Measuring the Economic Burden of NCDs

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Regional Workshop on Economic Aspects of NCDs and Their Risk Factors

August 24th 2015

Outline

- Motivation
- Production function approach to estimating the economic effects of NCDs
- Previous applications in India, China and Indonesia
- Future work on the Americas and model development

Advocating for Action on NCDs

- Can be difficult to achieve action on NCDs and raise funding for NCD targeted interventions:
  - Many other candidates for investment
  - Lack of awareness on behalf of stakeholders, public and media
  - Communicable diseases still very important in many countries
  - Lack of evidence on effects and solutions

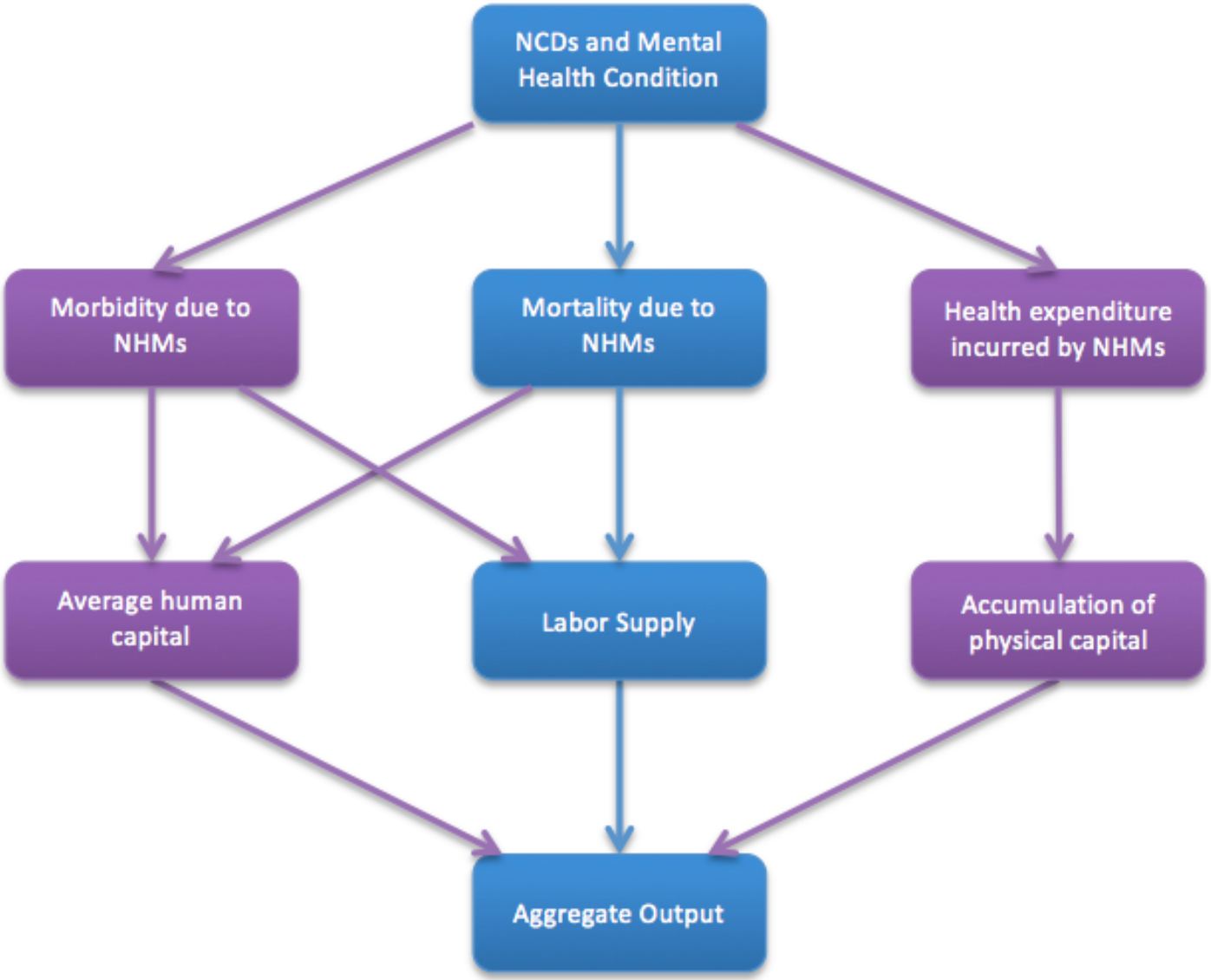
How to Measure the Economic Impact of NCDs?

- Effects on individuals are well studied, there is less evidence of the impact on society and economic growth
- Cost of illness and VSL provide a ‘partial equilibrium’ cost
- True macroeconomic impact of disease should account for spillover and growth effects

Pathways

- Disease burden can impact economic growth through a number of different pathways
- Reduce employment through mortality, early retirement (Dwyer & Mitchell, 1999), negative expectations regarding employment (McGarry, 2004), and reduced productivity (Lopez-Casasnovas, Rivera, & Currais, 2005)
- NCDs reduce the net availability of government resources reducing the public sector's ability to invest in strategic areas (education and infrastructure)
- Increased health expenditures impede the accumulation of physical and human capital, for example by diverting savings from productive investments to health care expenditure

Pathways


NCDs and Mental Health Condition
Morbidity due to NHMs
Mortality due to NHMs
Health expenditure incurred by NHMs
Average human capital
Labor Supply
Accumulation of physical capital
Aggregate Output

Production Function Approach

- Build a parsimonious working model of the economy by describing the relevant inputs (FOP), and how these are combined to produce output (national income)
- The central relationships in these models can be calibrated using microdata
- Workhorse macroeconomic model for the past 50 years has been the Solow approach, which specifies long run growth to be determined by capital accumulation, labour, and productivity
- Trade-off between realism, tractability, and usefulness

Advantages of the Production Function Approach (1)

- Economically founded approach to assess the macroeconomic impact of non-communicable diseases
- Captures the impact on society, not just individuals
- Provides a way of modeling development of the workforce and evolution of the capital stock of a country, crucial to assessing medium- and long-run economic performance
- Takes into account the adjustment mechanisms and dynamics by which economies are characterized

Advantages of the Production Function Approach (2)

- Economic impact of diseases can be traced over time
- Macroeconomic approach abstracts from subjective assessments regarding death and morbidity
- Easy to evaluate how GDP and GDP growth respond to changes in inputs
- Flexible and suitable for applications with limited data availability

WHO EPIC Model

- Augmented Solow model: national income depends on capital stock, labor force, and aggregate measures of human capital
- NCDs affect aggregate human capital and hence economic growth through a direct labor supply impact by reducing the number of working-age individuals due to increased mortality
- Cost is Projected GDP (Counterfactual) – Expected GDP with elimination of mortality for the specified disease
- Considers diabetes, ischemic heart disease, cerebrovascular disease, chronic obstructive pulmonary disease and breast cancer directly
- Then scaled using Global Burden of Disease DALY estimates to provide an overall assessment of the costs of NCDs in the 4 main domains (CVD, COPD, cancer, diabetes) + mental health
- Available from WHO as an Excel Worksheet

Output to date

- 2011 World Economic Forum report: Global Estimates for NCDs; WEF/WHO Best-buy report
- Journal of the Economics of Ageing paper (2014) on China and India using EPIC
- Development of corrected EPIC model (EPIC-H)
- India/China/Indonesia applications of EPIC-H and WEF Indonesia report (2015)

WORLD ECONOMIC FORUM

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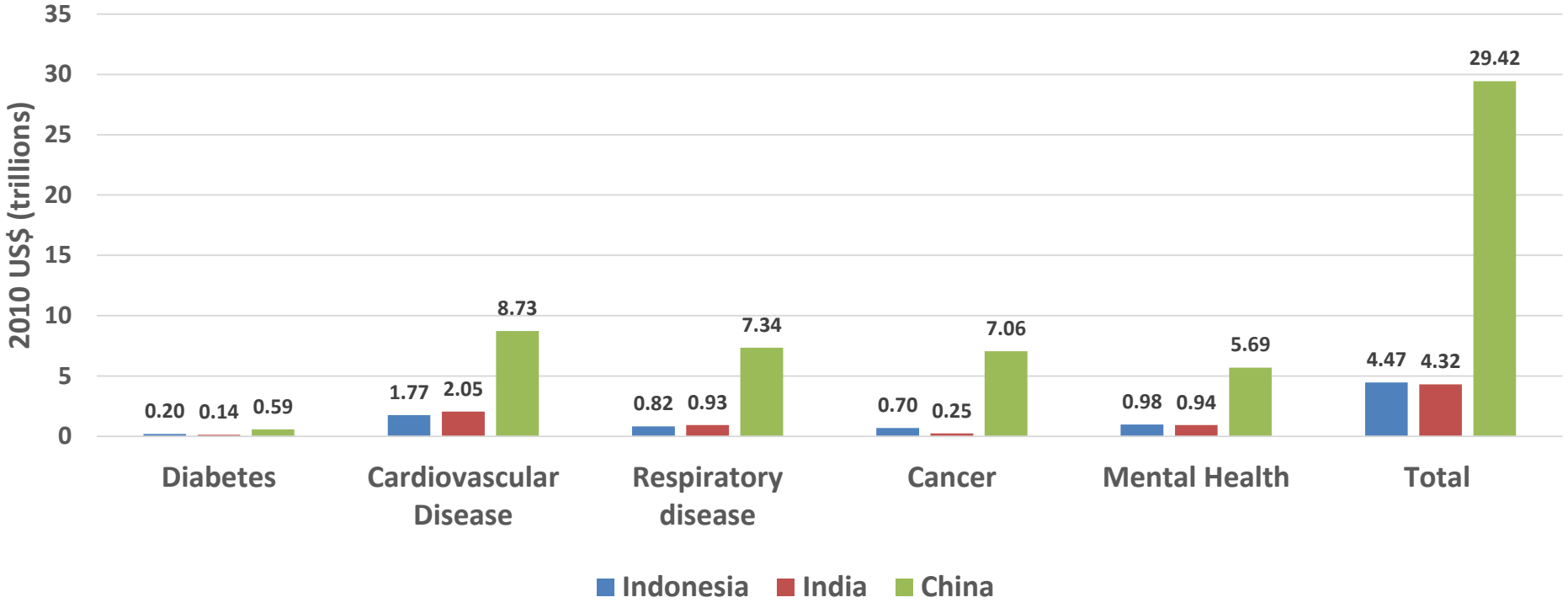
Economics of Non-Communicable Diseases in Indonesia

April 2015

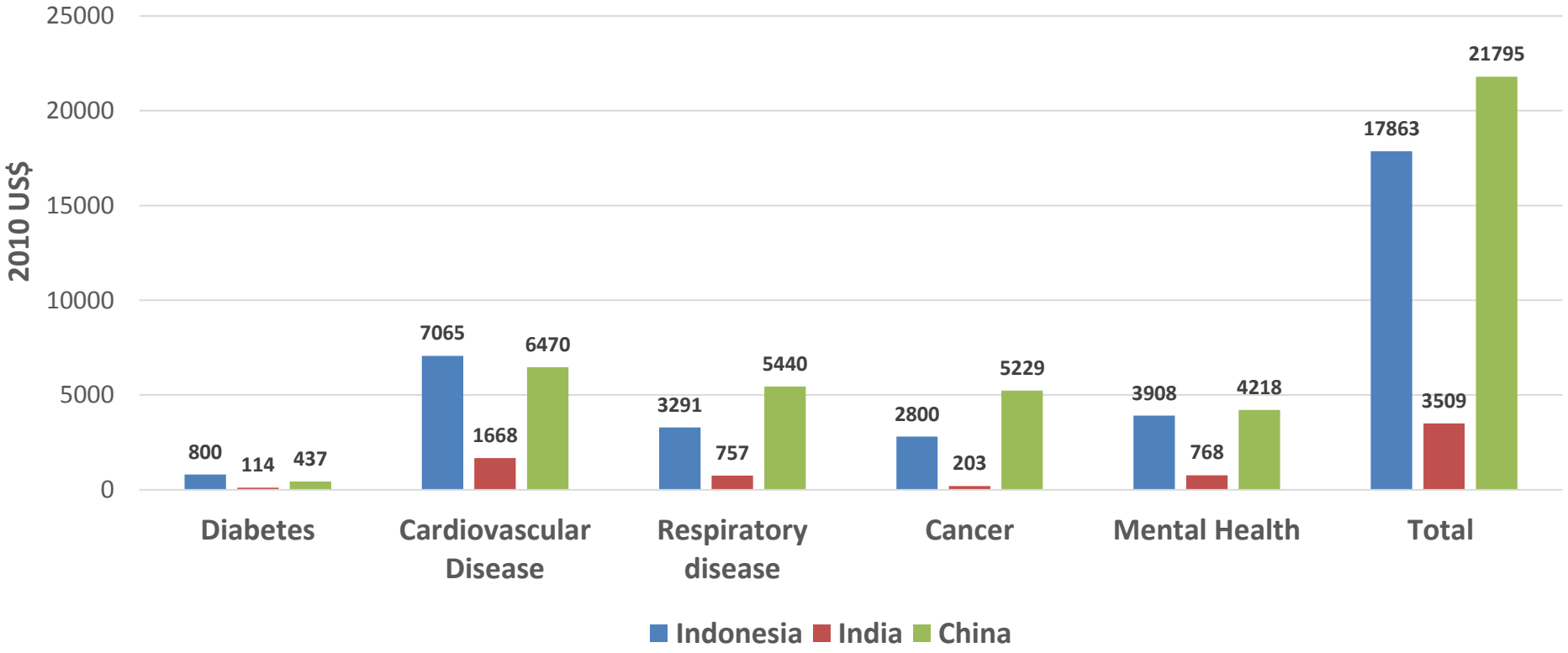
WEF Indonesia Report

- Comparison of lost output between Indonesia, India and China 2012-2030



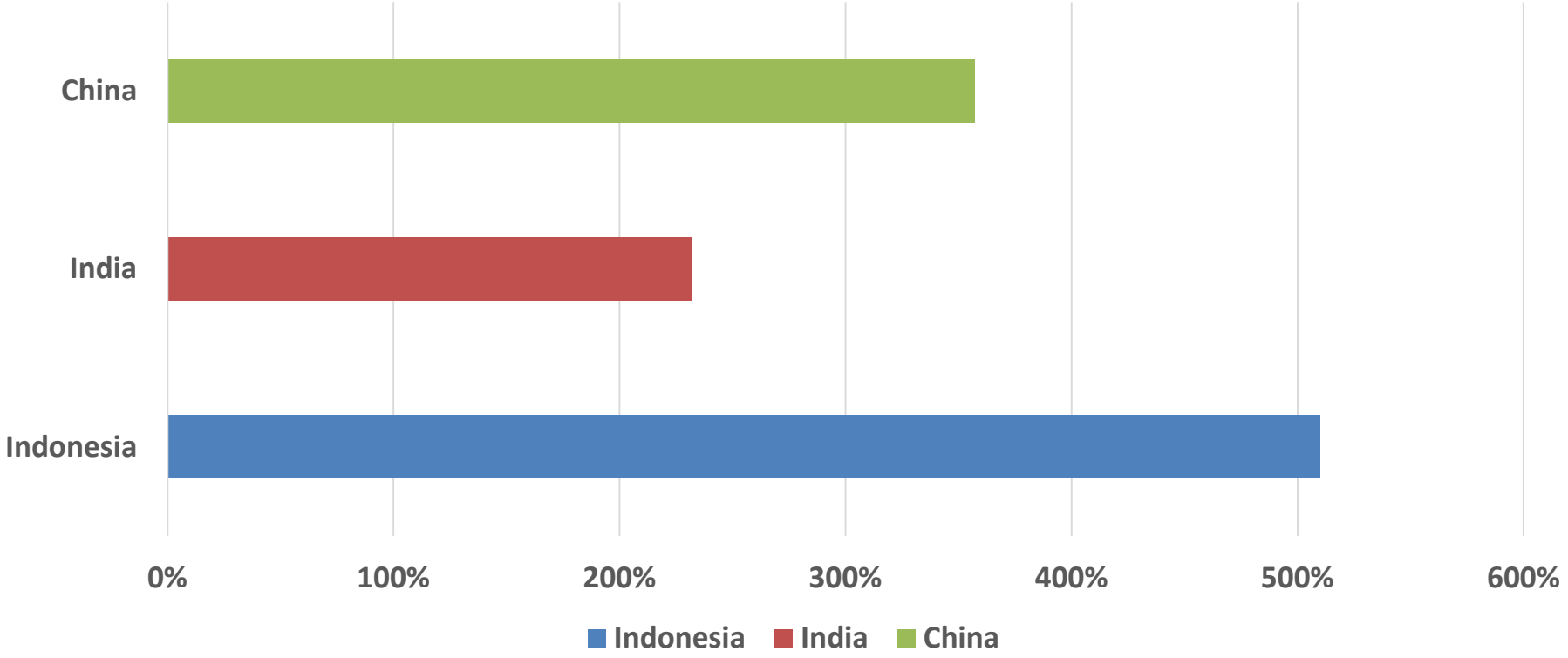
WEF Indonesia Report

- Comparison of lost output per capita between Indonesia, India and China 2012-2030



WEF Indonesia Report

- Comparison of lost output as a percentage of 2012 nominal GDP 2012-2030



Future Work

- In collaboration with PAHO, produce estimates of the NCD burden in Costa Rica, Peru, and Jamaica using updated EPIC-H model
- Develop a new model (HMM) which incorporates other pathways, sensitivity analyses for confidence intervals, and more easily allows for cost benefit analysis of interventions
- Will be open source and publicly available

Team

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Thank You!

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- Key reference:
- Bloom, D., Cafiero-Fonseca, E.T., McGovern, M.E., Prettner, K., Stanciole, A., Weiss, J., Bakkila, S., Rosenberg, L., 2014. The macroeconomic impact of non-communicable diseases in China and India: Estimates, projections, and comparisons. The Journal of the Economics of Ageing, 4, 100–111. http://dx.doi.org/10.1016/j.jeoa.2014.08.003
- And forthcoming update detailing corrections to EPIC and results