survey is from 2001.

Whereas macroeconomic data and general labour market information are readily available for all the country cases, disability prevalence rates and labour market information on people with disabilities is much more difficult to find. Table 8 provides an overview of the primary data which were available for the case study analysis.

[11] In Table 7 above, this means: GDP divided by the product of columns 2 and 4.

Grey shaded fields indicate that primary information is available. The numbers in the grey shaded field show from which year the information is. With the exception of Ethiopia, it was possible to use fairly up-to-date information in all countries. Major difficulties emerged in the identification of disability level groups (column 5) and the cross-referencing of disability and labour market data broken down by disability level group (column 6). The latter issue is a direct consequence of the former: countries usually offer an aggregate figure delineating the number of people with a disability without offering any information about the degree of difficulties related to the physical or mental impairment. The primary data available for this study only allowed the assignment of people to different disability level groups in six of the ten countries (Malawi, Namibia, South Africa, Viet Nam, Zambia, Zimbabwe), while in the remaining four countries (China, Ethiopia, Tanzania, Thailand), disability level distributions had to be estimated. Yet within these six countries, different survey designs did not allow for one and the same grouping algorithm. Only the grouping criteria in three countries analyzed by SINTEF with an identical questionnaire have been grouped the same way. Malawi, another country analyzed by SINTEF, uses a different methodology to identify people with disabilities, so that the grouping approach also had to be a different one. Finally, South Africa and Viet Nam offered primary data which allowed conclusions to be drawn on the level of disabilities. However, the survey designs were again different, so that grouping algorithms were not exactly the same.[12]

Since in most of the ten countries people with disabilities are not divided into disability level groups, the consequence is that neither there are cross-referenced labour market data for people in different disability level groups. The exception is four countries analyzed by SINTEF (Malawi, Namibia, Zambia and Zimbabwe), data from which have been recompiled by the organization for the purpose of this study (see p. 5, building disability level groups). In the six remaining countries a linear estimation method had to be used to generate the necessary data. The model is explained in more detail in Box 5 below. Firstly, it requires the labour market data for non-disabled people or, as a proxy, the general labour market data of a country. Secondly, it needs the labour market information the country provides on people with disabilities. Depending on the methodology the country is using to compile this piece of information, an assumption can be made if the figure refers to people with mild, moderate, severe or very severe disabilities. If, for instance, a country uses a simple ‘body functioning’ approach (see Annex 1, p. 53), it can be assumed that only persons with a severe disability are counted as ‘disabled’. That means that in these cases, the employment information reflects the status of people with severe disabilities, which may then be used to derive the employment information on those with a mild, moderate or even very severe disability.

[12] The exact description of *how* severity groups have been assigned can be found in the country studies in Annex 1.

Box 5: Estimating labour market data for different disability level groups

Equation 1: Estimating employment rates for different disability levels

$$e_i = e + \varepsilon i \quad \text{and} \quad \varepsilon = \frac{e_k - e}{k}$$

The formula suggests that the employment rate in the group of people with disabilities at a disability level *i* equals the sum of the employment rate of people without a disability *e* and a factor *ε* multiplied by the disability level *i*. *ε* is calculated as the difference between the employment rate for people without a disability and people with a disability at a disability level k, divided by that disability level k. The unemployment rate and the inactivity rate are calculated analogously.

Equation 2: Estimating unemployment rates for different disability levels

$$u_i = u + \varepsilon i \quad \text{and} \quad \varepsilon = \frac{u_k - u}{k}$$

Equation 3: Estimating inactivity rates for different disability levels

$$d_i = d + \varepsilon i \quad \text{and} \quad \varepsilon = \frac{d_k - d}{k}$$

The following sections of the study present in detail the calculation of economic losses related to the exclusion of people with disabilities in the sample of ten countries. The country studies focus predominantly on technical aspects of the calculation, that is, on the sources used, on challenges regarding the definition of disability, on how missing information has been replaced by estimates, and so forth. The purpose of this is to evaluate the extent to which the proposed model is applicable in practice. The purpose is not to provide in-depth interpretations and contextualizations of the findings. This important task will be left for future work.

Viet Nam

The measurement of disability preference rates in Viet Nam only recently underwent important changes. Before 2005 the line Ministries (Ministry of Labour, Invalids and Social Affairs, MOLISA; Ministry of Education and Training, MOET; Ministry of Health, MOH) collected disability data to meet their own needs. The General Statistical Office (GSO) had no official disability survey or census. This resulted in different definitions, approaches, methods, tools, and sample sizes. Prevalence rates measured by the various organizations differed strongly: whereas the MOLISA calculated a prevalence rate of 6.3 per cent in 1996, the National Health Survey (NHS) 2002 calculated a much lower prevalence rate of 2.9 per cent, and this even though all surveys were based on medical approaches to measure disability (see Table A.1, p. 55).

In 2005, the GSO started developing a strategy for the collection of disability data in Viet Nam. It conducted a workshop supported by the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP), World Bank/Washington Group (WB/WG), and the Medical Committee of the Netherlands-Vietnam (MCNV) to introduce the ICF approach in data collection, and developed a framework on disability data collection from 2005-2010. The first milestone was a pilot questionnaire in 2005, the second the integration of a disability module in the Vietnam Household Living Standards Survey (VHLSS), (GSO

2006). From 2009 onwards the Population and Housing Census will include disability questions.

The VHLSS is carried out every two years and covers 46,000 households. The 2006 survey incorporates an extended disability module with a slightly adapted version of the Washington Group (WG) questions. Table 9 presents the results grouped by type of disability as described in the WG questionnaire. The cut-off point for the results is the answer "some difficulty", so that prevalence rates are clearly above the rates which have been calculated by MOLISA (6.3 per cent) or the NHS in 2002 (2.9 per cent). Due to its lower cut-off point, the 2006 study can be assumed to reflect more adequately the number of people with disabilities in Viet Nam. It will thus be used in the following to calculate economic losses from excluding people with disabilities from the world of work.

Table 9: Viet Nam – Disability prevalence rates, by type of disability (per cent)

	Total	Vision	Hearing	Cognition	Mobility	Self-care	Communication
Total	**15.3**	11.2	3.3	4.6	5.9	2.1	2.7
Urban/Rural							
Urban	**17.8**	13.8	3.1	4.6	6.1	2.0	2.4
Rural	**14.4**	10.2	3.3	4.5	5.8	2.1	2.8
Sex							
Male	**13.9**	9.9	2.9	3.8	4.5	1.8	2.3
Female	**16.6**	12.4	3.7	5.3	7.2	2.3	3.1

Source: GSO 2006; the numbers refer to the share of persons who responded as having at least "some difficulty" in one of six issue areas (Vision, Hearing, Cognition, Mobility, Self-Care, Communication). As people may have more than one difficulty at a time, the sum of the percentages is larger than the total in the first column.

However, in order to calculate economic losses, more detailed information about disability prevalence rates and particularly about disability levels is necessary. Table 10 breaks down the prevalence rates into the four disability levels mild, moderate, severe and very severe, and into different age groups. This allows, based on a total population in 2006 of 84.1 million,[13] for the calculation of the total number of people with disabilities of working age (15-59), which is about 7 million (or 13.92 per cent). Thereof, about 1.5 million have a mild disability, 4.4 million have a moderate disability, 0.6 million have a severe disability, and 0.5 million have a very severe disability (see Table 11 below).

[13] World Bank WDI, DDP Quick Query.

Table 10: Viet Nam - Disability prevalence rates, by disability level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Total	**84.7**	**3.6**	**9.1**	**1.5**	**1.1**
By age group					
0-5	88.1	2.8	7.2	1.0	0.9
6-10	90.4	1.8	6.5	0.8	0.5
11-14	89.2	2.1	7.1	0.9	0.6
15-17	87.6	2.3	8.4	1.1	0.6
18-29	84.7	3.1	10.1	1.1	1.0
30-39	88.2	3.0	6.8	1.1	1.0
40-49	87.0	2.8	8.3	1.0	0.9
50-59	81.6	3.4	12.6	1.6	0.9
60+	80.1	5.7	10.1	2.5	1.6

Variations in totals due to rounding
Source: VHLSS (GSO 2006).

Table 11: Viet Nam - People with disabilities of working age (15-59), by disability level (millions)

		Disability level				
	Total	None	Mild	Moderate	Severe	Very severe
15-17	5,735	5,023	134	479	64	35
18-29	18,196	15,419	559	1,838	202	178
30-39	12,806	11,296	379	873	136	122
40-49	8,471	7,373	236	702	87	74
50-59	4,288	3,497	144	541	69	38
15-59 (millions)	49,496	42,607	1,451	4,433	558	446
15-59 (%)	100%	86.1%	2.9%	9.0%	1.1%	0.9%

Variations in totals due to rounding
The population figures for 2006 are estimated, based on the 1999 census data of the National Statistical Office (NSO) of Viet Nam.

In addition to disability prevalence rates, labour market information on people with disabilities is necessary for economic analysis. Unfortunately, such information is rather scarce in Viet Nam. According to the "National Action Plan to Support People with Disabilities, Period 2006–2010" (Government of Viet Nam 2006), about 58 per cent of people with disabilities are working, whilst 30 per cent are unemployed and wish to have a stable job. That means that the remaining 12 per cent can be described as inactive (not having a job and not actively looking for a job). It is not surprising that, as Table 12 shows, unemployment among people with disabilities is visibly higher than the value for the population in total. It is surprising, however, that inactivity rates among people with disabilities are lower (12 per cent)

than in total population. This has most likely something to do with different measurements of unemployment and inactivity (for example, someone who "wishes to have a job" is counted by the Vietnamese as unemployed but may be counted as inactive in official labour market statistics if this person is not actively looking for a job). However, while for policy-makers an adequate differentiation between "unemployed" and "inactive" is important to determine the right types of interventions, it can here be ignored, since for the calculation of economic losses it makes no difference if the person is counted as inactive or unemployed (both constitutes a productivity loss). This inconsistency is therefore not worrisome.

Table 12: Viet Nam - Labour market status - Total population and persons with disabilities

	Total population		People with disabilities	
	Million	Per cent	Million	Per cent
Employed	45.00	73.4	4.00	58.0
Unemployed	0.95	1.5	2.07	30.0
Inactive	15.36	25.1	0.83	12.0

Source: Left column (regular labour market figures, Viet Nam); right column (labour market figures for people with disabilities) – Government of Viet Nam 2006.

A more substantial problem, however, is that the figures above refer to MOLISA's narrow definition of disabled person, which uses a body functioning approach covering only a very small number of people, usually those with severe limitations. That means that, within the categorization scheme of this paper, the figures above describe the employment situation of people with severe limitations, not the employment situation of all people with disabilities. The data for those with mild, moderate or very severe disabilities need to be estimated. This can be done with a simple linear extrapolation model as described in Box 5 (p. 12). The results are presented in Table 13.

Table 13: Viet Nam - Working age population (15-59), by labour market status and disability level (per cent)

		People with disabilities - Disability level			
	Total population	Mild*	Moderate*	Severe	Very severe*
Employed	73.4	68.3	63.1	58.0	52.9
Unemployed	1.5	11.0	20.5	30.0	39.5
Inactive	25.1	20.7	16.4	12.0	7.6

* Column estimated based on linear model described in Box 5, p. 12.

In combination with the disability level groups (Table 11), these estimates allow for the calculation of economic losses related to disability in Viet Nam (Table 14). The economic losses related to disability in the country amount to US$ 1.82 billion in 2006, i.e. 2.99 per cent of Viet Nam's GDP. The sensitivity analysis, which is based on different potential productivity levels ($\beta_{(min)}^{*}$ and $\beta_{(max)}^{*}$) suggests a band of losses between US$ 1.77 and 1.87 billion.

Table 14: Viet Nam - Economic losses related to disability, by disability level (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group in '000 (ni)	1,452	4,433	558	446
Productivity adjustment factor (γi)	**0.19**	**0.20**	**0.19**	**0.16**
Part I (disabling environment)	0.14	0.13	0.12	0.11
Part II (extra unemployment)	0.09	0.14	0.13	0.09
Part III (extra inactivity)*	-0.04	-0.06	-0.06	-0.04
P x ni x γi (millon US$)	$365	$1,221	$140	$95
Σ Total economic loss (million US$)	**$1,821**			
Σ Min. total economic loss related to disability	$1,773			
Σ Max. total economic loss related to disability	$1,869			

* The negative figures here are rooted in the rather counter-intuitive higher degree of inactivity in the total population compared to inactivity amongst people with disabilities; it should not be read as indicating that people with disabilities help to decrease economic losses but rather as a counterweight to an unemployment figure which is most likely too high since many of those counted as unemployed are in fact inactive.

For the detailed calculation, see Annex (p. 65).

The model also allows some conclusions to be drawn regarding the sources of the economic losses in Viet Nam (Table 15). About two-thirds of the losses are linked to productivity losses caused by a disabling environment, i.e. by factors which make people with disabilities who are employed less productive than they could otherwise be.[14] About one-third of the losses are linked to higher unemployment and/or a higher labour market inactivity of people with disabilities. The table furthermore shows that the largest losses occur in the group of people with moderate disabilities. Through adequate policies, an untapped potential of US$ 1,221 million could be mobilized in this group.

Table 15: Viet Nam - Economic losses related to disability, by source and disability level (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Disabling environment	$269	$759	$88	$64	$1,179
Exclusion from the labour market	$96	$463	$52	$31	$642
Total	**$365**	**$1,221**	**$140**	**$95**	**$1,821**

[14] This is not to say that by changing the environment all people with disabilities could move up to 100 per cent of average productivity. The degree to which changes in the environment may increase productivity is determined by estimates given in Table 3.

Thailand

Information about people with disabilities in Thailand is collected by the National Statistical Office (NSO) at the Ministry of Information and Communication[15] and by the Office of Empowerment for Persons with Disabilities at the Ministry of Social Development and Human Security.[16] The NSO defines disability as "a limitation or inability in performing activities like normal people, due to health problems or illness lasting for 6 months or more". The primary screening of people with disabilities is based on a question referring to body functioning: "Do you have any health problems or illness lasting for 6 months or more, or do you have any impairment?" In addition, two activity-based questions are asked to specify limitations related to the physical impairment: "Do these problems cause limitations in performing activities of daily living?" If yes, "specify: eating, bathing, cleaning the face, brushing teeth, dressing and passing a stool, etc." Interestingly, only the first question is used to categorize a person as disabled, and the second group of questions is also filled out by those who do not fall into the category 'disabled'. That leads, as the figures below will show, to four different groups: (1) people with disabilities who do not report limitations in performing activities of daily living; (2) people with disabilities who do feel limitations in performing activities of daily living; (3) people without disabilities who do not feel limitations in performing activities of daily living; and (4) people without disabilities who do feel limitations in performing activities of daily living.

Table 16: Thailand - Total population and working age population (15-64), by disability status

		People with disabilities	
	Population (millions)	millions	Per cent
Total	65.57	1.87	2.85
Working age (15-64)	46.12	0.91	1.97

Source: NSO 2007 Disability Survey (not available in English).

Only recently the NSO published the results of its 2007 Disability Survey, which can be used to calculate the economic losses related to disability in Thailand. In a population of 65.6 million, the survey identifies 1.9 million people with disabilities (Table 16). This makes 2.85 per cent of the population, which is close to what the NHS calculated in 2002 for Viet Nam. Compared to Viet Nam's VHLSS survey in 2006, however, the figure is low, probably attributable to the body functioning methodology used.

Focusing on people with disabilities of working age (15-64) yields an even lower figure: of the approximately 46 million Thais, merely 0.9 million are identified as having a disability (that is, 1.97 per cent of the working age population). Two activity-based questions in the survey allow the people in this group to be assigned to different disability levels. The first asks if the person has difficulties or restrictions in participating in community life (such as going to temple, church, mosque, marriages, funerals, etc.); the second asks if the person has difficulties or restrictions in participating in domestic life (such as doing housework, shopping, etc.). The questions can be answered with "no difficulty", "some difficulty/restriction", "a lot of difficulty/restriction" and "cannot do at all".

[15] http://www.nso.go.th [1 Nov. 2009].

[16] http://www.oppd.opp.go.th [1 Nov. 2009].

Table 17: Thailand - Assigning disability levels to people with disabilities

	Participation in community life			
	Total		Persons with disabilities	
	millions	Per cent	millions	Per cent
Total (7+)	**58,798**		**1,859**	
No	57,892	98.46	1,018	54.77
Yes	905	1.54	841	45.22
Some difficulty/restriction	338	37.40	296	35.25
A lot of difficulty/restriction	235	26.00	223	26.56
Cannot do at all	331	36.60	321	38.19
Unknown	0	0.08	0	0.03

Source: NSO 2007 Disability Survey (not available in English).

Since both questions yield relatively similar results, it is sufficient to focus on the first one, presented in Table 17. The question is directed at people aged seven or older (7+). Interestingly, it finds that in the group of 1.9 million people with disabilities, only 0.9 million have difficulty participating in community life. In almost equal parts, respondents find that they have either some problems, a lot of problems, or were not able to participate at all. This can be used to build disability level groups: people with a disability who do not complain about a lack of participation in community life are considered to have mild difficulties'; those who are complaining about some difficulties are defined as moderate; those who have a lot of difficulties are in the group 'severe'; and those who state they cannot participate at all are assigned to the group 'very severe'.

Since the survey results in Table 17 capture people aged seven or older, the resulting figures need to be corrected by subtracting people of 'schooling age' (7-14) and people of 'retirement age' (65+). This has been carried out in Table 18, which presents the numbers of people of working age without a disability (46 million), those with mild disability (197,000), moderate disability (265,000), severe disability (185,000) and very severe disability (260,000).

Table 18: Thailand - Grouping persons with disabilities, by disability level (millions)

	Population 7+	Population 7-14 and 65+	Working age*
Total population	58,798	12,677	46,120
Total people with disabilities	1,859	952	907
People with mild disabilities**	954	757	197
People with moderate, severe and very severe disabilities	905	195	710
Moderate	338	73	265
Severe	235	51	185
Very severe	331	71	260

* The figures for the population 7+ is corrected by subtracting the "schooling age" population (7-14) and the "retirement age" population (65+) to obtain the figures for the working age population.

** People with a disability who do not fall into moderate, severe or very severe categories have been shifted into the "People with mild difficulties" group.

The labour market information for people with disabilities in comparison with labour market data for people without disability is presented in Table 19. The differences are striking. Once more, there is no data available for different disability level groups. Thus, these data need to be generated by using the simple linear model that has also been used for the Viet Nam data. This time the assumption is that the employment information for disabled people reflects the labour market situation of people with moderate difficulties (Table 20).

Table 19: Thailand - Labour market status - Total population and people with disabilities

	Total population		People with disabilities	
	millions	Per cent	millions	Per cent
Employed	35.99	72.2	0.64	35.2
Unemployed	0.46	0.9	0.49	26.9
Inactive	13.41	26.9	0.69	37.9

Sources: left column: ILO KILM (2007b), right column: NSO 2007 Disability Survey.

In combination with the disability level groups (Table 18), these estimates allow for the calculation of economic losses related to disability in Thailand (Table 21). They amount to US$ 1.42 billion in 2007, that is, 0.7 per cent of Thailand's GDP. The sensitivity analysis suggests a band between US$ 1.3 and 1.5 billion. These losses are considerably smaller than in Viet Nam.

Table 20: Thailand - Working age population (15-64), by labour market status and disability level (per cent)

	Total population	People with disabilities - Disability level			
		Mild*	Moderate*	Severe	Very severe
Employed	72.2	53.7	35.2	16.7	0.0
Unemployed	0.9	13.9	26.9	39.8	52.8
Inactive	26.9	32.4	37.9	43.5	49.0

* Column estimated based on linear model described in Box 5, p. 12.

Table 21: Thailand - Economic losses related to disability, using NSO data (million US$)

	Disability level			
	Mild	Moderate	Severe	Very severe
Number of people in disability level group in '000 (ni)	197	265	185	260
Productivity adjustment factor (γi)	**0.28**	**0.35**	**0.28**	**0.18**
Part I (disabling environment)	0.11	0.07	0.03	0.00
Part II (extra unemployment)	0.12	0.19	0.18	0.13
Part III (extra inactivity)	0.05	0.08	0.07	0.08
P x ni x γi (million US$)	$320	$529	$299	$269
Σ Total economic loss (million US$)	**$1,417**			
Σ Min. Total economic loss related to disability	$1,296			
Σ Max. Total economic loss related to disability	$1,539			

For the detailed calculation, see Annex (p.64).

The sources of the economic losses are presented in Table 22. It demonstrates that the major reason for economic losses is poor access to labour markets.

Overall, it remains questionable whether the figures for Viet Nam and Thailand can be compared, mostly because disability prevalence rates are so enormously different. Table 23 shows how different the result would look under the assumption that prevalence rates in Thailand are equal to those in Viet Nam, and also assuming that, corresponding to the Viet Nam case study, the labour market data for people with disabilities in fact describe the situation of those with severe (not moderate) difficulties. The result is clearly higher economic losses of US$ 9.6 billion (4.64 per cent of 2007 GDP).

Table 22: Thailand - Economic losses related to disability, by source and disability level, using NSO data (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$121	$107	$35	$0	$264
Due to exclusion from the labour market	$199	$422	$264	$269	$1,154
Total	**$320**	**$529**	**$299**	**$269**	**$1,417**

Variations in totals due to rounding

For the detailed calculation, see Annex (p.64).

Table 23: Thailand - Economic losses related to disability, by source and disability level, assuming Viet Nam prevalence rates (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$928	$2,251	$210	$109	$3,498
Due to exclusion from the labour market	$908	$4,380	$496	$294	$6,078
Total	**$1,836**	**$6,631**	**$706**	**$403**	**$9,576**

Variations in totals due to rounding
For the detailed calculation, see Annex (p.63).

China

China's main agency for collecting data on people with disabilities is the China Disabled Persons' Federation (CDPF). On a yearly basis, the organization gathers information on the overall situation of people with disabilities in the fields of vocational training and employment to provide data for the development of policies and regulations. The survey covers people of working age (male: 16-60; female: 16-55) in all economic activities, sectors and geographic areas, and generates information on employment, unemployment and economic activity.

CDPF defines a person with a disability according to the 1990 "Law of People's Republic of China on the Protection of People with Disabilities" as "…a person who suffers, psychologically or physiologically, from abnormalities in body structure or loss of an organ or function and has lost, wholly or in part, the ability to perform an activity in the way considered normal for human beings". The identification of people with disabilities is through administrative records; the person must have a certificate of disability issued by the People's Republic of China and be within employment age.

According to CDPF's National Sample Survey on Disability, conducted in 2006, there are 82.96 million people with various disabilities in China. That is 6.34 per cent of the population (Table 24 shows the number of people with disabilities grouped by disability type). Some 42 per cent (34.93 million) of the overall number of people with disabilities are of working age (15-59), 53 per cent are above the age of 60, and 5 per cent are between 0 and 14 years of age.

The majority of people with disabilities live in rural areas (75 per cent). Based on this data, the disability prevalence in the working age population is 3.3 per cent.

Table 24: China - People with disabilities, by type of disability (2006)

Type of disability	People (million)	Per cent of total
multiple	13.52	16.3
visual	12.33	14.9
hearing	20.04	24.2
speech	1.27	1.5
physical	24.12	29.1
intellectual	5.54	6.7
psychiatric	6.14	7.4

Source: CDPF (2006).

The current employment situation of people with disabilities in China is illustrated in Table 25. The 2006 National Sample Survey on Disability differentiates between employment in urban and rural areas. The large majority of people with disabilities who are listed as employed lives in rural areas (98 per cent), and only a small fraction in urban areas (2 per cent). This is surprising since 25 per cent of the people with disabilities live in urban areas. About 1.4 million people with disabilities are listed as unemployed.

Table 25: China - Labour market status of people with disabilities (15+) (2006)

	million	Per cent
Working age (15+)	34,930	100
Employed	17,083	48.9
...in urban areas	*362*	*1*
...in rural areas	*16,721*	*47.9*
Unemployed	1,396	4.0
Inactive	16,451	47.1

Source: CDPF (2006).

Table 26 compares the labour market situation of people with disabilities and the labour market situation of those without. The differences in inactivity rates are particularly striking, whereas the differences regarding unemployment are rather small. Again, this may have to do with borders between inactivity and unemployment not always being clear in the case of people with disabilities. However, since the economic model used in this study does not make a distinction between inactivity and unemployment, this problem is not of immediate relevance.

Table 26: China - Labour market status - Total population and persons with disabilities (15 +) (2006)

	Total population		People with disabilities	
	million	Per cent	million	Per cent
Employed	747.18	73.0	17.08	48.9
Unemployed	38.55	3.8	1.40	4.0
Inactive	237.59	23.2	16.45	47.1

Sources: Left column: ILO KILM (2007b); right column: CDPF (2006).

Disability data in China are less comprehensive than in the two countries above (Thailand and Viet Nam). There is no information which allows the assignment of people with disabilities to different disability level groups, and accordingly there is also no way of looking at the employment situation of people with disabilities at different disability levels. Hence, these figures need to be estimated.

As follows, two approaches will be taken. The first one is based on the official figure of 34.93 million people with disabilities of working age, assuming that the distribution between disability level groups is equal to the distribution in Viet Nam. The second calculation assumes that disability prevalence rates in China are higher than the ones provided by CDPF. This assumption makes sense, taking into account that the CDPF is using a body functioning approach based on a certificate of disability. As in the case of Thailand, such an approach leads to fairly low prevalence rates. The second calculation will thus be based on prevalence rates measured in Viet Nam under the ICF framework, making the assumption that these rates are equal to the Chinese ones.

Table 27: China - Working age population (15+), by labour market status and disability level (per cent)

		People with disabilities - Disability level			
	Total population	Mild*	Moderate*	Severe	Very severe*
Employed	73.0	61.0	48.9	36.8	24.8
Unemployed	3.8	3.9	4.0	4.1	4.2
Inactive	23.2	35.2	47.1	59.0	71.0

* Column estimated based on linear model described in Box 5, p. 12.

Table 28: China - Economic losses related to disability, by disability level, using CDPF data (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group in '000 (ni)	7,360	22,478	2,829	2,264
Productivity adjustment factor (γi)	**0.24**	**0.28**	**0.24**	**0.17**
Part I (disabling environment)	0.12	0.10	0.07	0.05
Part II (extra unemployment)	0.00	0.00	0.00	0.00
Part III (extra inactivity)	0.11	0.18	0.16	0.12
P x ni x γi (mio. US$)	$6,160	$22,171	$2,367	$1,363
Σ Total economic loss (million US$)	$32,062			
Σ Min. Total economic loss related to disability	$30,571			
Σ Max. Total economic loss related to disability	$33,552			
For the detailed calculation, see Annex (p.62).				

Table 27 demonstrates the results of the estimation of employment, unemployment and inactivity rates in China with the linear model presented in Box 5, p. 12. The important assumption is that the aggregated labour market figures for people with disabilities reflect the situation of people with moderate difficulties. The figures for people with mild, severe and very severe difficulties are results of the linear estimation.

Table 28 contains the economic losses related to disability in China, based on the official disability prevalence figures of the CDPF disaggregated by disability level by using figures from Viet Nam. They amount to US$ 32.1 billion, that is, 1.2 per cent of Chinese GDP in 2006. As Table 29 shows, about US$ 12 billion are created by a disabling environment, while US$ 20 billion relate to higher unemployment and inactivity rates.

Table 29: China - Economic losses related to disability, by source and disability level, using CDPF data (million US$)

	Disability level				
	Mild*	**Moderate***	**Severe**	**Very severe***	**Total**
Due to disabling environment	$3,176	$7,781	$738	$397	$12,092
Due to exclusion from the labour market	$2,984	$14,390	$1,630	$966	$19,970
Total	$6,160	$22,171	$2,367	$1,363	$32,062

***Calculated on the basis of linear model**
Variations in totals due to rounding

Table 30 indicates the economic losses related to disability in China based on prevalence rates measured in Viet Nam under the ICF framework. Again, the economic losses are clearly higher. They amount to US$ 111.7 billion, which is about 3 per cent of GDP.

Table 30: China - Economic losses related to disability, by source and disability level, assuming Viet Nam prevalence rates (million US$)

	Disability level				
	Mild*	Moderate*	Severe	Very severe*	Total
Due to disabling environment	$13,803	$36,941	$3,992	$2,669	$57,406
Due to exclusion from the labour market	$8,112	$39,119	$4,430	$2,626	$54,287
Total	$21,915	$76,060	$8,422	$5,296	$111,693

* Calculated on the basis of linear model
For the detailed calculation, see Annex (p.61).
Variations in totals due to rounding

Malawi

The amount of relevant disability research in Malawi is very limited. In 1983, a Survey of Handicapped Persons was carried out by the National Statistical Office (NSO) to estimate the incidence of disability and to establish demographic and socioeconomic characteristics of disabled persons by type and level of disability. The survey placed the rate of disability in the population at 2.9 per cent. Another NSO survey conducted in 1993 indicated that the prevalence of disability in the population was about 2 per cent. In 1998 a population census was carried out which, however, does not provide any information on disabilities or impairments in the population.

A more recent and comprehensive disability survey for Malawi has been carried out by *SINTEF Health Research* using the ICF definition of disability (see p. 4).[17] The survey covers a representative number of 1,521 households where at least one person with a disability is living, and, as a control group, a number of 1,537 households where no person has a physical or mental impairment (see Table 31 below).

Table 31: Malawi - Sample size of disability study

	Households	Individuals	Persons with disabilities
Households having a person with disability	1,521	8,038	1,579
Households without a person with disability (Controls)	1,537	7,326	44
Total	**3,058**	**15,364**	**1,623**

Source: Loeb and Eide 2004, p. 78.

The SINTEF study provides both extensive information on the employment and general living situation of people with disabilities and on the domain, level and origin of disability in Malawi. Information on employment and general living situations includes data comparisons on unemployment rates, education and skills, monthly salary, household income and expenses, and housing ownership. Information on disability includes age profiles, disability level scales,

[17] http://www.sintef.no [1 Nov. 2009].

disability distribution (regional, age, gender), causes of disability, and data on the availability and use of services and aids.

Table 32 shows unemployment rates in Malawi by disability in the economically active age range of 15 to 65 years. It suggests that unemployment is generally very high in Malawi. The difference between those with and without disabilities does not seem very large, although it is statistically significant (Loeb and Eide 2004, p. 91).

Table 32: Malawi - Labour market data, by disability status (per cent)

	Disabled	Non-disabled	Total
Currently working or returning to work	42.3	46.7	46.2
Unemployed or inactive	57.7	53.2	53.8

Source: Loeb and Eide 2004, p. 91.

In the measurement of disability, both activity-based and participation-based questions have been used. The former aim to capture the person's level of functioning by asking, "How difficult is it for you to perform the activity x without any kind of assistance at all?" The latter measure an individual's level of performance in their current or usual environment by asking, for instance, "Do you experience any problem(s) in performing this activity in your current environment?"

For the purpose of this report, SINTEF has recompiled the Malawi data in order to generate the set of information required for our model to calculate economic losses related to disability. To begin with, SINTEF grouped the Malawi data into different disability levels, using the algorithm presented in Section 1 (p. 6).

Table 33: Malawi - Working age population (15-64), by disability status and level

Disability status	Millions	Per cent
No disability	**6,342**	**88.1**
Disability	**856**	**11.9**
Mild	*43*	*0.6*
Moderate	*108*	*1.5*
Severe	*108*	*1.5*
Very severe	*597*	*8.3*
Total	7,198	100.0

Source: Calculations by SINTEF for the purpose of this study based on Loeb and Eide 2004.

Table 33 presents the results of the grouping exercise. The overall disability prevalence rate is 11.9 per cent. Surprisingly, most of this falls into the group of people with very severe difficulties. That means that 8.3 per cent of the respondents (all of working age) answered the question of whether they have difficulties in day to day activities with "yes, often", and the question of whether they need assistance to do day-to day-activities with "yes, a lot". This seems very high and some follow-up research should be made to verify this (the disability level pattern is not only that high in Malawi, but also in Namibia and Zimbabwe).

Table 34 presents the results of the cross-referencing of labour market data and disability prevalence rates. As expected, the employment rate falls with the level of the disability: whereas 60 per cent of people with mild disabilities are employed, only 38 per cent of those with very severe disabilities are employed. The sole puzzling fact is that non-disabled people seem to be worse off than those with mild and moderate disabilities and basically in the same situation as those with severe difficulties.

Table 34: Malawi - Working age population (15-64), by labour market status and disability level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Employed	46.5	60.0	54.3	46.7	38.4
Unemployed / inactive	53.5	40.0	45.7	53.3	61.6

Source: Calculations by SINTEF for the purpose of this study based on Loeb and Eide 2004.

Several explanations are possible. One is that there is no correlation between mild/moderate difficulties and the employment situation of disabled people in Malawi, since most of the employment is in the informal sector where light difficulties are not a reason for not engaging in productive work (the question would only be in this case how productive the work is). Another explanation could be special programmes to train people with disabilities that provide them with some skills not offered to non-disabled people. Finally, it would be instructive to check if the approach of SINTEF in assessing the employment situation of people with and without disabilities leads to biased figures, as differences between SINTEF and ILO labour market data are very significant: while SINTEF calculates an employment rate of 46.5 per cent, ILO/KILM calculates an employment rate of 79.4 per cent for the same year. In recognition of this significant difference we will offer the following calculations based on both the ILO and the SINTEF labour market data. Whereas the SINTEF version is internally more consistent, the version using the ILO data has the advantage of using a more reliable figure for overall employment, unemployment and labour market inactivity.

The economic consequences of the exclusion of people with disabilities from the world of work are presented in Tables 35 and 36, which use the official unemployment/inactivity figures of the ILO rather than the SINTEF data to quantify the number of non-disabled people. The tables suggest that the overall economic loss amounts to US$ 99 million, which is 3.12 per cent of GDP (the sensitivity analysis suggests a band between 2.84 and 3.4 per cent). As expected, losses are largely occurring in the group of people with very severe disabilities. Economic losses occur in equal parts due to a disabling environment and higher unemployment/inactivity rates.

Table 35: Malawi - Economic losses related to disability, by disability level, using ILO data (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group in '000 (ni)	43	108	108	597
Productivity adjustment factor (γi)	**0.30**	**0.30**	**0.24**	**0.18**
Part I (disabling environment)	0.12	0.11	0.09	0.08
Part II (extra unemployment / inactivity)	0.18	0.19	0.15	0.10
P x ni x γi (million US$)	$7	$18	$14	$59
Σ Total economic loss (million US$)	**$99**			
Σ Min. Total economic loss related to disability	$90			
Σ Max. Total economic loss related to disability	$107			

For the detailed calculation, see Annex (p. 67).

Table 36: Malawi - Economic losses related to disability, by source and disability level, using ILO data (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$3	$6	$6	$25	$40
Due to exclusion from the labour market	$4	$11	$9	$34	$58
Total	$7	$18	$14	$59	$99

Variations in totals due to rounding
For the detailed calculation, see Annex (p.67).

Table 37 presents the results gained when using the SINTEF figures for quantifying employment, inactivity and unemployment, rather than the official ILO figures. Since differences are very significant, the variation in economic losses is also immense: the total losses calculated with the SINTEF data amount to US$ 40 million, which is 1.25 per cent of GDP (the sensitivity analysis suggests a band between 1.22 and 1.28 per cent).

Table 37: Malawi - Economic losses related to disability, by source and disability level, using SINTEF data (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$3	$6	$6	$25	$40
Due to exclusion from the labour market	-$3	-$4	$0	$6	-$1
Total	$0	$3	$5	$32	$40

Variations in totals due to rounding
For the detailed calculation, see Annex (p.68).

Namibia

In 2001/2002, SINTEF Health Research carried out a survey on disability in Namibia in cooperation with the University of Namibia and the Ministry of Lands Resettlement and Rehabilitation (Eide et al. 2003b) The survey design resembles that used in Malawi (see p. 25) and hence is not discussed here.

Table 38: Namibia - Working age population (15–64), by disability status and level

Disability status	Million	Per cent
No disability	**1,098**	**87.1**
Disability	**163**	**12.9**
Mild	*1*	*0.1*
Moderate	*40*	*3.2*
Severe	*18*	*1.4*
Very severe	*103*	*8.2*
Total	1,261	100.0

Source: Calculations by SINTEF for the purpose of this study, based on Eide et al. 2003b.

Table 39: Namibia - Working age population (15-64), by labour market status, disability status and level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Employed	26.8	15.4	11.8	15.5	8.7
Unemployed/inactive	73.2	84.6	88.2	84.5	91.3

Source: Calculations by SINTEF for the purpose of this study, based on Eide et al. 2003b.

In 2008, at the request of the ILO, SINTEF recompiled the primary data of this survey for the current study. Tables 38 and 39 present disability prevalence rates in the country, as well as cross-referenced labour market information. The overall prevalence rate in Namibia is 12.9 per cent and, surprisingly, most disabled people in the country fall into the group of people with

very severe disabilities. The same phenomenon can be observed for Malawi (8.3 per cent – see Table 33) and Zimbabwe (5.9 per cent – see Table 48), countries for which the same algorithm has been used to assign persons with disabilities to different disability levels (see p. 6). Zambia, the fourth country examined by SINTEF, uses a different grouping methodology, and comes to the conclusion that rather few people (2.8 per cent) fall into this group, while the majority falls into the group of people with severe disabilities (9.3 per cent), as is seen in Table 43 below. This shows that the borders between the disability levels are often fluid and clearly a matter of definition.

The labour market situation of people at different levels of disability, as expected, worse than the labour market situation of those without disabilities irrespective of whether one uses the SINTEF figures for people with no disabilities or the official ILO data: whereas unemployment/inactivity rates for people without disabilities is already shockingly high (73.2 per cent – see Table 39), only one of ten in the large group of people with very severe disabilities has been counted as employed.

Table 40: Namibia - Economic losses related to disability, by disability level, using ILO data (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group (ni)	1,260	40,320	17,640	103,320
Productivity adjustment factor (γi)	**0.24**	**0.22**	**0.13**	**0.09**
Part I (disabling environment)	0.03	0.02	0.03	0.02
Part II (extra unemployment / inactivity)	0.21	0.19	0.10	0.07
P x ni x γi (million US$)	$4	$121	$32	$128
Σ Total economic loss (million US$)	$286			
Σ Min. total economic loss related to disability	$255			
Σ Max. total economic loss related to disability	$317			

For the detailed calculation, see Annex (p. 69).

Table 41: Namibia - Economic losses related to disability, by source and disability level, using ILO data (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$1	$13	$8	$25	$46
Due to exclusion from the labour market	$4	$108	$24	$104	$240
Total	$4	$121	$32	$128	$286

Variations in totals due to rounding

The economic consequences of this pattern are presented in Tables 40 and 41, which use the official unemployment/inactivity figures of the ILO instead of the SINTEF data to quantify the number of people with no difficulty. The tables suggest that the overall economic loss amounts to US$ 286 million, that is, 4.35 per cent of GDP (the sensitivity analysis suggests a band between 3.89 and 4.82 per cent). As expected, losses are largely occurring in the group of people with very severe disabilities, and exclusion from the labour market is five times as important as losses related to a disabling environment.

Table 42 presents the results when using the SINTEF figures to quantify employment, inactivity and unemployment rather than the official ILO figures. Since differences are quite notable, the variation in economic losses is also significant: the total losses calculated with the SINTEF data amount to US$ 168 million, which is 2.56 per cent of GDP (the sensitivity analysis suggests a band between 2.31 and 2.8 per cent).

Table 42: Namibia - Economic losses related to disability, by source and disability level, using SINTEF data (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$1	$13	$8	$25	$46
Due to exclusion from the labour market	$2	$54	$10	$57	$122
Total	$2	$67	$18	$82	$168

For the detailed calculation, see Annex (p. 70).
Variations in totals due to rounding

Zambia

Zambia is the most recent of the four countries analyzed by SINTEF with regard to disability prevalence and the impact of disability on living conditions. It has been carried out in cooperation with the Norwegian Federation of Organizations of Disabled People (FFO), the Zambia Federation of the Disabled (ZAFOD), the Institute for Economic and Social Research (INESOR) and the Central Statistical Office (CSO) in Zambia (Eide and Loeb 2006). The questionnaire it has been using is very similar to the one previously implemented in Malawi, Namibia and Zimbabwe. However, as the authors of the study point out, the accumulated experience in using this questionnaire suggests that the Zambian data have the best quality.

Table 43 presents the disability prevalence rates in Zambia grouped by disability level. It is important to point out that Zambia is the only country in the SINTEF sample for which the Washington Group questions have been used to measure disability.[18] This results in a prevalence rate that is notably higher than in Malawi (11.9 per cent), Namibia (12.9 per cent), and Zimbabwe (10.9 per cent). Secondly, the new set of questions made a different algorithm necessary to assign people with disabilities in Zambia to disability level groups (see pp. 5-7). The resulting structure seems biased in the sense that the majority of people with disabilities falls into the severe difficulties group, whereas only very few fall into the moderate difficulties

[18] See Annex 1, p. 53, for some background information on the impact of different measuring approaches on disability prevalence rates.

group. This shows that in the future further efforts are needed to improve and standardize grouping algorithms.

Table 43: Zambia - Working age population (15-64), by disability status and level

Disability status	Millions	Per cent
No disability	**5,295**	**83.3**
Disability	**1,066**	**16.8**
Mild	*259*	*4.1*
Moderate	*43*	*0.7*
Severe	*592*	*9.3*
Very severe	*173*	*2.8*
Total	6,360	100.0

Variations in totals due to rounding

Source: Calculations by SINTEF for the purpose of this study based on Eide and Loeb 2006.

Table 44: Zambia - Working age population (15-64), by labour market status and disability level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Employed	53.7	62.5	56.1	44.9	25.3
Unemployed/inactive	46.3	37.5	43.9	55.1	74.8

Variations in totals due to rounding

Source: Calculations by SINTEF for the purpose of this study based on Eide and Loeb 2006.

Table 44 presents the labour market situation of people with disabilities in Zambia. It is obvious that the labour market situation of a disabled person worsens with the degree of the disability: whereas 62.5 per cent of people with mild difficulties are working in Zambia, only 25.3 per cent of those with very severe difficulties claim to be “currently working”.

A rather puzzling question is why, according to the SINTEF data, the labour market situation of people without disability is slightly worse (53.7 per cent working) than the situation of people with mild and moderate disabilities (62.5 and 56.1 per cent working). Several explanations are possible. One is that there is no correlation between mild and moderate disabilities and the employment situation of people with disabilities in Zambia. One could argue that, since most of the employment is in the informal sector, light difficulties are not a reason for not engaging in productive work. Another explanation could be that special programmes exist to train people with disabilities which provide them with some skills not provided to people without disabilities. Finally, it is necessary to check if SINTEF’s approach to the assessment of the employment situation of people with and without difficulties leads to biased figures, as the SINTEF data in Table 44 vary significantly from ILO data.

Table 45: Zambia - Economic losses related to disability, by disability level, using ILO data (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group in '000 (ni)	259	43	592	173
Productivity adjustment factor (γi)	**0.19**	**0.21**	**0.20**	**0.16**
Part I (disabling environment)	0.13	0.11	0.09	0.05
Part II (extra unemployment/inactivity)	0.07	0.10	0.11	0.11
P x ni x γi (mio. US$)	$120	$22	$288	$68
Σ Total economic loss (million US$)	$498			
Σ Min. Total economic loss related to disability	$468			
Σ Max. Total economic loss related to disability	$528			
For the detailed calculation, see Annex (p. 73).				

Table 45 presents economic losses in Zambia related to the exclusion of people with disabilities. This calculation marks the upper end of the spectrum, because it uses ILO data to measure labour market information related to people with disabilities. It suggests that economic losses amount to US$ 498 million, which is 4.64 per cent of GDP (the sensitivity analysis suggests a band between 4.36 and 4.92 per cent). Losses due to a disabling environment and those due to higher unemployment and inactivity rates occur in almost equal parts (see Table 46). As expected, Table 46 shows that economic losses resulting from the exclusion of people with disabilities from the world of work occur in the relatively large group of people with severe disabilities.

Table 46: Zambia - Economic losses related to disability, by source and disability level, using ILO data (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$79	$12	$129	$21	$241
Due to exclusion from the labour market	$42	$10	$159	$46	$257
Total	$120	$22	$288	$68	$498
Variations in totals due to rounding					

Table 47 presents the results when using the SINTEF figures to quantify employment, inactivity and unemployment rather than the official ILO figures. Since differences are striking, the variation in economic losses is also significant: the total losses calculated with the SINTEF data amount to US$ 251 million, which is 2.34 per cent of GDP (the sensitivity analysis suggests a band between 2.27 and 2.41 per cent). This figure is considerably lower, and constitutes the lower end of estimated economic losses.

Table 47: Zambia - Economic losses related to disability, by source and disability level, using SINTEF data (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$79	$12	$129	$21	$241
Due to exclusion from the labour market	-$62	-$3	$47	$28	$11
Total	$17	$9	$176	$50	$251

For the detailed calculation, see Annex (p. 74).
Variations in totals due to rounding

Zimbabwe

In 2003, SINTEF carried out a survey on people with disabilities in Zimbabwe, in cooperation with the Southern Africa Federation of Disabled People (SAFOD), the Norwegian Federation of Organisations of Disabled People (FFO), as well as local disabled people's organizations, universities and ministries (Eide et al. 2003a). The survey design is similar to the one in Malawi and Namibia (see p. 25), and hence will not be discussed here in more detail.

Table 48: Zimbabwe - Working age population (15-64), by disability status and level

Disability status	Millions	Per cent
No disability	**7,207**	**89.3**
Disability	**880**	**10.9**
Mild	*16*	*0.2*
Moderate	*250*	*3.1*
Severe	*137*	*1.7*
Very severe	*476*	*5.9*
Total	8,087	100.0

Variations in totals due to rounding
Source: Calculations by SINTEF for the purpose of this study based on Eide et al. 2003a.

Table 48 presents the disability structure in Zimbabwe, which has been calculated using the same algorithm as in Malawi and Namibia. As in these countries, the algorithm seems to have a bias of assigning disabled persons predominantly to the groups of people with moderate disabilities (3.1 per cent) or people with very severe disabilities (5.9 per cent). Future work should be done to fine-tune and standardize the grouping mechanism.

Table 49: Zimbabwe - Working age population level (15-64), by labour market status and disability level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Employed	23.6	29.4	30.0	21.5	16.7
Unemployed/-inactive	76.4	70.6	70.0	78.5	83.3

Source: Calculations by SINTEF for the purpose of this study based on Eide et al. 2003a.

Table 49 presents the labour market situation of persons with disabilities in Zimbabwe. Even though the data seem internally consistent, in the sense that there is a correlation between disability level and employment situation, the employment situation of non-disabled people, just as in the case of Zambia, seems to be worse than the one of people with mild and moderate disabilities. Explanations of this phenomenon have already been offered above (see p. 27): either there is no correlation between employment and disability as long as prevalence rates are low; or there are special programs that support disabled persons by giving them small advantages over people with no disabilities; or the figures on people with no disabilities are flawed. Again, the results for the employment situation of people without disabilities differs extremely between SINTEF and the ILO, which calls into question the representative worth of the former data.

Table 50: Zimbabwe - Economic losses related to disability, by disability level, using ILO data (million US$)

	Disability level			
	Mild	Moderate	Severe	Very severe
Number of people in disability level group in '000 (ni)	16	250	137	476
Productivity adjustment factor (γi)	**0.44**	**0.36**	**0.26**	**0.17**
Part I (disabling environment)	0.06	0.06	0.04	0.03
Part II (extra unemployment/-inactivity)	0.38	0.30	0.22	0.13
P x ni x γi (mio. US$)	$4	$54	$22	$48
Σ Total economic loss (million US$)	$128			
Σ Min. Total economic loss related to disability	$115			
Σ Max. Total economic loss related to disability	$141			

For the detailed calculation, see Annex (p. 75).

Table 50 presents economic losses in Zimbabwe related to the exclusion of people with disabilities. As in the case of Zambia, this calculation marks the upper end of the spectrum because it uses ILO data to measure the labour market information of disabled people. It suggests that economic losses sum up to US$ 128 million, which is 3.8 per cent of GDP (the sensitivity analysis suggests a band between 3.4 and 4.1 per cent). Losses occur mostly due to higher unemployment and inactivity rates. This, however, is a finding that needs to be interpreted very carefully: when using the SINTEF figures for quantifying employment,

inactivity and unemployment rather than the official ILO figures, the opposite is drawn (see Table 52). Firstly, economic losses are far smaller, summing up to only US$ 20 million, which is 0.59 per cent of GDP (the sensitivity analysis suggests a band between 0.58 and 0.61 per cent). Secondly, the losses occur entirely due to a disabling environment.

Table 51: Zimbabwe - Economic losses related to disability, by source and disability level, using ILO data (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$1	$9	$4	$10	$23
Due to exclusion from the labour market	$4	$45	$18	$38	$105
Total	$4	$54	$22	$48	$128

For the detailed calculation, see Annex (p. 75).
Variations in totals due to rounding

Table 52: Zimbabwe - Economic losses related to disability, by source and disability level, using SINTEF data (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$1	$9	$4	$10	$23
Due to exclusion from the labour market	-$1	-$8	$1	$5	-$3
Total	$0	$1	$4	$14	$20

For the detailed calculation, see Annex p. 76.
Variations in totals due to rounding

Such huge contradictions in the data demand extreme care in the interpretation of the figures presented here. Apart from that, it must of course be highlighted that the data of the SINTEF study are already more than five years old, which is a long time for a country whose economy went down rapidly in recent times. In addition, ILO data are based on general labour force surveys and can, therefore, be regarded as giving a more representative picture of the labour market in total.

Ethiopia

Ethiopia, together with Tanzania, counts among the countries in this study that offer the weakest base of primary data on disability. The major source that is repeatedly quoted is the 1994 Population and Housing Census, carried out by the Central Statistical Authority at the Social Statistics Department.[19] In the report, a person is defined as disabled if "…due to

[19] See Annex p. 66 for more details.

physical conditions or injuries s/he cannot perform activities that other healthy persons can do, including work".

The question employed to identify a disability is based on body functioning rather than activity or participation: "Is there a member of this household who is physically or mentally disabled?" Since this question is rather inadequate to yield a figure useful for this report, and since the survey is about 15 years old, it was decided not to use these data to compile tables on the labour market status of persons with disabilities. Instead, for the purpose of calculating the economic losses relating to disability in Ethiopia, both the structure of the disability levels and the cross-referenced labour market information have been drawn from the Zambian case, where the data are more reliable.

Based on the assumptions above, Table 53 presents the economic losses in Ethiopia related to the exclusion of persons with disabilities. It suggests that economic losses total US$ 667 million, which is about 5 per cent of GDP (the sensitivity analysis suggests a band between 4.7 and 5.3 per cent). As Table 54 suggests, losses occur both due to a disabling environment and due to higher unemployment and inactivity rates. As expected, most economic losses arising from the exclusion of disabled people from the world of work occur in the comparably large group of people with severe difficulties. These conclusions, however, need to be interpreted carefully, since they are built on the assumption that the labour market situation in Ethiopia resembles the labour market situation in Zambia.

Table 53: Ethiopia - Economic losses related to disability, by disability level, based on Zambia disability data (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group in '000 (ni)	1,842	303	4,208	1,231
Productivity adjustment factor (γi)	**0.25**	**0.26**	**0.23**	**0.18**
Part I (disabling environment)	0.13	0.11	0.09	0.05
Part II (extra unemployment/inactivity)	0.12	0.15	0.14	0.13
P x ni x γi (mio. US$)	$179	$30	$373	$84
Σ Total economic loss (million US$)	$667			
Σ Min. total economic loss related to disability	$624			
Σ Max. total economic loss related to disability	$710			
For the detailed calculation, see Annex p. 66.				

Table 54: Ethiopia - Economic losses related to disability, by source and disability level (million US$)

	Disability level				
	Mild	Moderate	Severe	Very severe	Total
Due to disabling environment	$90	$13	$147	$24	$274
Due to exclusion from the labour market	$89	$17	$226	$60	$393
Total	$179	$30	$373	$84	$667
For the detailed calculation, see Annex p. 66.					

South Africa

The major source for information on disability in South Africa is the 2001 Census of Statistics South Africa (Statistics South Africa 2001). It contains data on both prevalence rates and the employment status of people with disabilities. The question used to identify people with disabilities was whether or not they had any serious disability that prevented them from engaging in "full participation in life activities". The types of disabilities covered by the census were sight, hearing, communication, physical, intellectual, and emotional. The census reported a total of 2.3 million people with some kind of disability that prevented them from full participation in life activities. This constitutes 5 per cent of the total population (44.8 million) enumerated in the census.

As in most countries studied here, the direct reference to "disability" results in relatively low prevalence rates. The census envisaged for 2011 will contain both the set of questions of the 2001 survey and a new set of questions based on the suggestions of the Washington Group.[20] Some test results of the new set of questions have been published recently by Statistics South Africa (Statistics South Africa 2006). They yield prevalence rates that are considerably higher than the ones in the 2001 census. A sample survey among 6,000 households (see Table 55) yielded that 67 per cent of the South African population (all ages) is reported as having "no difficulty" in any of the eight domains of functioning covered in the new set (seeing, hearing, walking, remembering, concentrating, self-care, communication, participating in community life). Difficulties have been reported by 32.6 per cent of respondents. In this group, 2.5 per cent have answered at least one of the questions with "unable to do" (very severe difficulty), 9.9 per cent have answered at least one question with "a lot of difficulty" (severe difficulty), and 20.24 per cent only had "some difficulty" (mild or moderate). In Table 55, the latter group has been divided into people who answered just one question with "some difficulty" and others who answered more than one with "some difficulty". People in the former group are counted as having a mild disability, people in the latter as having a moderate disability.

A comparison of the 2001 questions and the 2006 test results of the questionnaire for 2011 illustrate how different the respective results are: only 23.32 per cent of those identified as having "some difficulty" in the revised set of questions would have been identified as being disabled in the 2001 set. Likewise, merely 46.8 per cent of those who reported "a lot of difficulty" in the revised set of questions were identified as being disabled by the 2001

[20] See Annex for background information on the Washington Group questions (p. 57).

questions. Even those who reported being "unable to do" one of the eight activities listed in the survey do not necessarily fall squarely into the 2001 group of people with disabilities; only 61 per cent of respondents who reported being "unable to do" a certain activity would have been counted as disabled in the original 2001 survey.

Table 55: South Africa - Working age population (15+), by disability status and level

	Millions	Per cent
Total workforce (15+)	32.86	100.0
No disability (15+)	22.15	67.4
Disability (15+)	10.71	32.6
Mild	*1.86*	*5.7*
Moderate	*4.79*	*14.6*
Severe	*3.24*	*9.9*
Very severe	*0.82*	*2.5*

Variations in totals due to rounding
Source: Statistics South Africa 2006.

The survey also includes a question on the employment status of people with disabilities which allows the cross-referencing of disability prevalence rates and the employment situation of people with disabilities. The findings are presented in Table 56. Since the employment question does not distinguish between mild and moderate difficulties, the respective values for both groups are assumed to be equal.[21] The table illustrates that with an increasing level of disability, employment rates fall drastically; whereas there is hardly any difference between unemployment or inactivity rates of people with no difficulties and mild difficulties, unemployment/inactivity rates are clearly higher for people with severe or very severe difficulties.

Table 56: South Africa - Working age population (15+), by labour market status and disability level (per cent)

	Disability level				
	None	Mild	Moderate	Severe	Very severe
Employed	48.00	46.96	46.96	30.74	15.39
Unemployed/Inactive	52.00	53.04	53.04	69.26	84.61

Variations in totals due to rounding
Source: Calculation based on Statistics South Africa 2006.

Using this information to calculate the economic losses related to disability in South Africa yields a loss of US$ 17.8 billion, which is 7 per cent of South Africa's 2006 GDP. The sensitivity analysis suggests a band between 6.8 and 7.2 per cent of GDP.

[21] This is, of course, a conservative guess; a more sophisticated calculation (such as a linear extrapolation as suggested in Box 5, p. 12), would yield a lower employment rate for people with moderate difficulties compared to those with mild difficulties

Table 57: South Africa - Economic losses related to disability, by disability level (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group (ni)	1,862,185	4,788,476	3,239,897	814,903
Productivity adjustment factor (γi)	**0.08**	**0.08**	**0.13**	**0.11**
Part I (disabling environment)	0.09	0.09	0.06	0.03
Part II (extra unemployment / inactivity)	-0.01	-0.01	0.07	0.08
P x ni x γi (million US$)	$2,528	$6,750	$7,065	$1,475
Σ Total economic loss (million US$)	**$17,818**			
Σ Min. total economic loss related to disability	$17,289			
Σ Max. total economic loss related to disability	$18,347			
For the detailed calculation, see Annex (p. 71).				

Table 58 shows the sources of economic loss. It makes clear that a disabling environment is the major cost driver. The most important conclusion to be drawn from Table 58 is that many losses occur within the groups of people with light and moderate difficulties (US$ 2.5 and 6.7 billion respectively). This finding is important, since the body functioning approach that is still widely used to measure disability does not capture this group. This leads systematically to an underestimation of economic losses related to the exclusion of people with disabilities. Furthermore, the finding is important because it is particularly in the group of people with mild and moderate difficulties that there is the largest potential for productivity growth via better integration.

Table 58: South Africa - Economic losses related to disability, by source and disability level (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$2,989	$7,686	$3,405	$429	$14,508
Due to exclusion from labour market	-$461	-$936	$3,660	$1,046	$3,310
Total	$2,528	$6,750	$7,065	$1,475	$17,818

Tanzania

The major source of disability data in Tanzania is the 2002 Population and Housing Census carried out by the National Bureau of Statistics, Tanzania. Its questions focus on seven types of disability: seeing, hearing, speaking, moving/mobility, body movement, gripping/holding, and learning difficulties. The 2002 census defines people with disabilities as those who are "limited in the kind or amount of activities that s/he can do because of ongoing difficulties due to a long-term physical condition, mental condition or health problem". The questions asked to identify people with disabilities refer to 'difficulties' rather than 'disabilities': "Does the person have difficulties in seeing, hearing, etc.?"

Unfortunately, the data generated by the survey are more than thin: apart from a categorization stating what kind of disabilities Tanzanians have (visually impaired, hearing impaired, intellectually impaired, multiply impaired, and others), there is only an accumulated figure which states that the disability prevalence rate in Tanzania is 10 per cent, and that merely 40 per cent of those with a disability are working.

Thus, in order to calculate the economic costs related to disability, a number of assumptions needed to be made. Firstly, we assumed that among the 10 per cent of people with disabilities, which is 3.5 million people, the disability level structure is the same as in Zambia. Secondly, we assumed that the employment rate reflects the labour market situation of people with moderate difficulties and used the linear model described above (see Box 5, p. 12) to calculate the labour market situation of people with other levels of disability. The result of this calculation can be found in Table 59.

Table 59: Tanzania - Working age population, by labour market status and disability level (per cent)

		People with disabilities - Disability level			
	Total population	Mild	Moderate	Severe	Very severe
Employed	83.6	61.8	40.0	18.2	0.0
Unemployed/inactive	16.4	38.2	60.0	81.8	100.0

Age range not available.
Estimation based on the Zambia case study (Eide and Loeb 2006).

As Table 60 shows, under these assumptions the economic costs related to disability mount to US$ 480 million, which is 3.76 per cent of GDP (the sensitivity analysis suggests a band between 3.42 and 4.1 per cent). Table 61 shows that losses occur mostly because of higher unemployment and inactivity rates. As expected, most economic losses from excluding people with disabilities from the world of work occur in the comparably large group of people with severe disabilities.

Table 60: Tanzania - Economic losses related to disability, by disability level (million US$)

	Disability level			
	Mild	**Moderate**	**Severe**	**Very severe**
Number of people in disability level group (ni)	533,030	87,747	1,217,981	356,227
Productivity adjustment factor (γi)	**0.33**	**0.41**	**0.33**	**0.21**
Part I (disabling environment)	0.12	0.08	0.04	0.00
Part II (extra unemployment/inactivity)	0.21	0.33	0.29	0.21
P x ni x γi (mio. US$)	$123	$25	$281	$52
Σ Total economic loss (million US$)	$480			
Σ Min. total economic loss related to disability	$437			
Σ Max. total economic loss related to disability	$524			
For the detailed calculation, see Annex (p. 72).				

Table 61: Tanzania - Economic losses by source related to disability, by disability level (million US$)

	Disability level				
	Mild	**Moderate**	**Severe**	**Very severe**	**Total**
Due to disabling environment	$46	$5	$31	$0	$82
Due to exclusion from the labour market	$77	$20	$250	$52	$398
Total	$123	$25	$281	$52	$480
For the detailed calculation, see Annex (p. 72).					

3. Summary of the results

An overview of the disability prevalence rates in the ten observed countries is contained in Table 62. For some of the countries, two calculations with different underlying data have been conducted. While the main calculation is always highlighted in bold letters, the alternative/additional calculations are shown in grey letters.

Table 62: Overview of disability prevalence rates in the workforce[22] (per cent)

	Non-disabled persons	People with disabilities	Disability level			
			Mild	Moderate	Severe	Very severe
Asia						
China (ICF estimate)*	**86.08**	**13.92**	2.9	9.0	1.1	0.9
China (CDPF data)	96.70	3.30	0.7	2.1	0.3	0.2
Thailand (ICF estimate)*	**86.08**	**13.92**	2.9	9.0	1.1	0.9
Thailand (NSO)	98.07	1.93	0.4	0.6	0.4	0.6
Viet Nam	**86.08**	**13.92**	2.9	9.0	1.1	0.9
Africa						
Ethiopia	**83.24**	**16.76**	4.1	0.7	9.3	2.7
Malawi	**88.11**	**11.89**	0.6	1.5	1.5	8.3
Malawi (2)**	88.11	11.89	0.6	1.5	1.5	8.3
Namibia	**87.10**	**12.90**	0.1	3.2	1.4	8.2
Namibia (2)**	87.10	12.90	0.1	3.2	1.4	8.2
South Africa	**67.42**	**32.58**	5.7	14.6	9.9	2.5
Tanzania	**90.00**	**10.00**	2.4	0.4	5.5	1.6
Zambia	**83.24**	**16.76**	4.1	0.7	9.3	2.7
Zambia (2)**	83.24	16.76	4.1	0.7	9.3	2.7
Zimbabwe	**89.12**	**10.88**	0.2	3.1	1.7	5.9
Zimbabwe (2)**	89.12	10.88	0.2	3.1	1.7	5.9

* Using Viet Nam's disability distribution data, which are based on the ICF approach.

** Using SINTEF figures for unemployment and inactivity (deviating strongly from ILO figures).

The main calculations for the three Asian countries are all based on the Vietnamese disability level grouping. Viet Nam has only recently engaged in a comprehensive disability survey using an activity-based approach built on the ICF framework. This approach yields a disability prevalence rate in the working age population of 13.92 per cent. Assigning people in this group to different disability levels shows that a majority of people with disabilities has moderate difficulties (9 per cent). Surprisingly, the group of people with mild difficulties is

[22] In most of the country studies the age group of the workforce is chosen to be 15-64. China and Viet Nam are using the group 15-59, South Africa 15+.

much smaller (2.9 per cent). Yet of course, it is a matter of definition where to place the cut-off point between moderate and mild.[23] As expected, the group of people with severe and very severe difficulties is small (totalling 2 per cent).

The alternative calculations for China and Thailand (small grey letters) are based on the official disability prevalence rates in these countries, which are clearly lower than the one measured in Viet Nam. The explanation for this is straightforward: both countries are using body functioning approaches, and ask directly whether a person has a disability. Furthermore, in China, people are only counted if they are registered with the authorities as "disabled". As a result it can be assumed that only those individuals who have a severe impairment will be counted as "disabled". In fact, as Table 62 illustrates, the official aggregated disability figures for China and Thailand are very similar to the percentage of people with severe and very severe disabilities in Viet Nam. Accordingly, it can be assumed that the Chinese and Thai way of counting people with disabilities cuts off those with minor or even moderate difficulties.

In the African case, there are no differences between the main calculations and the additional calculations regarding the number of people with disabilities or their assignment to disability level groups (the differences occur with regard to the measurement of employment information, see below). Prevalence rates in the seven African sample countries lie between 10 per cent in Tanzania and 16.8 per cent in Zambia. For Ethiopia, the Zambian prevalence rates have been used, due to missing up-to-date primary information for the country. Also for Tanzania, Zambian data have been used as a basis for assigning people with disabilities to different disability level groups. The decision to take the Zambian data set as a basis for calculations is rooted in the fact that these data have been collected very recently by SINTEF, using the Washington Group questions. They can thus be considered the most reliable source within the sample. An unusually high prevalence rate has been measured in South Africa (32.6 per cent), where Washington Group questions have also been used. However, it is important to point out that the primary data on which the figure is based have been taken from a non-representative (yet already very comprehensive) testing survey for the upcoming 2011 census. That means it is easily possible that the questionnaire to be applied in the 2011 census may yield a lower value.

In order to calculate the macroeconomic costs related to disability, it is necessary as a next step to understand the employment situation of people with disabilities at different disability levels. Table 63 presents the overview for all sample countries, summing up those people who are either unemployed or inactive. As indicated above, most of these figures are not taken from genuine cross-referenced data but calculated with the linear extrapolation model described in Box 5, p. 12.

[23] Please refer to the Viet Nam country study for more information on how the cut-off point has been set, p. 13.

Table 63: Unemployment and labour market inactivity - Total population and people with disabilities, by disability level (per cent)

		People with disabilities - Disability level			
	Total population	Mild	Moderate	Severe	Very severe
Asia					
China (ICF)*	**27.0**	35.0	43.1	51.1	59.1
China (CDPF)	27.0	39.0	51.1	63.2	75.2
Thailand (ICF)*	**27.8**	40.1	52.5	64.8	77.1
Thailand (NSO)	27.8	46.3	64.8	83.3	100.0
Viet Nam	**26.6**	31.7	36.9	42.0	47.1
Africa					
Ethiopia	**30.5**	37.5	43.9	55.1	74.8
Malawi	**20.6**	40.0	45.7	53.3	61.6
Malawi (2)**	54.0	40.0	45.7	53.3	61.6
Namibia	**62.3**	84.6	88.2	84.5	91.3
Namibia (2)**	75.4	84.6	88.2	84.5	91.3
South Africa	**54.6**	53.0	53.0	69.3	84.6
Tanzania	**16.4**	38.2	60.0	81.8	100.0
Zambia	**30.5**	37.5	43.9	55.1	74.7
Zambia (2)**	47.8	37.5	43.9	55.1	74.7
Zimbabwe	**30.5**	70.6	70.0	78.5	83.3
Zimbabwe (2)**	76.7	70.6	70.0	78.5	83.3

* Using Viet Nam's disability distribution data, which are based on the ICF approach.

** Using SINTEF figures for unemployment and inactivity (deviating strongly from ILO figures).

In order to show transparently which figures are genuine and which have been calculated based on the linear model, the latter are put on a grey background. In this way, it is visible that all Asian figures had to be derived from the model, based on primary data for the total population, as well as primary data for people with severe difficulties. There are small differences between the main and the additional calculation, since the study assumes in the former that the employment information represents people with severe difficulties, whereas it assumes in the latter that the employment information represents people with moderate difficulties.

In the African group, the study can draw on genuine data for Malawi, Namibia, Zambia, and Zimbabwe, as well as slightly more comprehensive information for South Africa. Only the figures for Ethiopia and Tanzania had to be calculated entirely based on the linear model. In regard to the four countries Malawi, Namibia, Zambia and Zimbabwe, an important remark on the additional calculations needs to be made: in the main calculation, the unemployment and inactivity rate is taken from the official labour market statistics as presented previously in Table 7, p. 9, whereas the labour market information for people with disabilities has been taken from the data set calculated by SINTEF. The additional calculation, on the other hand, is entirely based on the SINTEF data.

Table 64: Indicators of labour market disadvantage, by disability level (per cent) [24]

	Disability level			
	Mild	Moderate	Severe	Very severe
Asia				
China (ICF)*	- 8.0	- 16.1	- 24.1	- 32.2
China (CDPF) (2)	- 12.1	- 24.1	- 36.2	- 48.2
Thailand (ICF)*	- 12.3	- 24.7	- 37.0	- 49.3
Thailand (NSO) (2)	- 18.5	- 37.0	- 55.5	- 72.2
Viet Nam	- 5.1	- 10.3	- 15.4	- 20.5
Africa				
Ethiopia	- 7.0	- 13.4	- 24.6	- 44.3
Malawi (ILO)	-19.4	- 25.1	- 32.7	- 41.0
Malawi (2) (SINTEF)**	+ 14.0	+ 8.3	+ 0.7	7.6
Namibia (ILO)	-22.3	-25.9	-22.2	-29.0
Namibia (2) (SINTEF)**	-9.2	-12.8	-9.1	-15.9
South Africa	+ 1.5	+ 1.5	-14.7	-30.0
Tanzania	-21.8	-43.6	-65.4	-83.6
Zambia (ILO)	-7.0	-13.4	-24.6	-44.2
Zambia (2) (SINTEF)**	+ 10.3	+ 3.9	7.3	26.9
Zimbabwe (ILO)	-40.1	-39.5	-48.0	-52.8
Zimbabwe (2) (SINTEF)**	--6.1	--6.7	-1.8	-6.6

* Using Viet Nam's disability distribution data.

**Using SINTEF figures for unemployment and inactivity (deviating strongly from ILO figures).

The consequences of this seemingly small difference are huge since the findings of SINTEF deviate strongly from the official figures. Accordingly, it is advisable to pay attention to both calculations, particularly in these countries, since the main one has a tendency to overestimate the economic costs, whereas the additional one most likely underestimates the costs. The difficulties with the additional calculation are particularly evident in an alternative presentation of the employment data in Table 64. This table calculates the difference between the unemployment/inactivity rate in a given disability level group and the same rate for people without disabilities. The table illustrates that in three of the four SINTEF countries, the labour market situation of people with mild and moderate disabilities is better than the labour market situation of people without disabilities – a puzzling finding requiring further research. In Malawi, even the labour market situation of people with severe disabilities is slightly better than the situation of those without, which is rather unlikely.

[24] Calculated by subtracting the unemployment and labour market inactivity rate of people with disabilities from that of the total population. (see Table 63). In this calculation the total population is used as a benchmark; the SINTEF calculations, however, take "people with no difficulties" as a benchmark.

Some additional work and investigation will be necessary to understand this counter-intuitive finding. Several explanations are possible, as mentioned above. One is that there is no correlation between mild and moderate difficulties and the employment situation of people with disabilities in the African countries, since most of the employment is in the informal sector where light difficulties are not a reason for not engaging in productive work (the question would only be in this case how productive the work is). Another explanation could be special programmes to train people with disabilities to provide them with some skills not offered to people without disabilities. Finally, the results could also be rooted in the non-standardized approach SINTEF is using to gather employment information or in the way the disability level groups have been defined in the respective countries.

Table 65 finally offers an overview of the macroeconomic costs related to the exclusion of people with disabilities from the labour market. They are listed both in terms of monetary values (in million current US$) and as a percentage of 2006 GDP. Economic costs in Asia lie between 3 per cent of GDP in Viet Nam and 4.6 per cent of GDP in Thailand.

The calculation also allows for broad conclusions on the sources of economic losses. The table differentiates between the share of the losses related to the lower productivity of people with disabilities ('%Productivity'), and the share of the losses related to higher unemployment and inactivity rates ('%Disadvantage'). As explained in more detail in the theoretical section, the productivity gap (the 'betas') is not conceptualized as a gap between people with disabilities and those without difficulties, but as a gap between the potential productivity of a disabled person in a certain disability level group and the actual productivity of this person, which is assumed to be lower due to a lack of adequate education and training programmes, as well as a lack of adequate support at the work space.

Interestingly, in the case of Asia, both factors are of equal importance in China, whereas in Thailand the 'disadvantage' effect and in Viet Nam the 'productivity effect' dominates. The causes for these differences in the structure of the macroeconomic costs of exclusion will only be understood by delving deeper into the country cases.

It must also be stated here that it is important not to overestimate the explanatory power of the productivity-disadvantage differentiation; in this study, the differences between potential and actual productivity are set assumptions which are held equal for all countries. That means, if due to adequate policy measures the gap between potential and actual productivity is smaller in one country than in the other, this difference would not be felt in the analysis. This remains an important weakness of the study, and it will be a critical future challenge to identify indicators that allow for a more adequate estimation of the gap between potential and real productivity.

Table 65: Overview of economic losses related to disability, by source

	Economic losses		Sources of economic losses	
	Total (millions)	%GDP	%Productivity	%Exclusion
Asia				
China (ICF)*	111,693	**4.22**	51.40	48.60
China (CDPF) (2)	32,062	1.21	37.71	62.29
Thailand (ICF)*	9,576	**4.64**	36.53	63.47
Thailand NSO (2)	1,417	0.69	18.62	81.38
Viet Nam	1,821	**2.99**	64.75	35.25
Africa				
Ethiopia	667	**5.01**	41.10	58.90
Malawi	99	**3.12**	40.85	59.15
Malawi (2)**	40	1.25	102.04	-2.04
Namibia	286	**4.35**	16.12	83.88
Namibia (2)**	168	2.56	27.46	72.54
South Africa	17,818	**6.98**	81.43	18.57
Tanzania	480	**3.76**	17.02	82.98
Zambia	498	**4.64**	48.32	51.68
Zambia (2)**	251	2.34	95.72	4.28
Zimbabwe	128	**3.75**	17.92	82.08
Zimbabwe (2)**	20	0.59	113.66	-13.66

* Using Viet Nam's disability distribution data.

** Using SINTEF figures for unemployment and inactivity (deviating strongly from ILO figures).

Macroeconomic costs in Africa are between 3.1 per cent of GDP in Malawi, and 7 per cent of GDP in South Africa when using the main calculations. The findings regarding the sources of the losses are mixed. In Tanzania, Namibia and Zimbabwe, the disadvantage element is dominating, i.e. there are large gaps between the unemployment and inactivity rates of people with disabilities and those without difficulties. In Zimbabwe, however, this finding must be seen as highly speculative, since the gap may also result from the immense difference in measuring employment between the ILO and SINTEF. In the additional calculation for Zimbabwe, labour market information for both people with and without disabilities is taken from SINTEF, which generates more internal consistency. The result is that the distribution of costs is opposite. In fact, the negative value indicates that, bottom line, the labour market situation of people with disabilities is even better than the labour market situation of people without disabilities. Because of this, the overall losses are also visibly smaller when trusting the SINTEF findings: instead of 3.75 per cent, the losses only amount to 0.6 per cent of GDP.

For the same reason, the findings for the other three SINTEF countries also need to be interpreted very carefully: using the SINTEF labour market data for people with no difficulties yields annual GDP losses of 1.3 per cent in Malawi (instead of 3.1 per cent), 2.6 per cent in Namibia (instead of 4.4 per cent), and 2.3 per cent in Zambia (instead of 4.6 per cent). Apart from the Namibian case, where the differences between the ILO and the SINTEF data are not as striking as in the other three countries, the choice of the labour market data source for people

without disabilities also affects the calculated sources of the economic losses. When using the ILO/KILM figures, which suggest far lower unemployment rates than the SINTEF ones, exclusion is a dominating factor for macroeconomic losses (59.1 per cent in Malawi, 51.7 per cent in Zambia); when using the original SINTEF data, exclusion hardly plays a role and losses only occur via anticipated productivity gaps.

The large gaps between the SINTEF and the ILO/KILM data, as well as the large methodological differences in measuring disability, constituted important challenges for the determination of economic costs related to disability in this study. Both challenges can be described as generic since they are likely to emerge in almost every approach of measuring the costs of exclusion. Two challenges that are more specific to the chosen methodology are the estimation of gaps between actual and potential productivity and the reliance on disability level groups. The former constitutes a problem because these gaps are hard to verify without detailed country level data, for instance on education and training for people with disabilities. The disability level groups constitute a problem because until now there are hardly any countries, especially in the developing world, that provide information on the degree to which people with disabilities are disadvantaged. Also, those countries that offer data on disability level levels tend to arrive at very different 'disability structures': in some countries the majority of people with disabilities experience moderate difficulties (e.g. South Africa), whereas in other countries most people with disabilities fall into the category of people with severe difficulties (e.g. Zambia). These differences could either be rooted in different perceptions of disability or they may be related to technical aspects, such as different grouping algorithms.

This study has identified ways of working around these problems, amongst others through modelling techniques that fill the gaps in the primary data. However, in order to tackle these challenges in a more sustainable way, a number of additional steps would need to be undertaken. First of all, the gathering of disability data needs to be standardized further. The development of the Washington Group questions has been very useful in this regard, not only because they offer a simple and easy way of getting an overview of disability prevalence in a country, but also because they offer a broad indicator for the severity of a difficulty by distinguishing between "some difficulties", "a lot of difficulties", and "cannot do at all". With this information, a simple algorithm would be sufficient to assign individuals to disability level groups (what such an algorithm may look like has been discussed theoretically in Section 1). With these data – provided that questions on both variables are asked in the same source – it should be no problem for national statistical organizations or research institutes to cross–reference employment and disability rates for the respective groups. Finally, it is of interest to benchmark the findings of this study with the results offered by Robert Metts in his 2000 paper. Table 66 displays this comparison. On the ILO side, both the main and the alternative calculation of losses related to the exclusion and disadvantage of people with disabilities in the labour market are presented (this is more interesting than the bandwidth calculations with different betas which this study also carried out). On the World Bank side, (Metts 2000) the estimated maximum and minimum losses in percentage of GDP can be found.

It is striking that, with the exception of Thailand, the values offered by Metts are markedly higher than the values calculated in this study. Even in the South African case, where this study operates with a disability prevalence rate of above 30 per cent, the resulting figure of 7 per cent of GDP is clearly below the value of 22–31 per cent suggested by Metts.

The reasons for the differences between the two studies are too large and too systematic to be attributed to the time that has passed between the two studies (Metts bases his calculations on 1997 country level data). The fundamental reasons for the differences are both a high value for the extrapolation base, Canada, and an extrapolation methodology which is based on unemployment rates taken from the CIA World Fact Book 1997 (see column %UR in Table 66). First of all, it should be mentioned that the data taken from the World Fact Book differ markedly from the official labour market data offered by ILO/KILM for the same year; surprisingly, the latter are in most cases lower. In China, for instance, the ILO reports 3 per

cent unemployment for 1997 compared to 10 per cent used in the Metts study. For Viet Nam, the ILO reports in the same year a rate of 2.9 per cent, as opposed to the 25 per cent in the Metts study. As the table below shows, the 1997 World Fact Book unemployment rates centre around 20 per cent for most of the African countries, with the exception of South Africa and Zimbabwe, where unemployment is even higher. In Asia, it is particularly Thailand which draws attention: an unemployment rate of only 2.6 per cent is obviously responsible for an economic loss which comes close to the ILO calculations in dimension (1.7 to 2.4 per cent).

Table 66: Comparing economic losses from current study with the findings of Metts (2000)

	ILO		World Bank		
Country	**%GDP**	**%GDP (2)**	**%GDP High**	**%GDP Low**	**%UR**
Asia					
China	4.22	1.21	9.15	6.45	10.0
Thailand	4.64	0.69	2.38	1.68	2.6
Viet Nam	2.99	----	22.88	16.13	25.0
Africa					
Ethiopia	5.01	----	18.94	13.35	20.7
Malawi	3.12	1.25	18.94	13.35	20.7
Namibia	4.35	2.56	19.95	14.06	21.8
South Africa	6.98	----	31.11	21.93	34.0
Tanzania	3.76	----	18.94	13.35	20.7
Zambia	4.64	2.34	20.13	14.19	22.0
Zimbabwe	3.75	0.59	41.18	29.03	45.0

By and large, the findings in this study contradict the findings of Metts in two important ways. Firstly, this study suggests that the costs related to the exclusion of people with disabilities lies somewhere between 1 and 7 per cent, even when referring to a broad definition of disability as proposed in the ICF framework. In fact, figures between 15 and 40 per cent as offered by the World Bank study seem rather counter-intuitive. As a comparison: the HIV/AIDS study discussed in Annex 1 (see pp. 57-59) suggests that in countries suffering heavily from the HIV/AIDS pandemic, annual GDP growth is hampered by 1 per cent. It is difficult to argue, in this context, that the exclusion of people with disabilities translates into GDP losses up to 40 per cent.

The second contradiction between this study and the study offered by Metts has to do with the usage of the unemployment rate as an extrapolation tool. The countries analyzed in this study have unemployment–population ratios which reach from 1 per cent in Thailand to 17 per cent in Namibia (unemployment rates are 1.23 and 31.20 per cent respectively). Yet the economic losses related to disability are about the same in both countries. This clearly questions the idea of the unemployment rate being an adequate anchor for the extrapolation to world level of country data on the employment situation of people with disabilities. Thus, additional research in more countries with different development levels will be necessary to get better insights on how country level data could be generalized.

4. Conclusions and recommendations

This study developed and pilot-tested a new approach for quantifying the macroeconomic losses related to the exclusion of people with disabilities from the world of work. After a discussion of a baseline approach published by the World Bank in 2000 (Metts, 2000), it created a formula to calculate "the price of exclusion".

The formula consists of three elements: the first one reflects the reduced productivity of employed people due to lower education, a lack of transport and physical accessibility, etc. This part does not suggest that changes in the environment can lift the productivity of people with disabilities to population average, but it suggests that changes in the environment may narrow the gap between the actual and the potential productivity level of a person at a given disability level.

The second part of the equation takes into account the higher unemployment rate among people with a disability compared to those reporting no disability. The third part finally takes into account the higher labour market inactivity rates among people with a disability compared to those reporting no disability. Together these three elements sum up to the accumulated economic losses related to disability.

The study applies the approach to a selection of ten low and middle-income developing countries, three of which are in Asia (China, Thailand, and Viet Nam), and seven in Africa (Ethiopia, Malawi, Namibia, South Africa, Tanzania, Zambia and Zimbabwe). It comes to the conclusion that economic losses related to disability are large and measurable, falling into a band between 3 and 5 per cent of GDP.

The study has not undertaken the effort of extrapolating the figures of the ten country cases to a global level. This would require additional country studies in regions that have been left out here (Europe, Latin America, and North America), as well as a deeper examination of appropriate extrapolation approaches.

The most important result of this study is that it is possible to generate country level data on the costs of exclusion. Even for countries where reliable primary data are generally scarce, the combination of reasonable assumptions and adequate modelling can generate findings that are more robust than those generated by a global extrapolation approach. The comparison of the findings of this paper and the extrapolation results of the World Bank paper in the last section has made that very clear.

However, the testing of this new methodology of calculating economic losses related to the exclusion of people with disabilities from the world of work has also revealed important open questions which future work needs to address. The following recommendations can be made to develop the study further:

1. This study distinguishes potential and actual productivity of people with disabilities. This is useful to indicate that people with disabilities are less productive not because they are "disabled" but because they live and work in environments that are "disabling". This is of crucial importance to the message the analysis wants to transmit: it makes economic sense to create an environment that is supportive for people with disabilities. So far, however, the concept of actual and potential productivity is under-theorized and the productivity differentials ('betas') used in this study need stronger empirical foundations. Also, it could be seen as problematic that these differentials are assumed equal for all countries. Future works need both to improve the understanding of the concept and to generate simple measures that allow for an estimation of the productivity–potential gap at country level.
2. This study has been struggling to a great degree with data derived from incomparable ways of measuring disability prevalence rates, as well as different ways of measuring the level of

disability (or respectively, with the problem that there was no information at all about the level of disability). Hence, recommendations (1) and (2) of the previous part of this study must be reinforced here: the biggest roadblock in calculating the economic consequences of unequal opportunities among people with and without disabilities is the lack of reliable, comparable primary data. In close cooperation with its constituents, the ILO should intensify its efforts to build a more profound stock of knowledge on the labour market situation of people with disabilities. The ILO should also continue to work in cooperation with the UN Washington Group to intensify worldwide implementation of the standardized set of questions in surveys and censuses.

3. Often it is not only a lack of primary data that makes it difficult to analyze labour market and productivity impacts of disability. The way existing data are compiled and published is also problematic: many statistical offices provide one general disability prevalence rate for their country but fail to offer in addition a disability prevalence rate for the working age population. Furthermore, many surveys potentially allow for the cross-referencing of disability and unemployment rates; yet, calculations of this kind are rarely published. In the same vein, many surveys allow for some conclusions on the level of disability in a country (at least the more recent ones, which use the ICF framework and the Washington Group questions) but they do not make use of this information. So, in addition to advocating for more and better data, the ILO should develop a guideline to support National Bureaus of Statistics and other organizations in compiling more valuable statistics from the data they generate in their surveys.

4. Finally, it is strongly recommended that the ‘naked figures’ offered in this study be interpreted against their country context to make more sense of similarities and differences. Furthermore, the analysis carried out here should be extended to a larger array of low-, middle- and high-income countries across all regions. Only this will generate the necessary information to arrive at a credible global estimate of costs related to the exclusion of people with disabilities from the world of work.

Annex 1: Gathering statistics on the employment situation of people with disabilities

Measuring the economic consequences of excluding people with disabilities from the workforce or the macroeconomic costs and benefits of supporting people with disabilities requires data on the number of people affected, as well as the quality of their disability and the reasons for their exclusion from the labour market. The scarcity of such data constitutes a major roadblock to research on people with disabilities in the labour force, as a recent World Bank study argues:

> "Unfortunately, the availability of high-quality, internationally comparable data on disability that is important for the planning, implementation, monitoring and evaluation of inclusive policies is often not available." (Mont 2007)

Difficulties with disability statistics arise in different areas. One is that standard questions and methodologies to measure labour market data are often not suitable to gather information on people with disabilities. Another difficulty is the definition of the term 'disability' *per se*, which differs across various countries. Finally, the quantity of available data constitutes a problem: while some countries do not have any statistics at all on people with disabilities in the labour force, others merely collect information every five to ten years or at one point in time.

Gathering labour market data

The ILO proposes a set of 47 statistical indicators that could be applied in the measurement of decent work. A recent ILO study looks at three of them in terms of applicability to people with disabilities: (1) the labour force participation rate; (2) the employment-population ratio; and (3) the unemployment rate. The indicators were chosen due to their wide availability for both the general labour force and the group of people with disabilities (ILO 2007a).

The labour force participation rate measures the extent to which a country's working age population is economically active, i.e. the number of people employed or actively looking for employment. Usually, labour force surveys use the concept of 'current economic activity'. That means that for a person to be counted as economically active, he or she needs to have been working or actively looking for work in a short reference period of a week or a day. This proves problematic in providing an adequate picture of people with disabilities, who tend to have longer periods of inactivity. Also, the common exclusion of the institutional population and the exclusion of household activities may lead to under-reporting if additional information is not gathered from other sources. Overall, the share of people with disabilities working in less regular employment situations needs to be assumed higher than the share in the total labour force. "Underreporting of this employment group would therefore heavily distort the analysis of the employment situation of people with disabilities" (ibid., p. 26).

The employment-population ratio measures the proportion of the working-age population that is employed. This indicator also tends to be measured with respect to a short reference period of a week or a day. In this period, the person needs to be employed for at least one hour (i.e. one hour per day or per week). Again, for the purpose of gathering data on the employment situation of people with disabilities, introducing reference periods longer than this would be necessary to avoid under-reporting. In addition, the definition of employment per se is partly problematic in the disability context. The ILO study highlights that the classification of contributing family workers and family workers engaged in production for own final use would need adjustments to capture the particular living situation of people with disabilities (ibid., p. 29).

The unemployment rate measures the number of people unemployed as a percentage of the labour force. Three criteria need to apply for a person to be in this group: the person must be without work, he or she must be seeking work, and must also be currently available for work. As the ILO study stresses, the narrow 'seeking work' criterion may lead to under-reporting, since often people with disabilities are discouraged to look for work but would definitely be willing to take up work if they could.

In sum, the difficulties in gathering labour market data on people with disabilities call for care in the use of labour market surveys and censuses. It suggests that – where possible – a few additional items should be introduced into the employment part of censuses and surveys to capture more precisely people with disabilities who are economically active. The ILO (2007, pp. 37-38) makes the following recommendations:

1. Consider the use of the concept of the 'usually active population'. That means: broaden the period in which the person needs to be working or actively be looking for work to a reference period of, for instance, 12 months.
2. Include the population living in institutions as far as employment measures for people with disabilities are concerned.
3. Strengthen the measurement of the labour market participation rate by investigating the nature of non-core employment situations, especially for contributing family workers.
4. Improve the measurement of the employment-population ratio by applying the one-hour criterion to a reference period of one week, and also apply the criterion to people engaged in production for own final use.
5. Apply the concept of 'usual hours of work' in the measurement of the employment-population ratio. That means, analogously to the first point, broaden the reference period to 12 months or thereabouts.
6. Relax the 'seeking work' criterion in the measurement of the unemployment rate, or find a better way to identify 'discouraged workers' amongst those who are considered economically inactive.
7. Set the upper age limit for the labour force to 60 years, since disability is increasing significantly above that age.

These items do not necessarily require changes in the general design of labour force surveys. They could also be introduced by asking additional questions to those who have been identified as disabled.

Measuring disability

Questions on the type and level of disability of people in the workforce are necessary to cross-classify employment and disability variables. Yet, the definition and measurement of disability is a complex challenge that is approached in many different ways. In Canada, for instance, varying approaches to measuring disability in 2001 yielded results between 13.7 and 31.3 per cent (Rietschlin and MacKenzie 2004).

Across countries, the variation is even greater (Mont 2007). A recent literature survey by Barbotte and Guillemin (2001) finds that disability rates ranged from 3.6 to 66 per cent, and low quality of life from disability ranged from 1.8 to 26 per cent. The authors conclude that "the heterogeneity of the conceptual framework and insufficient recognition of the importance of indicator accuracy, the age factor and the socioeconomic characteristics of the studied populations impede reliable international comparison".

A recent ILO study which compares national methodologies in disability statistics comes to a similar conclusion (ILO 2004c). A questionnaire sent out to national statistics offices in 217 countries and regions showed that these apply very different definitions: only 38 per cent of the countries which participated in the survey use the WHO/ICIDH classification and only four countries use its successor ICF. Others derive definitions from national law and regulations or from guidelines in national statistical offices, ministries of health, NGOs, and so forth.

Large differences in disability figures often relate to varying measurement techniques. Mont (2007), for instance, distinguishes five types of questions to generate empirical data on disability. They reach from self-identification and the identification of diagnosable conditions over questions on activities of daily living to more general questions on participation (see Table A.1 below). It can be shown that self-identification questions usually lead to low disability prevalence rates, whereas questions on activities of daily living and participation yield higher ones.

Table A.1: Different approaches in calculating disability prevalence rates

Body functioning	**Self-identification as disabled**	The respondent (proxy person) is directly asked if they are disabled.
	Diagnosable conditions	The respondent (proxy person) is read a list of conditions, such as polio, epilepsy, paralysis, etc. and is asked if they have any of them.
Actions and activities	**Activities of Daily Living (ADL)**	The respondent is classified as disabled if they have difficulty performing any ADLs, which are task-based and centre on basic activities such as dressing, bathing and feeding oneself.
	Instrumental Activities of Daily Living (IADL)	This approach is similar to the ADLs except that IADLs are higher order tasks. Examples include whether a person has problems managing money, shopping for groceries, or maintaining their household.
Participation	**Participation**	This method asks if the person has some condition which affects a particular social role, such as attending school or being employed. For example, the question in the US Current Population Survey is (Do you/Does anyone in this household) have a health problem or disability which prevents (you/them) from working or which limits the kind or amount of work (you/they) can do?

Source: Mont 2007.

Finally, it is important to stress that not even harmonized formal definitions and standardized questionnaires guarantee comparable data. This is especially evident in cases where direct questions of the type “do you have a disability?” are used: stigmatization of disability in some cultures, subjective perceptions of what is ’disability’, and different cultural standards of what is considered to be ‘normal’ and what is not, may lead to strong differences in answering behaviour (Mont 2007, p. 8). Because of that, there is now a wide consensus among researchers to prefer activity- or participation–based questions over self-identification or diagnosable conditions approaches.

Disability measuring: Linking design and purpose

Ultimately, the purpose of measurement should determine the definition of disability used and the questions asked. The Washington Group, which was established by the UN in 2001 to promote and coordinate international cooperation in the area of health statistics, identifies three major classes of purpose for measuring the disabled population: (1) the provision of services; (2) measuring the level of functioning in the population; and (3) the equalization of opportunities (ILO 2007a, p. 52).

Monitoring functioning in population helps in understanding the scope of potential concerns related to disability. Calculating the macroeconomic costs of disability is a particular tool to express this scope in monetary terms. In general, the functional capacity of the population can be conceptualized according to all three functional domains illustrated in Table A.2 below: body functioning, activities and participation. For the estimation of economic losses it is important to determine the actual limitation of a person in the world of work: viewing impairments, for instance, only limit productivity, and hence should only figure in a macroeconomic loss calculation, if no reading glasses are available or the impairment cannot be compensated by glasses. Because of this it can be argued that participation questions offer themselves as the preferable approach.

The participation of an individual in the world of work can be assessed by a general question such as: “Are you limited in the kind or amount of work you can do because of a physical, mental, or emotional problem?” If it is answered with “yes” and there is a rudimentary technique to quantify related productivity losses, it is possible to estimate the macroeconomic loss related to the disability of a person. If the answer is “no”, it remains open if the person has no physical impairment or if its environment is sufficiently supportive, so that the physical impairment has no impact on participation. For the purpose of making a simple calculation of productivity foregone due to disability, however, this difference is not important.

Demands on measurement techniques are more complex if data are needed to determine the costs and benefits of programmes to support people with disabilities, or if the purpose of measurement is the identification of people who are excluded because of mental, physical or emotional impairments. In this case action /activity questions are the method of choice. They provide more detailed information on people’s functioning levels, which, in combination with information on the support that people have available within their families and their community, may provide a foundation for the development of cost and benefit analyses.

Table A.2: Disability questions

Questions developed by the Washington Group	Answers
Core questions	
Do you have difficulty seeing, even if wearing glasses?	
Do you have difficulty hearing, even if using a hearing aid?	
Do you have difficulty walking or climbing stairs?	
Do you have difficulty remembering or concentrating?	No – no difficulty Yes – some difficulty Yes – a lot of difficulty Cannot do at all
Additional questions	
Do you have difficulty (with self-care such as) washing all over or dressing?	
Using your usual (customary) language, do you have difficulty communicating, for example understanding others or others understanding you?	
Question suggested by the ILO to cover upper limbs	
Do you have difficulty using your arms, hands and fingers (lifting, holding, gripping)?	

Source: ILO 2007a, pp. 55-56.

The Washington Group developed and tested a small set of activity-based questions for equalization of opportunity purposes, i.e. for the identification of people who are at a greater risk than the general population of experiencing restrictions in performing specific tasks or participating in activities (ILO 2007a, p. 52). They cover four core domains (walking, seeing, hearing, cognition), as well as the additional domains of self-care and communication (see Table A.2 above for questions and possible answers). None of the questions is directed at upper limb functioning. This constitutes a serious weakness in measuring the employment situation of people with disabilities since problems in the upper limb area may constitute an important impairment for a worker. The ILO thus suggests adding such a question to the set above (ibid., p. 61).

Estimating growth functions – A top-down approach

The bottom-up approach to measuring the cost of exclusion of people with disabilities from the world of work which has been put forward in this study is not the only methodology for calculating the economic costs of a social phenomenon. For instance, the ILO report “HIV/AIDS and work: Global estimates, impact and response” (ILO 2004a), which provides estimates of the impact of HIV/AIDS on men and women in the labour force, uses a different technique which could be described as a 'top-down' approach.

Box A.1: Economic growth model of the ILO/AIDS study

Equation A.1.1: Generic Growth Function (ILO/AIDS study)

$$Growth_i = \alpha_0 + \alpha_1 LN(GDPCA_i) + \alpha_2 LIFE + \alpha_3 INVEST_i + \alpha_4 TRADE_i + \alpha_5 HC_i + \alpha_6 GOV_i + \alpha_7 DUMMY + X_i$$

Equation A.1.1 suggests that the growth rate of the real GDP per capita in a country i (*GROWTH*$_i$) is a function of: the country's initial per capita income (GDPCA); its life expectancy as a proxy for health capital; its investment ratio (INVEST); its degree of openness (TRADE); its primary school enrolment rate as a proxy for human capital (HC); its government consumption (GOV); and a regional dummy (DUMMY). AIDS indirectly influences growth through its impact on life expectancy. Thus, a second equation is needed to map the relationship between life expectancy and HIV prevalence.

Equation A.1.2: Life Expectancy Function (ILO/AIDS study)

$$LIFE_i = \beta_0 + \beta_1 Ln(GDPCA_i) + \beta_2 MAL + \beta_3 HC_i + \beta_4 Ln(HIV_i) + \beta_5 Ln(HIV_i)^2 + U_i$$

Equation A.1.2 maps life expectancy (*LIFE*) as a function of per capita income (GDPCA), malaria morbidity (MAL), human capital (HC) and HIV prevalence. Now, a third equation is needed to map the relationship of HIV prevalence with other factors in the economy.

Equation A.1.3: HIV/AIDS Prevalence Function (ILO/AIDS study)

$$Ln(HIV_i) = \delta_0 + \delta_1 GROWTH_i + \delta_2 MIGRANT + \delta_3 GINI + \delta_4 ETHNIC + \delta_5 MAL + \delta_6 HC + \delta_7 TIME + Z_i$$

Equation A.1.3 contains the factors that are likely to exacerbate the HIV impact. Besides economic growth these are: labour migration (MIGRANT); income inequality (GINI); ethnic fractionalization (ETHNIC); malaria morbidity (MAL); human capital (HC); and the number of years since HIV/AIDS was reported for the first time (TIME).

Source: ILO 2004a; Coulibaly 2007.

The methodology of this study, which measures the impact of HIV/AIDS on GDP growth in 45 countries between 1992 and 2002, is based on historical GDP growth data in these countries (Coulibaly 2007). In simple terms, the author estimates, based on this data, an economic growth model in which he then identifies independent variables related to HIV/AIDS. By recalculating the growth function without these variables, he generates a spread that constitutes the economic loss related to the pandemic (see Table A.1 (p. 55) above for a more detailed explanation).

For the estimation of the growth function the author chooses a 10-year period from 1992 to 2002, using a Two-Stage Least Squares Technique (TSLS). The data employed for the estimation are largely taken from the World Development Indicators (WDI), the WHO database (malaria), the ILO migration database, UNAIDS (HIV prevalence rates) and additional national sources.

Applicability of the top-down approach to the current study

An important advantage of using a top-down approach for measuring the 'price of exclusion' would be that it does not require hypotheses on how disability directly or indirectly affects the productivity of the workforce. To begin with, it would only require a growth function similar to the one used in the ILO HIV/AIDS study.

Equation 4: Growth function

$$Growth_i = \alpha_0 + \alpha_1 LN(GDPCA_i) + \alpha_2 LIFE + \alpha_3 INVEST_i + \alpha_4 TRADE_i + \alpha_5 HC_i + \alpha_6 GOV_i + \alpha_6 DRPI_i + \alpha_8 DUMMY + X_i$$

Equation 4 illustrates such a function containing an independent variable that one might call DRPI (Disability Related Participation Impediment). DRPI would have to be an indicator that shows to what extent the workforce of a country is losing its potential by excluding people with disabilities. Calculating DRPI would be a complex challenge. A 'back of the envelope approach' would be to state that DRPI could take values between 0 and 1. The case of DRPI = 1 would represent an ideal case without any limitations on participation related to disability; in other words, a situation where opportunities are 100 per cent equal. Assuming that in a survey among N persons taken from the economically active population each person expresses on a scale between 0 and 1 how severe their participation in the economy is limited due to a physical, mental or emotional problem, and the absence or non-affordability of adequate support, a simple way of compiling DRPI would be:

Equation 5: Calculating a "Disability Related Participation Impediment" (DRPI)

$$DRPI = 1 - \sum_{i=1}^{N} \frac{SEV_i}{N} \quad \text{(SEV=0 means no limitation; 1 is complete limitation)}$$

Even though the idea seems attractive because of limited requirements on empirical data and modelling techniques, some factors make its implementation rather difficult:

1. The approach requires time series data of a disability variable that builds on participation. This constitutes problems: firstly, there are only a few countries which offer these data; secondly, even if these data are available, they are not collected on a yearly basis, so that the approach lacks empirical content.
2. The approach calculates the correlation between the dynamics of the disability variable and the dynamics of the growth variable. That, however, means it only yields a result if the disability variable moves into a certain direction. If it remains rather stable, identifying the impact of disability-related exclusion is not measurable with this method. This could develop into a problem, since it must be assumed that in most countries the disability variable is less dynamic than it is the case for the HIV/AIDS variable in the study analyzed above.
3. In the suggestion above, the variable DRPI flows as an independent variable into the growth function. From both a methodological and technical point of view this is questionable: presumably, low growth rates are correlated with tight labour markets. These, in turn, can be assumed to affect people with disabilities more severely than others. Thus, both variables are most likely auto-correlated: weak growth lowers participation, and low participation lowers growth.

These problems highlight that using the ILO HIV/AIDS study as a blueprint for an ILO study on the costs of excluding people with disabilities from productive work meets several serious problems. These are rooted in the availability of data (HIV prevalence rates are much better documented in time series than data on disability), and the nature of the problem (HIV/AIDS prevalence rates measure a medical condition which can be used as an independent variable in a growth function, whereas participation is a complex variable which interferes with growth itself).

Coming to a final conclusion on the applicability of the approach would require a deeper assessment of available data, as well as a deeper examination of possible indicators and econometric models which control for auto-correlations. However, even without going deeper into the analysis, the severity of the problems suggests that a static calculation that is not built on time series data, but rather on productivity data at a given point in time, is more likely to yield fruitful results.

Annex 2: Detailed country calculations for *Price of exclusion* study

China, based on Viet Nam prevalence rate

GDP (current US$)	**2,644,681**
Average Labour Productivity	**3,540**
Employed	**73%**
Unemployed	**3.77%**
Inactive	**23.22%**

Total Loss Related to Disability	**$111,693,196,778**	**4.22%**	**(% GDP)**
Minimum Total Loss	$107,640,852,891	4.07%	(% GDP)
Maximum Total Loss	$115,745,540,665	4.38%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**880,898,205**	**30,008,345**	**91,651,714**	**11,532,642**	**9,229,094**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$3,540**	**$2,655**	**$1,947**	**$885**	**$177**
	(4a) Minimum	$3,540	$2,478	$1,770	$708	$0
	(4b) Maximum	$3,540	$2,832	$2,124	$1,062	$354
	(5) Potential Labour Productivity (P*)	**$3,540**	**$3,363**	**$2,655**	**$1,593**	**$885**
	(5a) Minimum	$3,540	$3,186	$2,478	$1,416	$708
	(5b) Maximum	$3,540	$3,540	$2,832	$1,770	$1,062
art I	(6) Employment Rate (e)	73%	65%	57%	49%	41%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$13,803,022,504**	**$36,941,420,876**	**$3,992,062,581**	**$2,669,456,475**
Part II	(9) Unemployment Rate	3.77%	4%	4%	4%	4%
	(10) Unemployment Spread (ui-u)	0.00%	0.08%	0.16%	0.24%	0.32%
	(11) Losses Unemployment	**$0**	**$80,949,944**	**$390,375,678**	**$44,209,285**	**$26,206,558**
	(11a) Minimum	$0	$76,689,421	$364,350,633	$39,297,142	$20,965,246
	(11b) Maximum	$0	$85,210,468	$416,400,724	$49,121,428	$31,447,870
Part III	(12) Labour Force Inactivity	23.22%	31%	39%	47%	55%
	(13) Labour Force Inactivity Spread (di-d)	0.00%	7.96%	15.92%	23.88%	31.84%
	(14) Losses Inactivity	**$0**	**$8,030,942,675**	**$38,728,682,544**	**$4,385,947,841**	**$2,599,919,816**
	(14a) Minimum	$0	$7,608,261,481	$36,146,770,374	$3,898,620,303	$2,079,935,853
	(14b) Maximum	$0	$8,453,623,868	$41,310,594,713	$4,873,275,379	$3,119,903,779
	(15) Total Productivity Loss	**$0**	**$21,914,915,123**	**$76,060,479,098**	**$8,422,219,707**	**$5,295,582,850**
	(15a) Minimum	$0	$21,487,973,406	$73,452,541,884	$7,929,980,026	$4,770,357,575
	(15b) Maximum	$0	$22,341,856,840	$78,668,416,313	$8,914,459,387	$5,820,808,124

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	30,008,345	91,651,714	11,532,642	9,229,094
Productivity Adjustment factor (γi)	0.21	0.23	0.21	0.16
Part I (Disabling Environment)	0.13	0.11	0.10	0.08
Part II (Extra Unemployment)	0.00	0.00	0.00	0.00
Part III (Extra Inactivity)	0.08	0.12	0.11	0.08
P x ni x γi (mio. US$)	$21,915	$76,060	$8,422	$5,296

Σ Total Economic Loss (mio. US$)	**$111,693**
Σ Minimum	$107,641
Σ Maximum	$115,746

China (2), based on CDPF data

GDP (current US$)	**2,644,681**
Average Labour Productivity	**3,540**
Employed	**73%**
Unemployed	**3.77%**
Inactive	**23.22%**

Total Loss Related to Disability	**$32,061,741,741**	**1.21%**	**(% GDP)**
Minimum Total Loss	$30,571,076,981	1.16%	(% GDP)
Maximum Total Loss	$33,552,406,502	1.27%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**1,023,320,000**	**7,359,769**	**22,478,262**	**2,828,466**	**2,263,504**
	(2) % of Labour Productivity (β)	100%	75%	55%	25%	5%
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$3,540**	**$2,655**	**$1,947**	**$885**	**$177**
	(4a) Minimum	$3,540	$2,478	$1,770	$708	$0
	(4b) Maximum	$3,540	$2,832	$2,124	$1,062	$354
	(5) Potential Labour Productivity (P*)	**$3,540**	**$3,363**	**$2,655**	**$1,593**	**$885**
	(5a) Minimum	$3,540	$3,186	$2,478	$1,416	$708
	(5b) Maximum	$3,540	$3,540	$2,832	$1,770	$1,062
Part I	(6) Employment Rate (e)	73%	61%	49%	37%	25%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$3,175,929,685**	**$7,781,276,006**	**$737,698,267**	**$397,143,839**
Part II	(9) Unemployment Rate	3.77%	4%	4%	4%	4%
	(10) Unemployment Spread (ui-u)	0.00%	0.12%	0.23%	0.35%	0.47%
	(11) Losses Unemployment	**$0**	**$28,788,463**	**$138,830,434**	**$15,722,276**	**$9,319,914**
	(11a) Minimum	$0	$27,273,281	$129,575,072	$13,975,357	$7,455,931
	(11b) Maximum	$0	$30,303,646	$148,085,796	$17,469,196	$11,183,897
Part III	(12) Labour Force Inactivity	23.22%	35%	47%	59%	71%
	(13) Labour Force Inactivity Spread (di-d)	0.00%	11.94%	23.88%	35.82%	47.76%
	(14) Losses Inactivity	**$0**	**$2,955,191,378**	**$14,251,212,263**	**$1,613,922,022**	**$956,707,193**
	(14a) Minimum	$0	$2,799,654,990	$13,301,131,446	$1,434,597,353	$765,365,754
	(14b) Maximum	$0	$3,110,727,766	$15,201,293,081	$1,793,246,692	$1,148,048,632
	(15) Total Productivity Loss	**$0**	**$6,159,909,526**	**$22,171,318,703**	**$2,367,342,566**	**$1,363,170,946**
	(15a) Minimum	$0	$6,002,857,955	$21,211,982,524	$2,186,270,977	$1,169,965,525
	(15b) Maximum	$0	$6,316,961,096	$23,130,654,883	$2,548,414,155	$1,556,376,368

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	7,359,769	22,478,262	2,828,466	2,263,504
Productivity Adjustment factor (γi)	0.24	0.28	0.24	0.17
Part I (Disabling Environment)	0.12	0.10	0.07	0.05
Part II (Extra Unemployment)	0.00	0.00	0.00	0.00
Part III (Extra Inactivity)	0.11	0.18	0.16	0.12
P x ni x γi (mio. US$)	$6,160	$22,171	$2,367	$1,363

Σ Total Economic Loss (mio. US$)	**$32,062**
Σ Minimum	$30,571
Σ Maximum	$33,552

Thailand, based on Viet Nam prevalence rate

GDP (current US$)	**206,338**
Average Labour Productivity	**5,733**
Employed	**72%**
Unemployed	**0.92%**
Inactive	**26.90%**

Total Loss Related to Disability	**$9,575,740,307**	**4.64%**	**(% GDP)**
Minimum Total Loss	$9,122,053,990	4.42%	(% GDP)
Maximum Total Loss	$10,029,426,623	4.86%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**39,701,472**	**1,352,455**	**4,130,679**	**519,768**	**415,949**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$5,733**	**$4,300**	**$3,153**	**$1,433**	**$287**
	(4a) Minimum	$5,733	$4,013	$2,867	$1,147	$0
	(4b) Maximum	$5,733	$4,587	$3,440	$1,720	$573
	(5) Potential Labour Productivity (P*)	**$5,733**	**$5,447**	**$4,300**	**$2,580**	**$1,433**
	(5a) Minimum	$5,733	$5,160	$4,013	$2,293	$1,147
	(5b) Maximum	$5,733	$5,733	$4,587	$2,867	$1,720
Part I	(6) Employment Rate (e)	72%	60%	48%	35%	23%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$928,187,870**	**$2,250,927,239**	**$209,757,550**	**$109,057,855**
Part II	(9) Unemployment Rate	0.92%	10%	18%	27%	36%
	(10) Unemployment Spread (ui-u)	0.00%	8.65%	17.29%	25.94%	34.58%
	(11) Losses Unemployment	**$0**	**$636,860,350**	**$3,071,216,336**	**$347,809,266**	**$206,175,777**
	(11a) Minimum	$0	$603,341,385	$2,866,468,580	$309,163,792	$164,940,622
	(11b) Maximum	$0	$670,379,316	$3,275,964,092	$386,454,740	$247,410,932
Part III	(12) Labour Force Inactivity	26.90%	31%	34%	38%	42%
	(13) Labour Force Inactivity Spread (di-d)	0.00%	3.68%	7.37%	11.05%	14.73%
	(14) Losses Inactivity	**$0**	**$271,318,911**	**$1,308,417,256**	**$148,175,705**	**$87,836,191**
	(14a) Minimum	$0	$257,038,969	$1,221,189,439	$131,711,738	$70,268,953
	(14b) Maximum	$0	$285,598,854	$1,395,645,074	$164,639,672	$105,403,429
	(15) Total Productivity Loss	**$0**	**$1,836,367,132**	**$6,630,560,831**	**$705,742,521**	**$403,069,823**
	(15a) Minimum	$0	$1,788,568,223	$6,338,585,259	$650,633,080	$344,267,429
	(15b) Maximum	$0	$1,884,166,040	$6,922,536,404	$760,851,962	$461,872,216

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,352,455	4,130,679	519,768	415,949
Productivity Adjustment factor (γi)	0.24	0.28	0.24	0.17
Part I (Disabling Environment)	0.12	0.10	0.07	0.05
Part II (Extra Unemployment)	0.08	0.13	0.12	0.09
Part III (Extra Inactivity)	0.03	0.06	0.05	0.04
P x ni x γi (mio. US$)	$1,836	$6,631	$706	$403

Σ Total Economic Loss (mio. US$)	**$9,576**
Σ Minimum	$9,122
Σ Maximum	$10,029

Thailand (2), based on NSO data

GDP (current US$)	**206,338**
Average Labour Productivity	**5,733**
Employed	**72%**
Unemployed	**0.92%**
Inactive	**26.90%**

Total Loss Related to Disability	**$1,417,485,571**	**0.69%**	**(% GDP)**
Minimum Total Loss	$1,295,803,857	0.63%	(% GDP)
Maximum Total Loss	$1,539,167,285	0.75%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**46,120,327**	**197,288**	**265,397**	**184,499**	**259,722**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$5,733**	**$4,300**	**$3,153**	**$1,433**	**$287**
	(4a) Minimum	$5,733	$4,013	$2,867	$1,147	$0
	(4b) Maximum	$5,733	$4,587	$3,440	$1,720	$573
	(5) Potential Labour Productivity (P*)	**$5,733**	**$5,447**	**$4,300**	**$2,580**	**$1,433**
	(5a) Minimum	$5,733	$5,160	$4,013	$2,293	$1,147
	(5b) Maximum	$5,733	$5,733	$4,587	$2,867	$1,720
Part I	(6) Employment Rate (e)	72%	54%	35%	17%	0%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$121,452,963**	**$107,103,416**	**$35,332,676**	**$0**
Part II	(9) Unemployment Rate	0.92%	14%	27%	40%	53%
	(10) Unemployment Spread (ui-u)	0.00%	12.97%	25.94%	38.90%	51.87%
	(11) Losses Unemployment	**$0**	**$139,351,731**	**$295,989,032**	**$185,189,824**	**$193,106,525**
	(11a) Minimum	$0	$132,017,429	$276,256,430	$164,613,177	$154,485,220
	(11b) Maximum	$0	$146,686,032	$315,721,634	$205,766,471	$231,727,830
Part III	(12) Labour Force Inactivity	26.90%	32%	38%	43%	47%
	(13) Labour Force Inactivity Spread (di-d)	0.00%	5.52%	11.05%	16.57%	20.31%
	(14) Losses Inactivity	**$0**	**$59,367,426**	**$126,098,951**	**$78,895,634**	**$75,597,393**
	(14a) Minimum	$0	$56,242,825	$117,692,354	$70,129,453	$60,477,915
	(14b) Maximum	$0	$62,492,028	$134,505,547	$87,661,816	$90,716,872
	(15) Total Productivity Loss	**$0**	**$320,172,120**	**$529,191,398**	**$299,418,134**	**$268,703,918**
	(15a) Minimum	$0	$309,713,217	$501,052,199	$270,075,306	$214,963,135
	(15b) Maximum	$0	$330,631,023	$557,330,597	$328,760,963	$322,444,702

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	197,288	265,397	184,499	259,722
Productivity Adjustment factor (γi)	0.28	0.35	0.28	0.18
Part I (Disabling Environment)	0.11	0.07	0.03	0.00
Part II (Extra Unemployment)	0.12	0.19	0.18	0.13
Part III (Extra Inactivity)	0.05	0.08	0.07	0.05
P x ni x γi (mio. US$)	$320	$529	$299	$269

Σ Total Economic Loss (mio. US$)	**$1,417**
Σ Minimum	$1,296
Σ Maximum	$1,539

Viet Nam

GDP (current US$)	**60,999**
Average Labour Productivity	**1,356**
Employed	**73%**
Unemployed	**1.55%**
Inactive	**25.05%**

Total Loss Related to Disability	**$1,821,071,046**	**2.99%**	**(% GDP)**
Minimum Total Loss	$1,773,147,304	2.91%	(% GDP)
Maximum Total Loss	$1,868,994,788	3.06%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	42,607,418	1,451,448	4,433,024	557,813	446,394
	(2) % of Labour Productivity (β)	100%	75%	55%	25%	5%
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	100%	95%	75%	45%	25%
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	$1,356	$1,017	$746	$339	$68
	(4a) Minimum	$1,356	$949	$678	$271	$0
	(4b) Maximum	$1,356	$1,084	$813	$407	$136
	(5) Potential Labour Productivity (P*)	$1,356	$1,288	$1,017	$610	$339
	(5a) Minimum	$1,356	$1,220	$949	$542	$271
	(5b) Maximum	$1,356	$1,356	$1,084	$678	$407
Part I	(6) Employment Rate (e)	73%	68%	63%	58%	53%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	$0	$268,622,528	$758,745,086	$87,712,028	$63,980,883
Part II	(9) Unemployment Rate	1.55%	11%	21%	30%	39%
	(10) Unemployment Spread (ui-u)	0.00%	9.48%	18.97%	28.45%	37.93%
	(11) Losses Unemployment	$0	$177,258,311	$854,816,319	$96,806,283	$57,385,218
	(11a) Minimum	$0	$167,928,926	$797,828,564	$86,050,029	$45,908,174
	(11b) Maximum	$0	$186,587,696	$911,804,073	$107,562,536	$68,862,261
Part III	(12) Labour Force Inactivity	25.05%	21%	16%	12%	8%
	(13) Labour Force Inactivity Spread (di-d)	0.00%	-4.35%	-8.70%	-13.05%	-17.40%
	(14) Losses Inactivity	$0	-$81,325,621	-$392,187,355	-$44,414,454	-$26,328,179
	(14a) Minimum	$0	-$77,045,325	-$366,041,531	-$39,479,515	-$21,062,543
	(14b) Maximum	$0	-$85,605,917	-$418,333,179	-$49,349,393	-$31,593,814
	(15) Total Productivity Loss	$0	$364,555,217	$1,221,374,049	$140,103,857	$95,037,922
	(15a) Minimum	$0	$359,506,129	$1,190,532,119	$134,282,543	$88,826,514
	(15b) Maximum	$0	$369,604,306	$1,252,215,980	$145,925,171	$101,249,330

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,451,448.182	4,433,023.97	557,812.5861	446,394.2268
Productivity Adjustment factor (γi)	0.19	0.20	0.19	0.16
Part I (Disabling Environment)	0.14	0.13	0.12	0.11
Part II (Extra Unemployment)	0.09	0.14	0.13	0.09
Part III (Extra Inactivity)	-0.04	-0.07	-0.06	-0.04
P x ni x γi (mio. US$)	$365	$1,221	$140	$95

Σ Total Economic Loss (mio. US$)	$1,821
Σ Minimum	$1,773
Σ Maximum	$1,869

Ethiopia, based on Zambia disability data

GDP (current US$)	**13,315,402,752**
Average Labour Productivity	**389**
Employed	**76%**
Unemployed/Inactive	**24%**

Total Loss Related to Disability	**$667,117,747**	**5.01%**	**(% GDP)**
Minimum Total Loss	$624,084,062	4.69%	(% GDP)
Maximum Total Loss	$710,151,432	5.33%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**37,666,858**	**1,841,491**	**303,145**	**4,207,829**	**1,230,677**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$389**	**$292**	**$214**	**$97**	**$19**
	(4a) Minimum	$389	$272	$195	$78	$0
	(4b) Maximum	$389	$311	$234	$117	$39
	(5) Potential Labour Productivity (P*)	**$389**	**$370**	**$292**	**$175**	**$97**
	(5a) Minimum	$389	$350	$272	$156	$78
	(5b) Maximum	$389	$389	$311	$195	$117
Part I	(6) Employment Rate (e)	76%	63%	56%	45%	25%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$89,597,008**	**$13,239,048**	**$147,078,221**	**$24,238,654**
Part II	(9) Unemployment / Inactivity Rate	24.40%	38%	44%	55%	75%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	13.10%	19.50%	30.70%	50.30%
	(11) Losses Unempl. / Inactivity	**$0**	**$89,202,781**	**$17,256,780**	**$226,267,887**	**$60,237,367**
	(11a) Minimum	$0	$84,507,898	$16,106,328	$201,127,011	$48,189,894
	(11b) Maximum	$0	$93,897,664	$18,407,232	$251,408,764	$72,284,841
	(12) Total Productivity Loss	**$0**	**$178,799,789**	**$30,495,828**	**$373,346,109**	**$84,476,022**
	(12a) Minimum	$0	$174,104,906	$29,345,376	$348,205,233	$72,428,548
	(12b) Maximum	$0	$183,494,672	$31,646,280	$398,486,985	$96,523,495

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,841,491	303,145	4,207,829	1,230,677
Productivity Adjustment factor (γi)	0.25	0.26	0.23	0.18
Part I (Disabling Environment)	0.13	0.11	0.09	0.05
Part II (Extra Unemployment / Inactivity)	0.12	0.15	0.14	0.13
P x ni x γi (mio. US$)	$179	$30	$373	$84

Σ Total Economic Loss (mio. US$)	**$667**
Σ Minimum	$624
Σ Maximum	$710

Malawi, based on ILO data

GDP (current US$)	**3,163,727,360**
Average Labour Productivity	**554**
Employed	**79%**
Unemployed/Inactive	**21%**

Total Loss Related to Disability	**$98,707,671**	**3.12%**	**(% GDP)**
Minimum Total Loss	$89,964,992	2.84%	(% GDP)
Maximum Total Loss	$107,450,350	3.40%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**6,341,580**	**43,140**	**107,850**	**107,850**	**596,770**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$554**	**$415**	**$305**	**$138**	**$28**
	(4a) Minimum	$554	$388	$277	$111	$0
	(4b) Maximum	$554	$443	$332	$166	$55
	(5) Potential Labour Productivity (P*)	**$554**	**$526**	**$415**	**$249**	**$138**
	(5a) Minimum	$554	$499	$388	$222	$111
	(5b) Maximum	$554	$554	$443	$277	$166
Part I	(6) Employment Rate (e)	79%	60%	54%	47%	38%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$2,867,796**	**$6,488,389**	**$5,580,253**	**$25,389,555**
Part II	(9) Unemployment / Inactivity Rate	20.57%	40%	46%	53%	62%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	19.43%	25.13%	32.73%	41.03%
	(11) Losses Unempl. / Inactivity	**$0**	**$4,411,214**	**$11,260,475**	**$8,799,590**	**$33,910,399**
	(11a) Minimum	$0	$4,179,045	$10,509,777	$7,821,857	$27,128,319
	(11b) Maximum	$0	$4,643,383	$12,011,173	$9,777,322	$40,692,478
	(12) Total Productivity Loss	**$0**	**$7,279,010**	**$17,748,864**	**$14,379,843**	**$59,299,954**
	(12a) Minimum	$0	$7,046,841	$16,998,165	$13,402,111	$52,517,874
	(12b) Maximum	$0	$7,511,180	$18,499,562	$15,357,575	$66,082,034

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	43,140	107,850	107,850	596,770
Productivity Adjustment factor (γi)	0.30	0.30	0.24	0.18
Part I (Disabling Environment)	0.12	0.11	0.09	0.08
Part II (Extra Unemployment / Inactivity)	0.18	0.19	0.15	0.10
P x ni x γi (mio. US$)	$7	$18	$14	$59

Σ Total Economic Loss (mio. US$)	**$99**
Σ Minimum	$90
Σ Maximum	$107

Malawi (2), based on SINTEF data

GDP (current US$)	**3,163,727,360**
Average Labour Productivity	**554**
Employed	**46%**
Unemployed/Inactive	**54%**

Total Loss Related to Disability	**$39,521,417**	**1.25%**	**(% GDP)**
Minimum Total Loss	$38,701,307	1.22%	(% GDP)
Maximum Total Loss	$40,341,527	1.28%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**6,341,580**	**43,140**	**107,850**	**107,850**	**596,770**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$554**	**$415**	**$305**	**$138**	**$28**
	(4a) Minimum	$554	$388	$277	$111	$0
	(4b) Maximum	$554	$443	$332	$166	$55
	(5) Potential Labour Productivity (P*)	**$554**	**$526**	**$415**	**$249**	**$138**
	(5a) Minimum	$554	$499	$388	$222	$111
	(5b) Maximum	$554	$554	$443	$277	$166
Part I	(6) Employment Rate (e)	46%	60%	54%	47%	38%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$2,867,796**	**$6,488,389**	**$5,580,253**	**$25,389,555**
Part II	(9) Unemployment / Inactivity Rate	54.00%	40%	46%	53%	62%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	-14.00%	-8.30%	-0.70%	7.60%
	(11) Losses Unempl. / Inactivity	**$0**	**-$3,178,474**	**-$3,719,173**	**-$188,199**	**$6,281,270**
	(11a) Minimum	$0	-$3,011,186	-$3,471,228	-$167,288	$5,025,016
	(11b) Maximum	$0	-$3,345,762	-$3,967,118	-$209,110	$7,537,524
	(12) Total Productivity Loss	**$0**	**-$310,678**	**$2,769,216**	**$5,392,054**	**$31,670,825**
	(12a) Minimum	$0	-$143,390	$3,017,161	$5,412,965	$30,414,571
	(12b) Maximum	$0	-$477,966	$2,521,271	$5,371,143	$32,927,079

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	43,140	107,850	107,850	596,770
Productivity Adjustment factor (γi)	-0.01	0.05	0.09	0.10
Part I (Disabling Environment)	0.12	0.11	0.09	0.08
Part II (Extra Unemployment / Inactivity)	-0.13	-0.06	0.00	0.02
P x ni x γi (mio. US$)	$0	$3	$5	$32

Σ Total Economic Loss (mio. US$)	**$40**
Σ Minimum	$39
Σ Maximum	$40

Namibia, based on ILO data

GDP (current US$)	**6,566,350,848**
Average Labour Productivity	**13,824**
Employed	**38%**
Unemployed/Inactive	**62%**

Total Loss Related to Disability	**$285,960,571**	**4.35%**	**(% GDP)**
Minimum Total Loss	$255,133,171	3.89%	(% GDP)
Maximum Total Loss	$316,787,970	4.82%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**1,097,460**	**1,260**	**40,320**	**17,640**	**103,320**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$13,824**	**$10,368**	**$7,603**	**$3,456**	**$691**
	(4a) Minimum	$13,824	$9,677	$6,912	$2,765	$0
	(4b) Maximum	$13,824	$11,059	$8,294	$4,147	$1,382
	(5) Potential Labour Productivity (P*)	**$13,824**	**$13,133**	**$10,368**	**$6,221**	**$3,456**
	(5a) Minimum	$13,824	$12,442	$9,677	$5,530	$2,765
	(5b) Maximum	$13,824	$13,824	$11,059	$6,912	$4,147
Part I	(6) Employment Rate (e)	38%	15%	12%	16%	9%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$536,478**	**$13,154,156**	**$7,559,460**	**$24,852,159**
Part II	(9) Unemployment / Inactivity Rate	62.30%	85%	88%	85%	91%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	22.30%	25.90%	22.20%	29.00%
	(11) Losses Unemployment / Inactivity	**$0**	**$3,689,764**	**$108,264,334**	**$24,359,226**	**$103,544,994**
	(11a) Minimum	$0	$3,495,566	$101,046,712	$21,652,646	$82,835,995
	(11b) Maximum	$0	$3,883,962	$115,481,956	$27,065,807	$124,253,993
	(12) Total Productivity Loss	**$0**	**$4,226,242**	**$121,418,490**	**$31,918,686**	**$128,397,153**
	(12a) Minimum	$0	$4,032,044	$114,200,868	$29,212,105	$107,688,154
	(12b) Maximum	$0	$4,420,440	$128,636,113	$34,625,267	$149,106,151

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,260	40,320	17,640	103,320
Productivity Adjustment factor (γi)	0.24	0.22	0.13	0.09
Part I (Disabling Environment)	0.03	0.02	0.03	0.02
Part II (Extra Unemployment / Inactivity)	0.21	0.19	0.10	0.07
P x ni x γi (mio. US$)	$4	$121	$32	$128

Σ Total Economic Loss (mio. US$)	**$286**
Σ Minimum	$255
Σ Maximum	$317

Namibia (2), based on SINTEF data

GDP (current US$)	**6,566,350,848**
Average Labour Productivity	**13,824**
Employed	**25%**
Unemployed/Inactive	**75%**

Total Loss Related to Disability	**$167,893,159**	**2.56%**	**(% GDP)**
Minimum Total Loss	$151,781,407	2.31%	(% GDP)
Maximum Total Loss	$184,004,910	2.80%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**1,097,460**	**1,260**	**40,320**	**17,640**	**103,320**
	(2) % of Labour Productivity (β)	100%	75%	55%	25%	5%
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$13,824**	**$10,368**	**$7,603**	**$3,456**	**$691**
	(4a) Minimum	$13,824	$9,677	$6,912	$2,765	$0
	(4b) Maximum	$13,824	$11,059	$8,294	$4,147	$1,382
	(5) Potential Labour Productivity (P*)	**$13,824**	**$13,133**	**$10,368**	**$6,221**	**$3,456**
	(5a) Minimum	$13,824	$12,442	$9,677	$5,530	$2,765
	(5b) Maximum	$13,824	$13,824	$11,059	$6,912	$4,147
Part I	(6) Employment Rate (e)	25%	15%	12%	16%	9%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$536,478**	**$13,154,156**	**$7,559,460**	**$24,852,159**
Part II	(9) Unemployment / Inactivity Rate	75.40%	85%	88%	85%	91%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	9.20%	12.80%	9.10%	15.90%
	(11) Losses Unempl. / Inactivity	**$0**	**$1,522,343**	**$53,508,433**	**$9,985,802**	**$56,774,328**
	(11a) Minimum	$0	$1,442,219	$49,941,204	$8,876,269	$45,419,463
	(11b) Maximum	$0	$1,602,466	$57,075,662	$11,095,336	$68,129,194
	(12) Total Productivity Loss	**$0**	**$2,058,821**	**$66,662,589**	**$17,545,262**	**$81,626,487**
	(12a) Minimum	$0	$1,978,697	$63,095,360	$16,435,728	$70,271,621
	(12b) Maximum	$0	$2,138,944	$70,229,818	$18,654,795	$92,981,353

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,260	40,320	17,640	103,320
Productivity Adjustment factor (γi)	0.12	0.12	0.07	0.06
Part I (Disabling Environment)	0.03	0.02	0.03	0.02
Part II (Extra Unemployment / Inactivity)	0.09	0.10	0.04	0.04
P x ni x γi (mio. US$)	$2	$67	$18	$82

Σ Total Economic Loss (mio. US$)	**$168**
Σ Minimum	$152
Σ Maximum	$184

South Africa

GDP (current US$)	**255,155,470,336**
Average Labour Productivity	**17,091**
Employed	**45%**
Unemployed/Inactive	**55%**

Total Loss Related to Disability	**$17,817,926,135**	**6.98%**	**(% GDP)**
Minimum Total Loss	$17,288,667,457	6.78%	(% GDP)
Maximum Total Loss	$18,347,184,814	7.19%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**22,153,538**	**1,862,185**	**4,788,476**	**3,239,897**	**814,903**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$17,091**	**$12,818**	**$9,400**	**$4,273**	**$855**
	(4a) Minimum	$17,091	$11,964	$8,546	$3,418	$0
	(4b) Maximum	$17,091	$13,673	$10,255	$5,127	$1,709
	(5) Potential Labour Productivity (P*)	**$17,091**	**$16,237**	**$12,818**	**$7,691**	**$4,273**
	(5a) Minimum	$17,091	$15,382	$11,964	$6,837	$3,418
	(5b) Maximum	$17,091	$17,091	$13,673	$8,546	$5,127
Part I	(6) Employment Rate (e)	45%	47%	47%	31%	15%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$2,988,977,816**	**$7,685,942,955**	**$3,404,883,977**	**$428,585,024**
Part II	(9) Unemployment / Inactivity Rate	54.57%	53%	53%	69%	85%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	-1.52%	-1.52%	14.69%	30.05%
	(11) Losses Unemployment / Inactivity	**$0**	**-$460,900,401**	**-$935,662,469**	**$3,659,914,741**	**$1,046,184,494**
	(11a) Minimum	$0	-$436,642,486	-$873,284,971	$3,253,257,547	$836,947,595
	(11b) Maximum	$0	-$485,158,317	-$998,039,967	$4,066,571,934	$1,255,421,392
	(12) Total Productivity Loss	**$0**	**$2,528,077,414**	**$6,750,280,486**	**$7,064,798,718**	**$1,474,769,518**
	(12a) Minimum	$0	$2,552,335,330	$6,812,657,983	$6,658,141,524	$1,265,532,619
	(12b) Maximum	$0	$2,503,819,498	$6,687,902,988	$7,471,455,911	$1,684,006,416

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	1,862,185	4,788,476	3,239,897	814,903
Productivity Adjustment factor (γi)	0.08	0.08	0.13	0.11
Part I (Disabling Environment)	0.09	0.09	0.06	0.03
Part II (Extra Unemployment / Inactivity)	-0.01	-0.01	0.07	0.08
P x ni x γi (mio. US$)	$2,528	$6,750	$7,065	$1,475

Σ Total Economic Loss (mio. US$)	**$17,818**
Σ Minimum	$17,289
Σ Maximum	$18,347

Tanzania

GDP (current US$)	**12,783,767,552**
Average Labour Productivity	**697**
Employed	**84%**
Unemployed/Inactive	**16%**

Total Loss Related to Disability	**$480,106,668**	**3.76%**	**(% GDP)**
Minimum Total Loss	$436,613,638	3.42%	(% GDP)
Maximum Total Loss	$523,599,698	4.10%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**19,755,015**	**533,030**	**87,747**	**1,217,981**	**356,227**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$697**	**$523**	**$383**	**$174**	**$35**
	(4a) Minimum	$697	$488	$348	$139	$0
	(4b) Maximum	$697	$557	$418	$209	$70
	(5) Potential Labour Productivity (P*)	**$697**	**$662**	**$523**	**$314**	**$174**
	(5a) Minimum	$697	$627	$488	$279	$139
	(5b) Maximum	$697	$697	$557	$348	$209
Part I	(6) Employment Rate (e)	84%	62%	40%	18%	0%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$45,900,849**	**$4,891,475**	**$30,909,191**	**$0**
Part II	(9) Unemployment / Inactivity Rate	16.42%	38%	60%	82%	100%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	21.79%	43.58%	65.37%	83.58%
	(11) Losses Unemployment / Inactivity	**$0**	**$76,888,067**	**$19,985,131**	**$249,664,989**	**$51,866,967**
	(11a) Minimum	$0	$72,841,327	$18,652,789	$221,924,435	$41,493,573
	(11b) Maximum	$0	$80,934,807	$21,317,473	$277,405,544	$62,240,360
	(12) Total Productivity Loss	**$0**	**$122,788,915**	**$24,876,606**	**$280,574,180**	**$51,866,967**
	(12a) Minimum	$0	$118,742,175	$23,544,264	$252,833,626	$41,493,573
	(12b) Maximum	$0	$126,835,656	$26,208,948	$308,314,735	$62,240,360

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	533,030	87,747	1,217,981	356,227
Productivity Adjustment factor (γi)	0.33	0.41	0.33	0.21
Part I (Disabling Environment)	0.12	0.08	0.04	0.00
Part II (Extra Unemployment / Inactivity)	0.21	0.33	0.29	0.21
P x ni x γi (mio. US$)	$123	$25	$281	$52

Σ Total Economic Loss (mio. US$)	**$480**
Σ Minimum	$437
Σ Maximum	$524

Zambia, based on ILO data

GDP (current US$)	**10,734,318,592**
Average Labour Productivity	**2,430**
Employed	**69%**
Unemployed/Inactive	**31%**

Total Loss Related to Disability	**$497,820,021**	**4.64%**	**(% GDP)**
Minimum Total Loss	$468,004,531	4.36%	(% GDP)
Maximum Total Loss	$527,635,510	4.92%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**5,294,700**	**258,852**	**42,612**	**591,480**	**172,992**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$2,430**	**$1,822**	**$1,336**	**$607**	**$121**
	(4a) Minimum	$2,430	$1,701	$1,215	$486	$0
	(4b) Maximum	$2,430	$1,944	$1,458	$729	$243
	(5) Potential Labour Productivity (P*)	**$2,430**	**$2,308**	**$1,822**	**$1,093**	**$607**
	(5a) Minimum	$2,430	$2,187	$1,701	$972	$486
	(5b) Maximum	$2,430	$2,430	$1,944	$1,215	$729
Part I	(6) Employment Rate (e)	69%	63%	56%	45%	25%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$78,615,885**	**$11,616,453**	**$129,052,128**	**$21,267,934**
Part II	(9) Unemployment / Inactivity Rate	30.53%	38%	44%	55%	75%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	6.97%	13.37%	24.57%	44.17%
	(11) Losses Unemployment / Inactivity	**$0**	**$41,616,975**	**$10,378,252**	**$158,863,945**	**$46,408,449**
	(11a) Minimum	$0	$39,426,608	$9,686,368	$141,212,396	$37,126,759
	(11b) Maximum	$0	$43,807,342	$11,070,135	$176,515,495	$55,690,139
	(12) Total Productivity Loss	**$0**	**$120,232,860**	**$21,994,705**	**$287,916,073**	**$67,676,383**
	(12a) Minimum	$0	$118,042,493	$21,302,821	$270,264,524	$58,394,693
	(12b) Maximum	$0	$122,423,227	$22,686,588	$305,567,623	$76,958,073

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	258,852	42,612	591,480	172,992
Productivity Adjustment factor (γi)	0.19	0.21	0.20	0.16
Part I (Disabling Environment)	0.13	0.11	0.09	0.05
Part II (Extra Unemployment / Inactivity)	0.07	0.10	0.11	0.11
P x ni x γi (mio. US$)	$120	$22	$288	$68

Σ Total Economic Loss (mio. US$)	**$498**
Σ Minimum	$468
Σ Maximum	$528

Zambia (2), based on SINTEF data

GDP (current US$)	**10,734,318,592**
Average Labour Productivity	**2,430**
Employed	**52%**
Unemployed/Inactive	**48%**

Total Loss Related to Disability	**$251,315,954**	**2.34%**	**(% GDP)**
Minimum Total Loss	$243,871,095	2.27%	(% GDP)
Maximum Total Loss	$258,760,813	2.41%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**5,294,700**	**258,852**	**42,612**	**591,480**	**172,992**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$2,430**	**$1,822**	**$1,336**	**$607**	**$121**
	(4a) Minimum	$2,430	$1,701	$1,215	$486	$0
	(4b) Maximum	$2,430	$1,944	$1,458	$729	$243
	(5) Potential Labour Productivity (P*)	**$2,430**	**$2,308**	**$1,822**	**$1,093**	**$607**
	(5a) Minimum	$2,430	$2,187	$1,701	$972	$486
	(5b) Maximum	$2,430	$2,430	$1,944	$1,215	$729
Part I	(6) Employment Rate (e)	52%	63%	56%	45%	25%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$78,615,885**	**$11,616,453**	**$129,052,128**	**$21,267,934**
Part II	(9) Unemployment / Inactivity Rate	47.81%	38%	44%	55%	75%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	-10.31%	-3.91%	7.29%	26.89%
	(11) Losses Unempl. / Inactivity	**$0**	**-$61,600,263**	**-$3,036,118**	**$47,144,266**	**$28,255,669**
	(11a) Minimum	$0	-$58,358,144	-$2,833,711	$41,906,014	$22,604,535
	(11b) Maximum	$0	-$64,842,382	-$3,238,526	$52,382,517	$33,906,803
	(12) Total Productivity Loss	**$0**	**$17,015,622**	**$8,580,335**	**$176,196,394**	**$49,523,603**
	(12a) Minimum	$0	$20,257,741	$8,782,743	$170,958,142	$43,872,470
	(12b) Maximum	$0	$13,773,503	$8,377,927	$181,434,645	$55,174,737

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	258,852	42,612	591,480	172,992
Productivity Adjustment factor (γi)	0.03	0.08	0.12	0.12
Part I (Disabling Environment)	0.13	0.11	0.09	0.05
Part II (Extra Unemployment / Inactivity)	-0.10	-0.03	0.03	0.07
P x ni x γi (mio. US$)	$17	$9	$176	$50

Σ Total Economic Loss (mio. US$)	**$251**
Σ Minimum	$244
Σ Maximum	$259

Zimbabwe, based on ILO data

GDP (current US$)	**3,418,093,568**
Average Labour Productivity	**609**
Employed	**70%**
Unemployed/Inactive	**30%**

Total Loss Related to Disability	**$128,308,869**	**3.75%**	**(% GDP)**
Minimum Total Loss	$115,430,042	3.38%	(% GDP)
Maximum Total Loss	$141,187,696	4.13%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**7,206,510**	**16,140**	**250,170**	**137,190**	**476,130**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	**100%**	**90%**	**70%**	**40%**	**20%**
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$609**	**$457**	**$335**	**$152**	**$30**
	(4a) Minimum	$609	$426	$305	$122	$0
	(4b) Maximum	$609	$487	$365	$183	$61
	(5) Potential Labour Productivity (P*)	**$609**	**$579**	**$457**	**$274**	**$152**
	(5a) Minimum	$609	$548	$426	$244	$122
	(5b) Maximum	$609	$609	$487	$305	$183
Part I	(6) Employment Rate (e)	70%	29%	30%	22%	17%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$578,026**	**$9,142,243**	**$3,593,000**	**$9,685,862**
Part II	(9) Unemployment / Inactivity Rate	30.46%	71%	70%	79%	83%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	40.14%	39.54%	48.04%	52.84%
	(11) Losses Unemployment / Inactivity	**$0**	**$3,748,756**	**$45,187,264**	**$18,064,166**	**$38,309,552**
	(11a) Minimum	$0	$3,551,453	$42,174,780	$16,057,037	$30,647,642
	(11b) Maximum	$0	$3,946,059	$48,199,748	$20,071,296	$45,971,462
	(12) Total Productivity Loss	**$0**	**$4,326,781**	**$54,329,507**	**$21,657,166**	**$47,995,415**
	(12a) Minimum	$0	$4,129,479	$51,317,023	$19,650,036	$40,333,504
	(12b) Maximum	$0	$4,524,084	$57,341,991	$23,664,296	$55,657,325

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	16,140	250,170	137,190	476,130
Productivity Adjustment factor (γi)	0.44	0.36	0.26	0.17
Part I (Disabling Environment)	0.06	0.06	0.04	0.03
Part II (Extra Unemployment / Inactivity)	0.38	0.30	0.22	0.13
P x ni x γi (mio. US$)	$4	$54	$22	$48

Σ Total Economic Loss (mio. US$)	**$128**
Σ Minimum	$115
Σ Maximum	$141

Zimbabwe (2), based on SINTEF data

GDP (current US$)	**3,418,093,568**
Average Labour Productivity	**609**
Employed	**23%**
Unemployed/Inactive	**77%**

Total Loss Related to Disability	**$20,234,586**	**0.59%**	**(% GDP)**
Minimum Total Loss	$19,742,821	0.58%	(% GDP)
Maximum Total Loss	$20,726,350	0.61%	(% GDP)

		No Dis.	Mild	Moderate	Severe	Very Sev
Labour Productivity	**(1) People with Disabilities (n)**	**7,206,510**	**16,140**	**250,170**	**137,190**	**476,130**
	(2) % of Labour Productivity (β)	**100%**	**75%**	**55%**	**25%**	**5%**
	(2a) Minimum	100%	70%	50%	20%	0%
	(2b) Maximum	100%	80%	60%	30%	10%
	(3) % of Labour Productivity (%β*)	**100%**	**95%**	**75%**	**45%**	**25%**
	(3a) Minimum	100%	90%	70%	40%	20%
	(3b) Maximum	100%	100%	80%	50%	30%
	(4) Labour Productivity (P)	**$609**	**$457**	**$335**	**$152**	**$30**
	(4a) Minimum	$609	$426	$305	$122	$0
	(4b) Maximum	$609	$487	$365	$183	$61
	(5) Potential Labour Productivity (P*)	**$609**	**$579**	**$457**	**$274**	**$152**
	(5a) Minimum	$609	$548	$426	$244	$122
	(5b) Maximum	$609	$609	$487	$305	$183
Part I	(6) Employment Rate (e)	23%	29%	30%	22%	17%
	(7) Productivity Spread (β*-β)	0%	20%	20%	20%	20%
	(8) Losses: Disabling Environment	**$0**	**$578,026**	**$9,142,243**	**$3,593,000**	**$9,685,862**
Part II	(9) Unemployment / Inactivity Rate	76.70%	71%	70%	79%	83%
	(10) Unemployment / Inactivity Spread (ui-u)	0.00%	-6.10%	-6.70%	1.80%	6.60%
	(11) Losses Unemployment / Inactivity	**$0**	**-$569,670**	**-$7,656,629**	**$676,821**	**$4,784,932**
	(11a) Minimum	$0	-$539,687	-$7,146,187	$601,619	$3,827,946
	(11b) Maximum	$0	-$599,653	-$8,167,070	$752,023	$5,741,918
	(12) Total Productivity Loss	**$0**	**$8,356**	**$1,485,614**	**$4,269,821**	**$14,470,795**
	(12a) Minimum	$0	$38,338	$1,996,056	$4,194,618	$13,513,808
	(12b) Maximum	$0	-$21,627	$975,173	$4,345,023	$15,427,781

	Mild	Moderate	Severe	Very Sev
Number of People in Disability level Group (ni)	16,140	250,170	137,190	476,130
Productivity Adjustment factor (γi)	0.00	0.01	0.05	0.05
Part I (Disabling Environment)	0.06	0.06	0.04	0.03
Part II (Extra Unemployment / Inactivity)	-0.06	-0.05	0.01	0.02
P x ni x γi (mio. US$)	$0	$1	$4	$14

Σ Total Economic Loss (mio. US$)	**$20**
Σ Minimum	$20
Σ Maximum	$21

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