# Economic Performance and Development

# Realising MDGs in South Africa

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# OUTLINE

Background and status of MDGs

Methodology and Data

Simulations and results

Conclusion

# Background

- Adoption in 2000 of the Millennium Development Goals (MDG) to reach in 2015:
  - Eradicate poverty and hunger
  - Primary education for all
  - Gender equality
  - Reduce child mortality
  - Improve maternal health
  - Combat illnesses (HIV, TB, malaria…)
  - Environmental sustainability
  - Global partnership towards development
- All the MDGs are closely related to the rights as in the South African Constitution.

# STATUS - MDG1

| ERADICATE EXTREME POVERTY AND HUNGER | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = halve 1990 $1 a day poverty and malnutrition rates | | | | | | |
| Population below $1 a day (%) | .. | 6.3 | 11.3 | .. | 5 | .. | .. |
| Poverty Gap at $1 a day (%) | .. | 0.6 | 3.2 | .. | 1.1 | .. | .. |
| Percentage share of consumption held by poorest 20% | .. | 3.6 | 2.9 | .. | 2.8 | .. | .. |
| Prevalence of child malnutrition (% of children under 5) | .. | 3 | .. | .. | 3 | .. | .. |



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# STATUS - MDG2

| | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| **ACHIEVE UNIVERSAL PRIMARY EDUCATION** | **2015 target is to have net enrolment of 100%** | | | | | | |
| **Net primary enrolment ratio male (%)** | 90 | .. | 96 | 98.1 | 97.9 | 98.1 | 98 |
| **Net primary enrolment ratio female (%)** | 90 | .. | 96 | 98.4 | 98.6 | 98.2 | 98.8 |
| **Youth literacy rate (% ages 15-24)** | .. | 93.9 | 93.5 | 88.8 | 89.5 | 90.1 | 90.3 |



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# STATUS - MDG3

| PROMOTE GENDER EQUALITY | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2005 target is to have education ratio to 100 | | | | | | |
| Ratio of girls to boys in primary education | 1:1.05 | 1:1.03 (1996) | 1:1.02 (1999) | .. | 1:1.05 | .. | 1:1.04 (2009) |
| Ratio of girls to boys in secondary education | 1:0.89 | 1:0.88 (1996) | 1:0.89 (1999) | | | 1:0.95 | 1:0.94 |
| Ratio of young illiterate females to males (% ages 15-24) | .. | 101 | 99.9 | .. | .. | .. | .. |
| Share of women employed in the nonagricultural sector (%) | 42.6 | 43.6 | 44.6 | 44 | 42.9 | 42.9 | .. |
| Proportion of seats held by women in national parliament (%) | 3 | 25 | 30 | 32.8 | 32.8 | 33 | .. |



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# STATUS - MDG4

| REDUCE CHILD MORTALITY | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = reduce 1990 under 5 mortality by two thirds | | | | | | |
| **Under 5 mortality rate (per 1,000)** | 61.7 | 63.2 | 77.4 | 78.5 | 74.6 | 69.4 | 65.3 |
| **Infant mortality rate (per 1,000 births)** | 45 | 45 | 50 | 55 | 56 | 56 | 48 |
| **Immunization, measles (children under 12 months)** | 79 | 76 | 77 | 80.1 | 86.6 | 87.6 | 93.3 |

# STATUS - MDG5

| IMPROVE MATERNAL HEALTH | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = reduce 1990 maternal mortality by three quarters | | | | | | |
| **Maternal mortality ratio (modeled estimate per 100,000 births)** | 230 | 260 | 380 | 440 | 400 | 400 | 410 |
| **Births attended by skilled health staff (% total)** | .. | 82 | 84 | 92 (2003) | .. | .. | 94.3 (2009) |



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# STATUS - MDG6

| COMBAT HIV/AIDS, MALARIA AND OTHER DISEASES | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = halve and begin to reverse prevalence of diseases | | | | | | |
| Prevalence of HIV (% ages 15-49) | 0.8 | 6.2 | 15.9 | 18.2 | 18.2 | 18.1 | 8.7 |
| Contraceptive prevalence rate (% women aged 15-24) | 57 | .. | 56.3 (1998) | 59.9 (2003) | 14.8 | 12.7 | .. |
| Number of children orphaned by HIV/AIDS (thousands) | .. | .. | 660 | 1 200 | .. | 1400 | 1 800 |
| Incidence of tuberculosis (per 100,000 people) | 224 | 392.4 | 580 | 645 | 940 | 948 | 960 |
| Tuberculosis cases detected under DOTS (%) | 72.8 | 41.2 | 62.6 | 71.7 | 76.6 | 78. | 72.13 |

# STATUS - MDG7

| ENSURE ENVIRONMENTAL SUSTAINABILITY | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = various | | | | | | |
| Area (% of land area) | 7.58 | 7.58 | 7.58 | 7.58 | 7.58 | 7.58 | 7.58 |
| Nationally protected areas (% of total land area) | .. | 6.1 | .. | .. | 6.1 | .. | 6.05 |
| GDP per unit of energy use (2005 PPP $ per kg of oil equivalent) | 3.03 | 2.74 | 2.99 | .3.15 | 3.25 | 3.29 | .. |
| CO2 emissions (metric tons per capita) | 9.47 | 9.03 | 8.37 | 8.72 | 8.74 | 8.82 | .. |
| Access to an improved water source (% of population) | 83 | 84 | 89 | 91.7 | 92.2 | 92.7 | 92 |
| Access to improved sanitation (% of population) | 55 | 56 | 57 | 66.7 | 68.2 | 70.1 | 69.7 |

# STATUS - MDG8

| DEVELOP A GLOBAL PARTNERSHIP FOR DEVELOPMENT | 1990 | 1995 | 2000 | 2005 | 2006 | 2007 | 2008 |
|---|---|---|---|---|---|---|---|
| | 2015 target = various | | | | | | |
| Youth unemployment rate (% of total labour force ages 15-24) | .. | .. | 44.2 | .. | .. | 46.9 | .. |
| Fixed line and mobile telephones (per 1,000 people) | 94.3 | 116 | 302.3 | 825.1 | 825.1 | 889 | .. |
| Fixed line and mobile telephones (per 100 people ) | 9.43 | 11.6 | 30.23 | 82.51 | 93.49 | 97.87 | 101.5 |
| Personal computers (per 1,000 people) | 7.1 | 28.1 | 66.4 | 84.6 | 84.6 | .. | .. |
| Personal computers (per 100 people ) | 0.71 | 2.81 | 6.59 | 8.46 | | | |

# Aim and Objectives

- Where is South Africa, 2 (4) years prior to the deadline?
- Is South Africa “on track” to achieve the MDGs under current public policies and investments?
- If not:
  - How much additional public spending will be needed?
  - What would be the most feasible financing strategy?
  - Which trade-offs need to be made when identifying a preferred financing strategy?

# Methodology

- Use of a Dynamic Computable General Equilibrium Model designed for the study of MDGs.
  - Retroaction between education sectors and labor markets.
  - Model that takes into account capital accounts for agents
- Model based on Chitiga et al (2010), Maisonnave and Robichaud (2010) and Lofgren and Dias Bonilla, C (2006)-- Maquette for MDG Simulations (MAMS)

# Methodology

- MDGs taken into account in the model:
  - MDG2 (net completion rate)
  - MDG4 (child mortality rate)
  - MDG5 (maternal mortality rate)
  - MDG6 (HIV prevalence)
- Targets for each MDG are taken from the South African Country report (2010).
- Some of the MDGs targets are already achieved (MDG7 and MDG8), some are likely (MDG2 and MDG6), some are still far (MDG4 and MDG5)

# Methodology

- Logistic function to compute students' behaviours (graduation rate, graduate and continue, intake rate).
- Calibrated at the base year
- Depends on initial values and proxies such as education quality, wage rate differential, health indicator, consumption per capita
- Computation of MDG2:

# Methodology: example from Education

$$MDG2VAL_{t,t\geq NY_{'ped'}} = \frac{\left[\sum_{h} SHR_{h,'ped','entry',t-(NY_{'ped'}-1)} \cdot \prod_{tj} SHR_{h,'ped','grd',tj} \cdot POP^{H7}_{h,t-NY_{'PED'}-1}\right]}{\sum_{h} POP^{H7}_{h,t-NY_{'PED'}-1}}$$

- Computation of MDG2: Multiplication of the intake rate and the graduation rate for the length of the primary school



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# Methodology

- Computation of  the other MDG: Use of a logistic function. Base year value taken from observations. Then, endogenously computed.
- Depends on initial values, services per capita of health, services in water per capita, consumption per capita
- Labor supply related to education system. Model considers skilled, unskilled and semi skilled labor supply

# Data

- Social Accounting Matrix based on 2005 data, with 57 activities and products, notably primary, secondary and tertiary education sectors.
- Education data based on 2005, data from Department of Education
- Financial data taken from SARB, Quarterly Bulletin

# Scenarios

- Simulation 1: Can South Africa achieve ALL the MDG targets by 2015 ?
- Simulation 2: How much *more* is needed to reach MDG2 and tradeoffs?
- Simulation 3: How much *more* is needed to reach MDG6 and tradeoffs?
- Simulation 4: Financing MDG6 through indirect tax increase

# Simulation 1: Can South Africa achieve the MDGs by 2015

- Simulation 1: Can South Africa achieve the MDGs target in 2015?
  - There is no solution for this scenario. In other words, given the very tight time constraint (5 years) and given that actual values for MDG4 and MDG5 are very far away from their target, it is not feasible to reach all the MDGs.
  - Increasing the timeframe should help the model to solve.
  - Model predictions are believable.  Given the actual values of some MDGs and the targets, it would be too costly for the economy to finance them by 2015.

# Findings

| Variable | SIMULATION 1 | SIMULATION 2 | SIMULATION 3 | SIMULATION 4 |
|---|---|---|---|---|
| **MDG2_Education** | INFES | Attained | ++ | — |
| **MDG4_Child Mortality** | INFES | + | ++ | ++ |
| **MDG5_Martenal Mortality** | INFES | + | ++ | ++ |
| **MDG6_HIV Prevalence** | INFES | + | Attained | Attained |
| **MDG8_Investment/GDP** | INFES | — | — | ++ |
| **Household Consumption** | INFES | ± | ± | ± |
| **Government Savings** | INFES | — | — | — |
| **Borrowing** | INFES | — | — | BAU |
| **Education Spending** | INFES | 1.2% to 23.5% | BAU | BAU |
| **Health Spending** | INFES | BAU | 3.3% to 17.4% | 2.73% to 14.85% |

# Simulation 2: Reaching MDG2

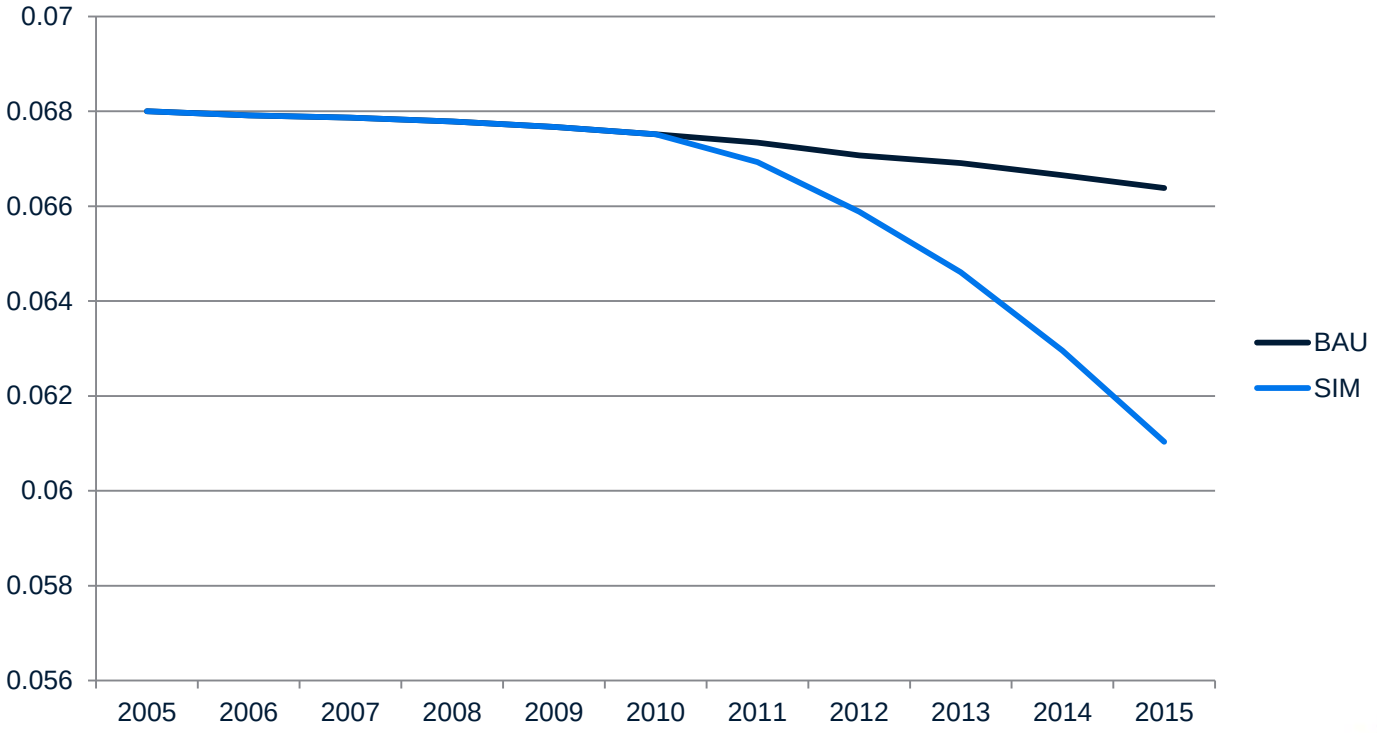
- How much would it cost to reach this target?
- Impact on other MDGs
- Impact on agents
- Impact on borrowing

Impact on government's primary education spending (in % to BAU)

| Years | CG'primary' |
|---|---|
| 2011 | 1.24 |
| 2012 | 3.38 |
| 2013 | 6.46 |
| 2014 | 10.84 |
| 2015 | 23.57 |

# Results simulation 2: Reaching MDG2

Evolution of MDG4



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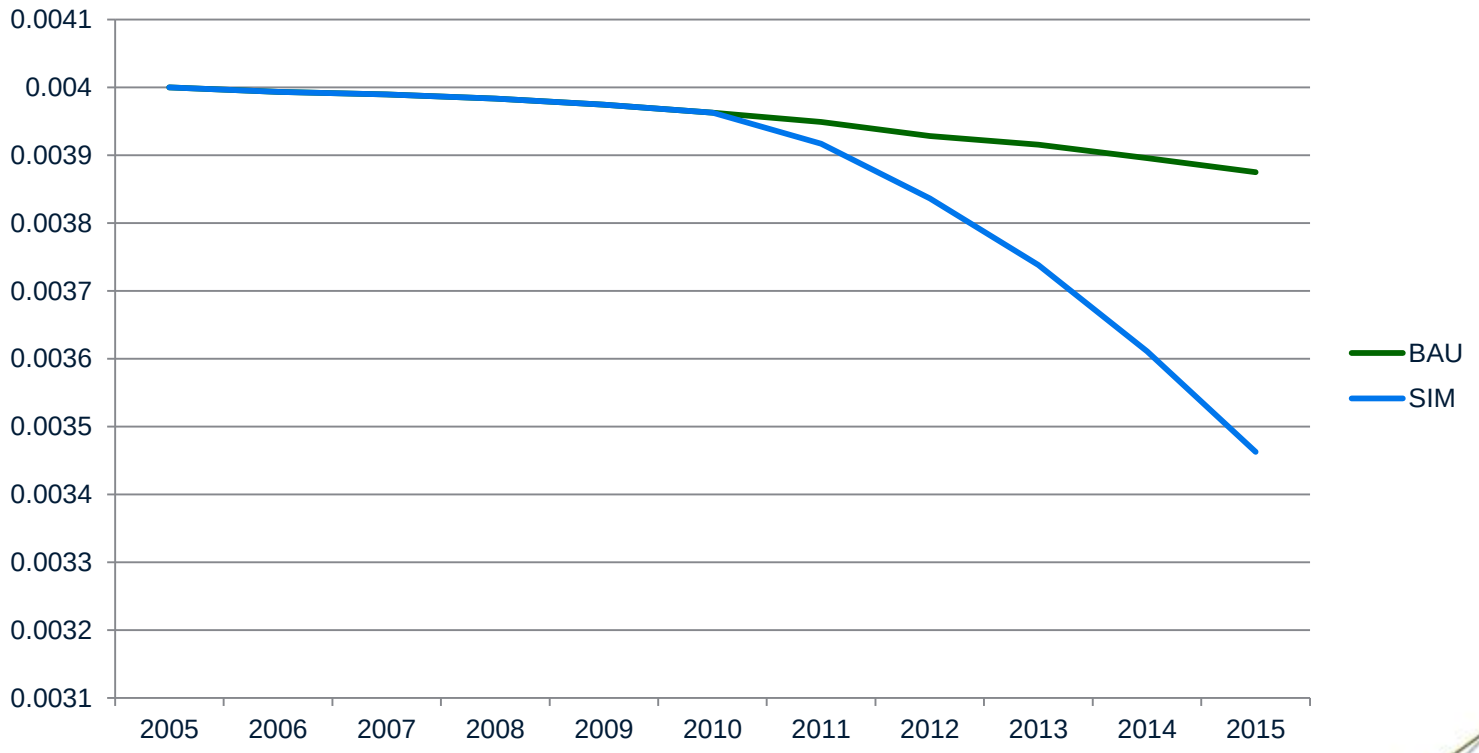
# Results simulation 2: Reaching MDG2

Evolution of MDG5



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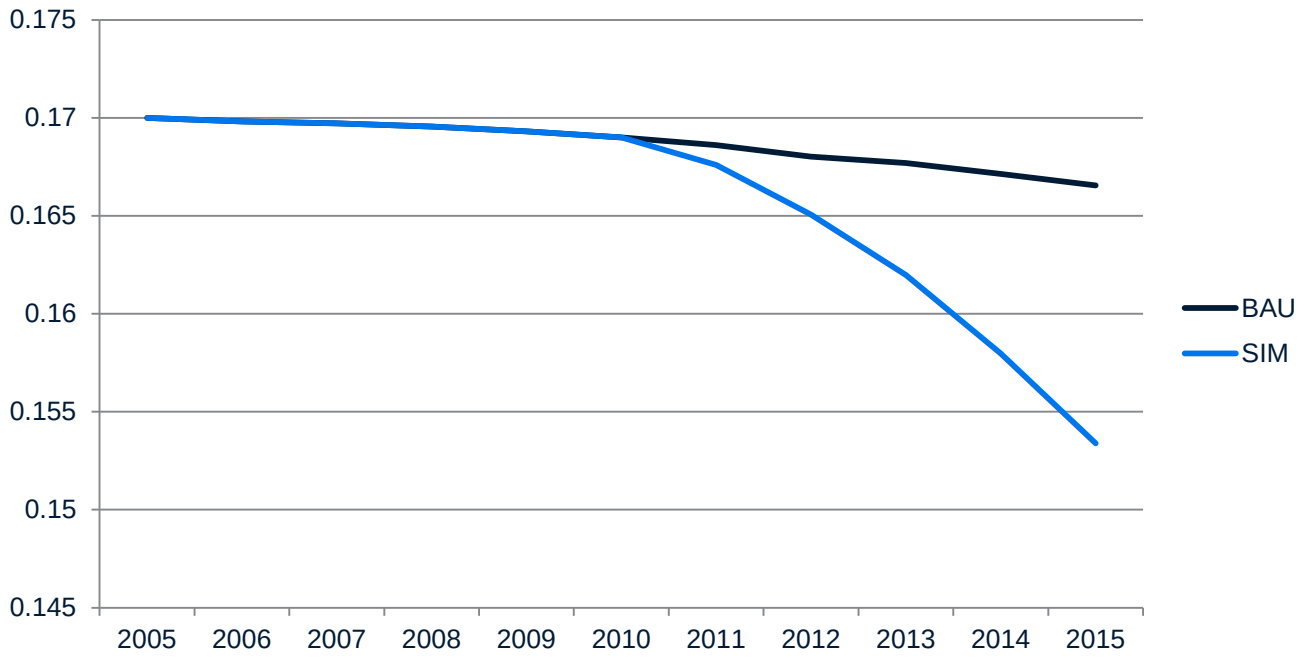
# Results simulation 2: Reaching MDG2

Evolution of MDG6




But impact on MDG8 is negative



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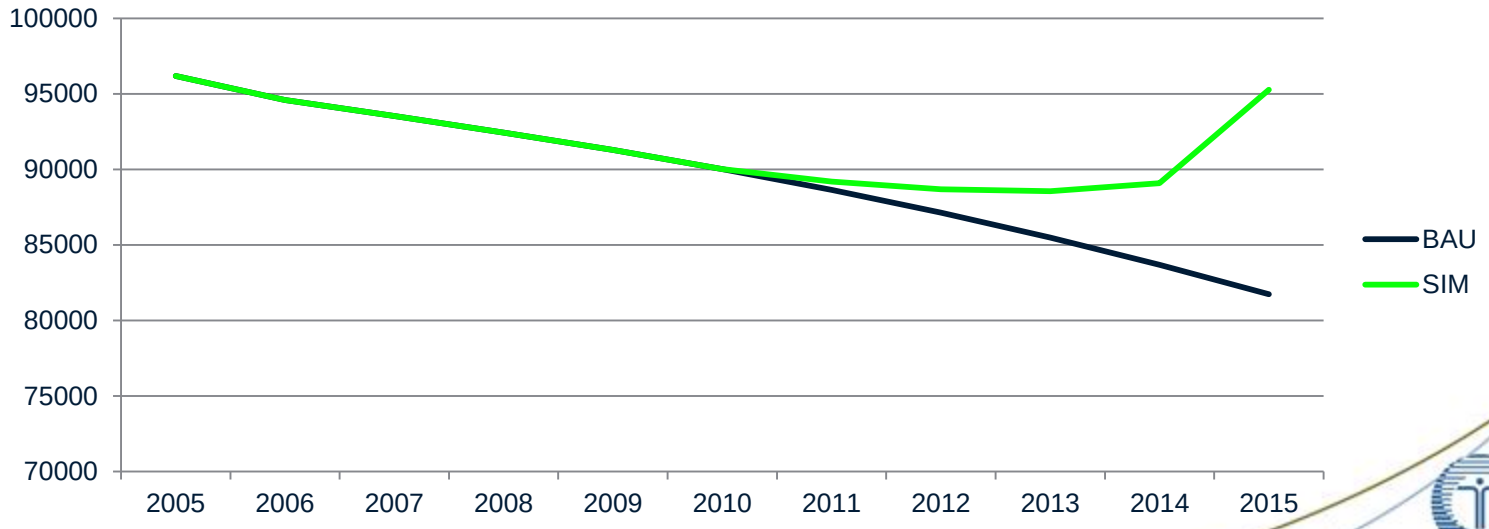
# Results simulation 2: Reaching MDG2

- Impact on government:

| | YG | YGTR | SG |
|---|---|---|---|
| 2011 | 0.03 | 0.03 | -0.86 |
| 2015 | 0.83 | 0.72 | -23.66 |

- Impact on domestic borrowing:



# Results simulation 2: Reaching MDG2

- Investment of agents:

| | firm | households | Rest of the world |
|---|---|---|---|
| 2011 | -0.2 | 0.28 | 0.11 |
| 2015 | -4.27 | 3.84 | 2.41 |

- Impact on investment:

| | IT | IT_PRI | IT_PUB |
|---|---|---|---|
| 2011 | -0.11 | -0.13 | 0.00 |
| 2015 | -2.40 | -2.86 | 0.03 |

# Simulation 4: Reaching MDG6 with indirect tax

Impact on government's health spending (in % to BAU)

| Years | CG'health' |
|---|---|
| 2011 | 2.73 |
| 2012 | 4.96 |
| 2013 | 8.31 |
| 2014 | 11.49 |
| 2015 | 14.85 |

# Simulation 4: Reaching MDG6 with indirect tax
## Results: impact on MDGs

### Evolution of MDG4

| Years | % Variation |
|---|---|
| 2011 | -0.36 |
| 2012 | -0.63 |
| 2013 | -1.02 |
| 2014 | -1.36 |
| 2015 | -1.69 |

### Evolution of MDG5

| Years | % Variation |
|---|---|
| 2011 | -0.47 |
| 2012 | -0.83 |
| 2013 | -1.35 |
| 2014 | -1.80 |
| 2015 | -2.24 |

### Evolution of MDG2

| Years | % Variation |
|---|---|
| 2011 | -0.07 |
| 2012 | -0.17 |
| 2013 | -0.32 |
| 2014 | -0.50 |
| 2015 | -0.72 |

### Evolution of MDG8

| Years | % Variation |
|---|---|
| 2011 | -0.11 |
| 2012 | -0.21 |
| 2013 | -0.35 |
| 2014 | -0.50 |
| 2015 | -0.65 |



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# Simulation 4: Reaching MDG6 with indirect tax

- Impact on households:

| | YH | YHTR | SH |
|---|---|---|---|
| 2011 | 0.01 | -0.01 | -0.01 |
| 2015 | 0.08 | -0.09 | -0.04 |

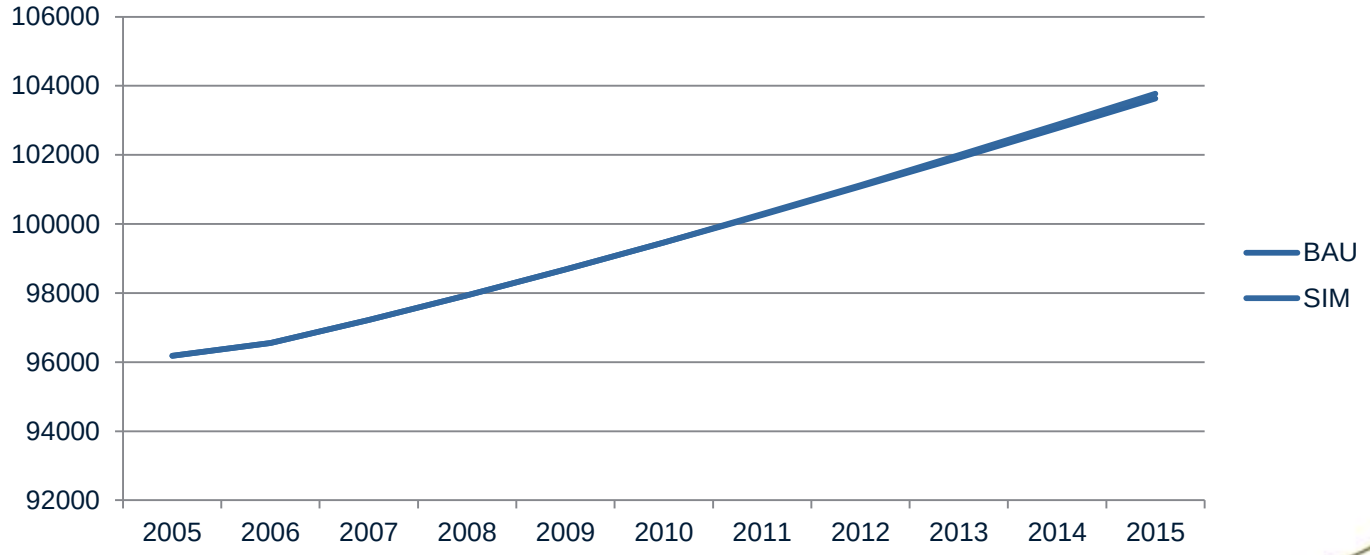
- Real consumption per capita decreases:-0.4% in 2015
- Total indirect taxes increases by 5.9% in 2015

# Simulation 4: Reaching MDG6 with indirect tax

- Impact on government:

| | YG | YGTR |
|---|---|---|
| 2011 | 0.33 | -0.01 |
| 2015 | 1.88 | -0.11 |

- Impact on domestic borrowing:



# Simulation 4: Reaching MDG6 with indirect tax

- Investment of agents: (in % compared to BAU)

| | firm | households | Rest of the world |
|---|---|---|---|
| 2011 | -0.06 | 0.08 | 0.01 |
| 2015 | -0.36 | 0.26 | 0.00 |

- Impact on investment:

| | IT | IT_PRI | IT_PUB |
|---|---|---|---|
| 2011 | -0.02 | -0.04 | 0.05 |
| 2015 | -0.18 | -0.29 | 0.34 |

# MAJOR INSIGHTS

- Results show changes in the intermediate variables, notably the importance of MDG6 (HIV) on the computation of other MDGs
  - HIV reduction seems to have a massive impact on maternal mortality and child mortality
- Costs of attaining all outstanding MDGs simultaneously by 2015 too high – implied costs too high to allow model resolution
  - Same for MDG4 and MDG5 because there is too much to do in 4 years

# Conclusion

- Government should prioritise MDG2 (universal education) and MDG6 (HIV indicators) in the interim as their attainment will have positive impacts on the other MDGs (*positive spillovers*); and
- The time frame for attaining all outstanding MDGs simultaneously should be extended beyond 2015 to make the task feasible
- Government should explore alternative ways of financing the MDGs – *Tax Vs Deficit Finance,*
  - *(maybe also private sector incentives (to be explored))*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