Using System Analysis to Forecast Labor Force Participation by Age, Sex and Educational Attainment in Egypt to 2051
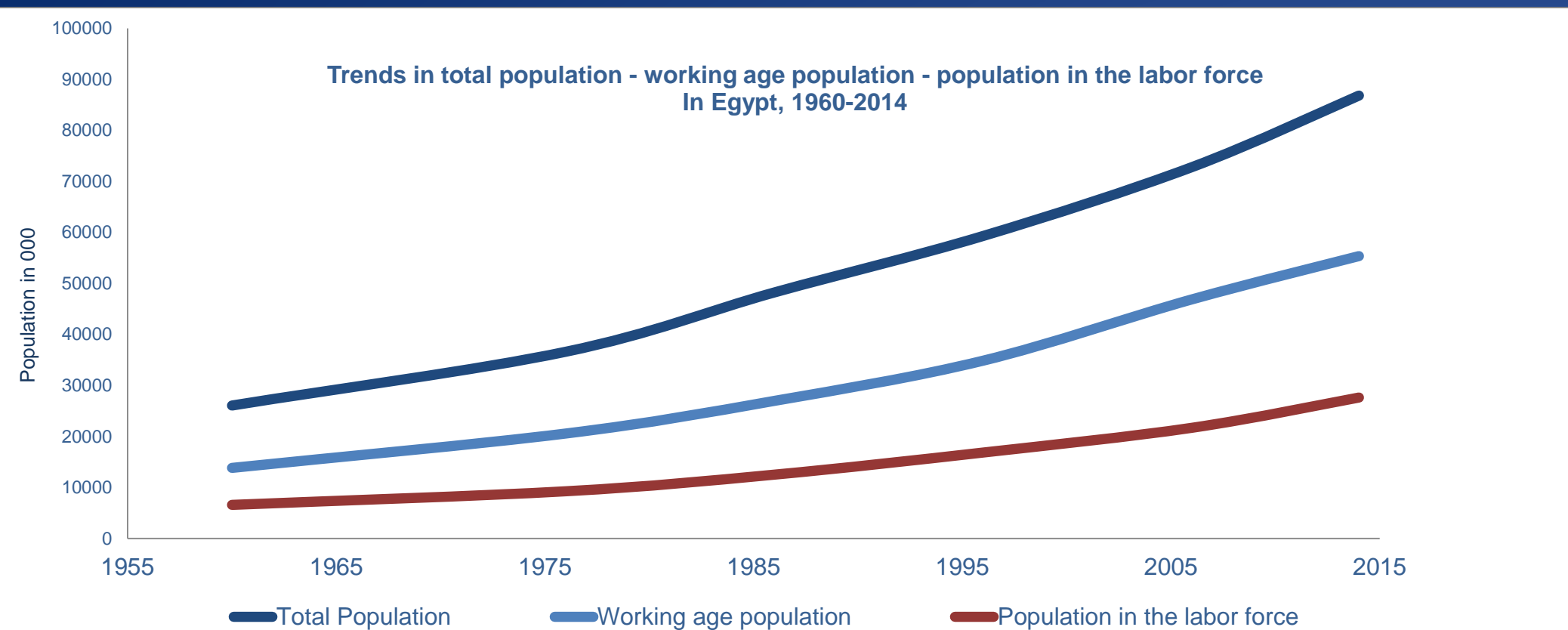
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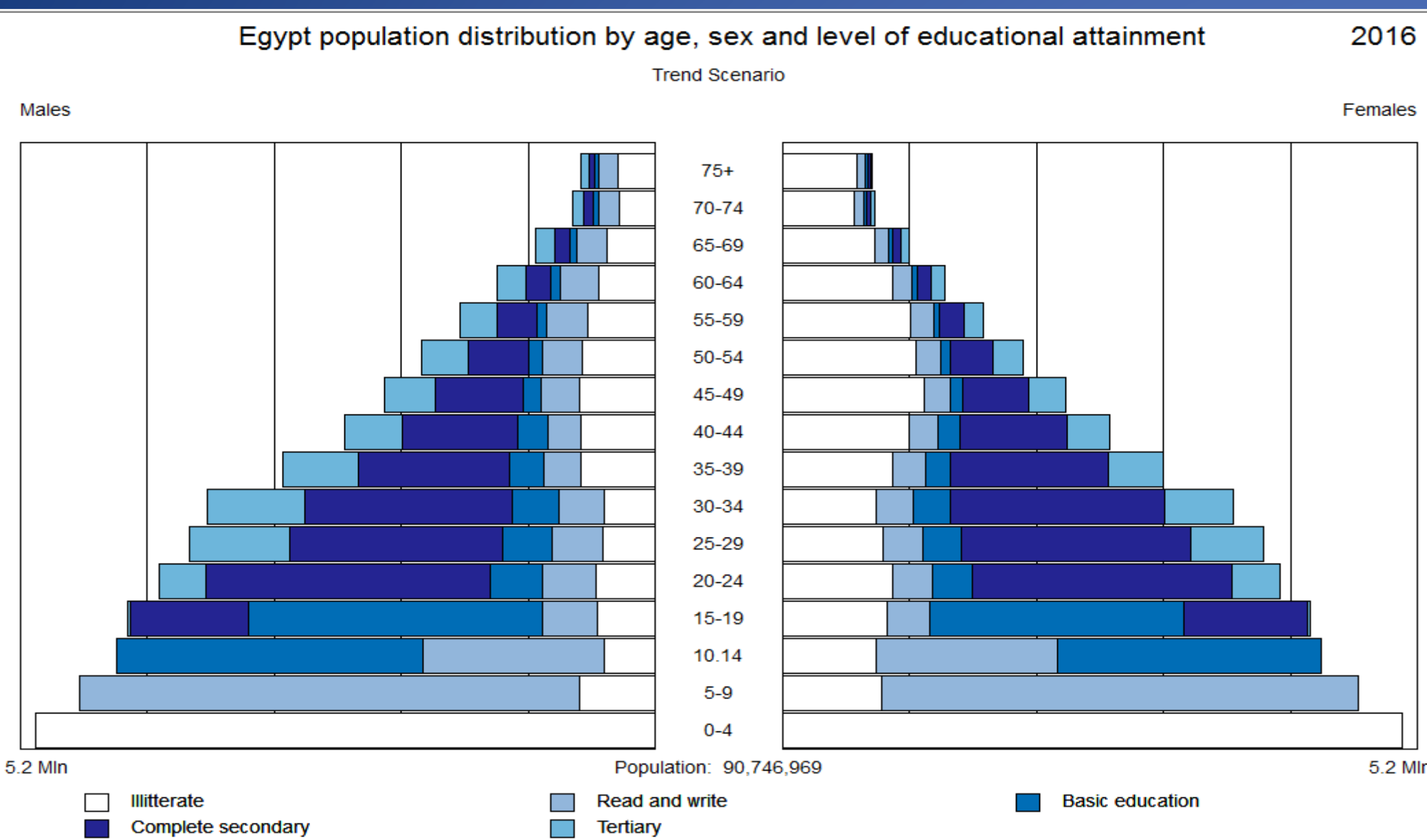IIASA & VID
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(1) Introduction

Egypt population size has rapidly increased during the past decades to about **87 million inhabitants in 2014**. Egypt will only be able to cope with its **population-development challenges** if it manages to significantly advance its economic development and slow population growth, where an emphasis on **human capital formation** (education) is likely to be a key factor. The working-age population (15-64) represents about 64% of the total population. However, only 50% of this age-group is engaged in the labor force; and more than 20% is illiterate, this percentage is even raised up among women of working age to 30%, which explains their low participation in the formal labor force: only 24%.
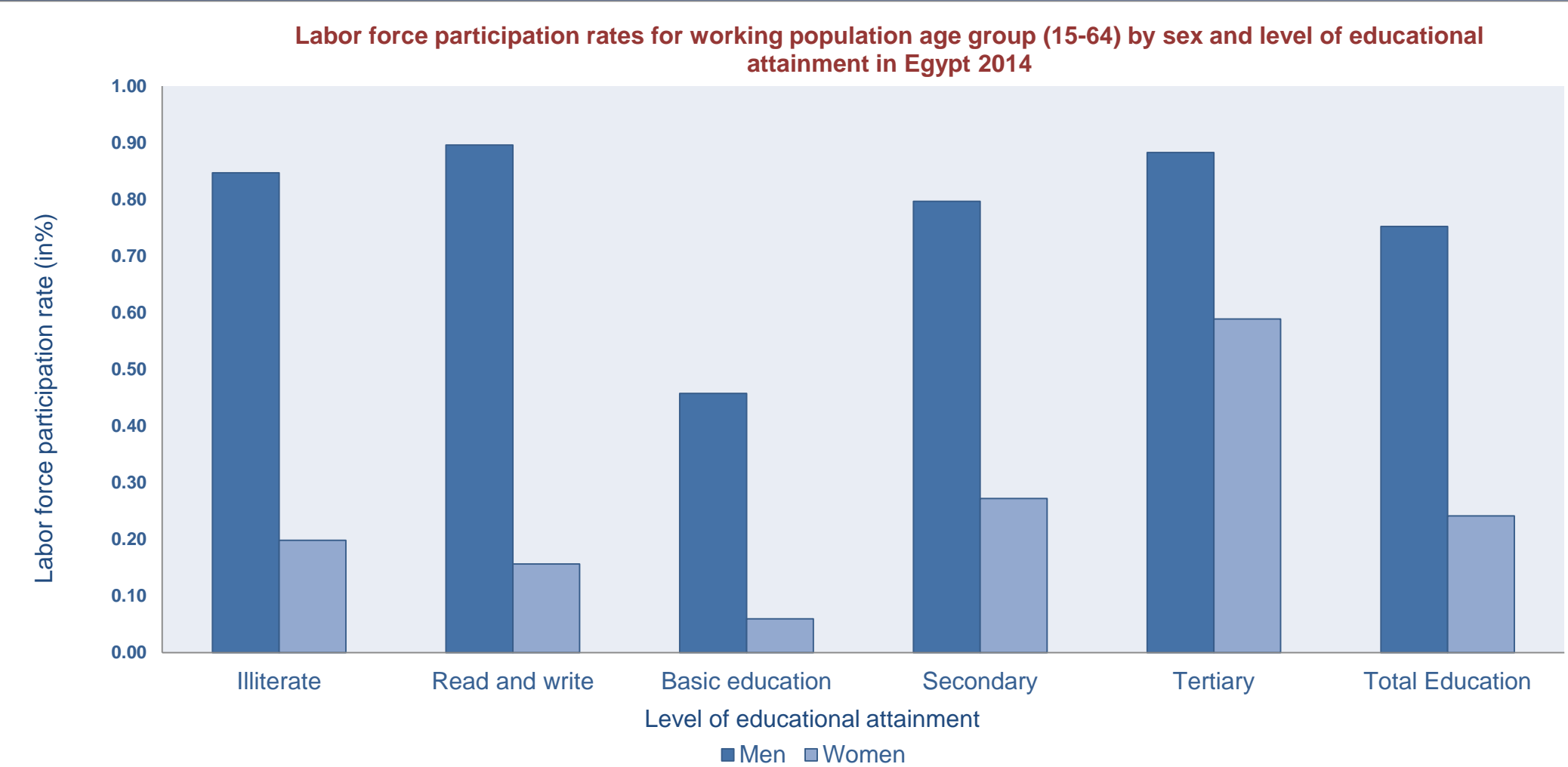
Source: Central Agency for Public Mobilization and Statistics, 2015

Trends in total population - working age population - population in the labor force In Egypt, 1960-2014

Source: Annual statistical yearbook, 2014, Central Agency for Public Mobilization and Statistics (2015) - Data for the year 2014 were estimated using data from the Labor force sample surveys, 2014 (Central Agency for Public Mobilization and Statistics, 2015)

Egypt population distribution by age, sex and level of educational attainment **2016**
Trend Scenario

Source: Goujon et al., 2007, *Population and Human Capital Growth in Egypt: projections for Governorates to 2051*

Labor force participation rates for working population age group (15-64) by sex and level of educational attainment in Egypt 2014

Source: Estimated using data from the Labor force sample surveys 2014 (Central Agency for Public Mobilization and Statistics, 2015)

(2) Data and methodology

Two main steps are required to produce labor force participation forecasts by age, sex, and level of educational attainment:

(1) **Producing population projections by age, sex, and level of educational attainment**:

We use the multi-state population projections by Goujon et al. (2007) to 2051, after validation. The multi-state model is based on the disaggregation of the population by age and sex into subgroup or states, such as educational attainment .

(2) **Producing projection of the labor force participation rates by sex, age and level of educational attainment to 2051**

Labor force participation is collected / estimated from the 2006 census and from annual series of the labor force survey (2010-2014) .

(3) Projection scenarios

The projections of the labor force participation were conducted by using 4 scenarios for the period 2006-2051, combining different sets of assumptions about **A - demographic change (fertility, mortality, and migration), and education** and **B - labor force participation**.

(1) **Trend A/ Trend B Scenario:** This scenario reproduces the trend observed in education, fertility and labor force participation rates in the last years.
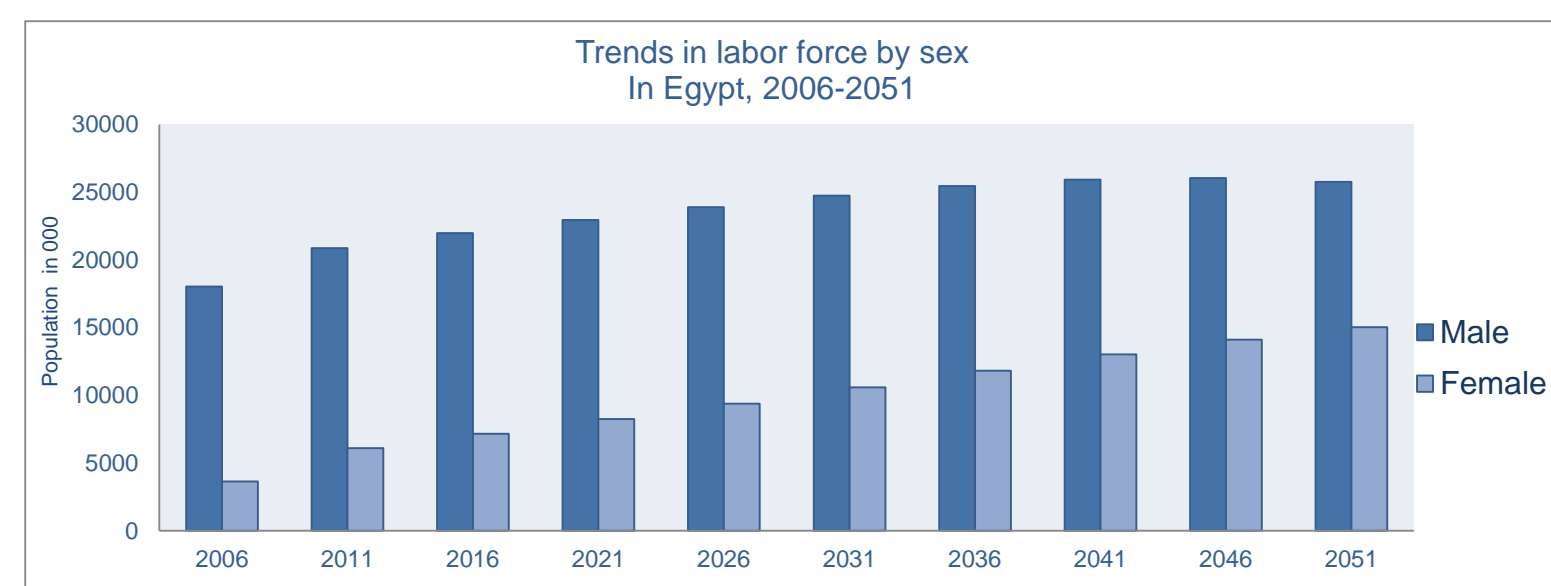
(2) **Ambitious A/ Trend B Scenario:** This scenario assumes that the total fertility rate will go down to replacement level (2.1 children) by 2017, and that the MDGs in terms of education have been achieved. It reproduces the labor force participation rates of the last years.

(3) **Trend A/ Ambitious B Scenario:** This scenario reproduces the trend observed in education and fertility in the last years. It implements *gradually* the 10th *sustainable development goal* (SDG): "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status". We assume the same labor force participation rate for men and women by 2031 for those with tertiary education, by 2036 for those with secondary, by 2041 for those with basic education, by 2046, for those who can just read and write, and by 2051, for those who are still illiterate.

(4) **Ambitious A/ Ambitious B Scenario:** This scenario assumes that the total fertility rate will go down to replacement level (2.1 children) by 2017, and that the MDGs in terms of education have been achieved. It implements *gradually* the 10th *sustainable development goal* (SDG): "By 2030, empower and promote the social, economic and political inclusion of all, irrespective of age, sex, disability, race, ethnicity, origin, religion or economic or other status". We assume the same labor force participation rate for men and women by 2031 for those with tertiary education, by 2036 for those with secondary, by 2041 for those with basic education, by 2046, for those who can just read and write, and by 2051, for those who are still illiterate.
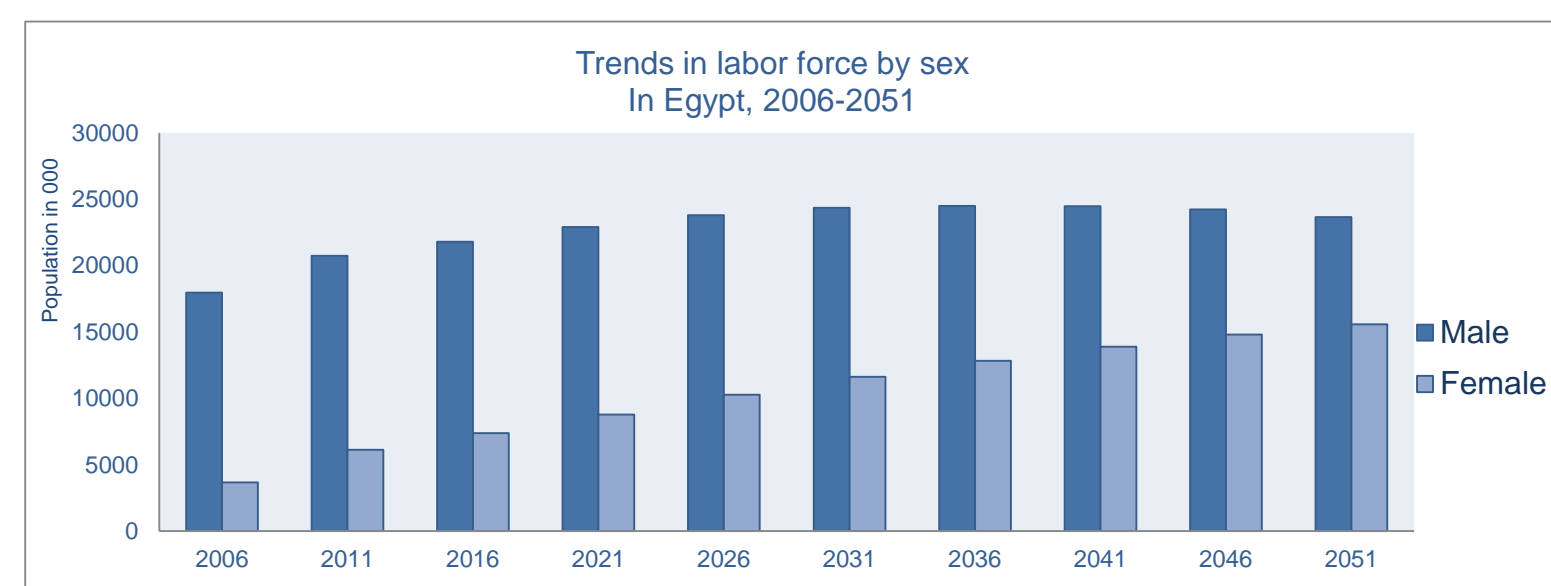
(4) Main results
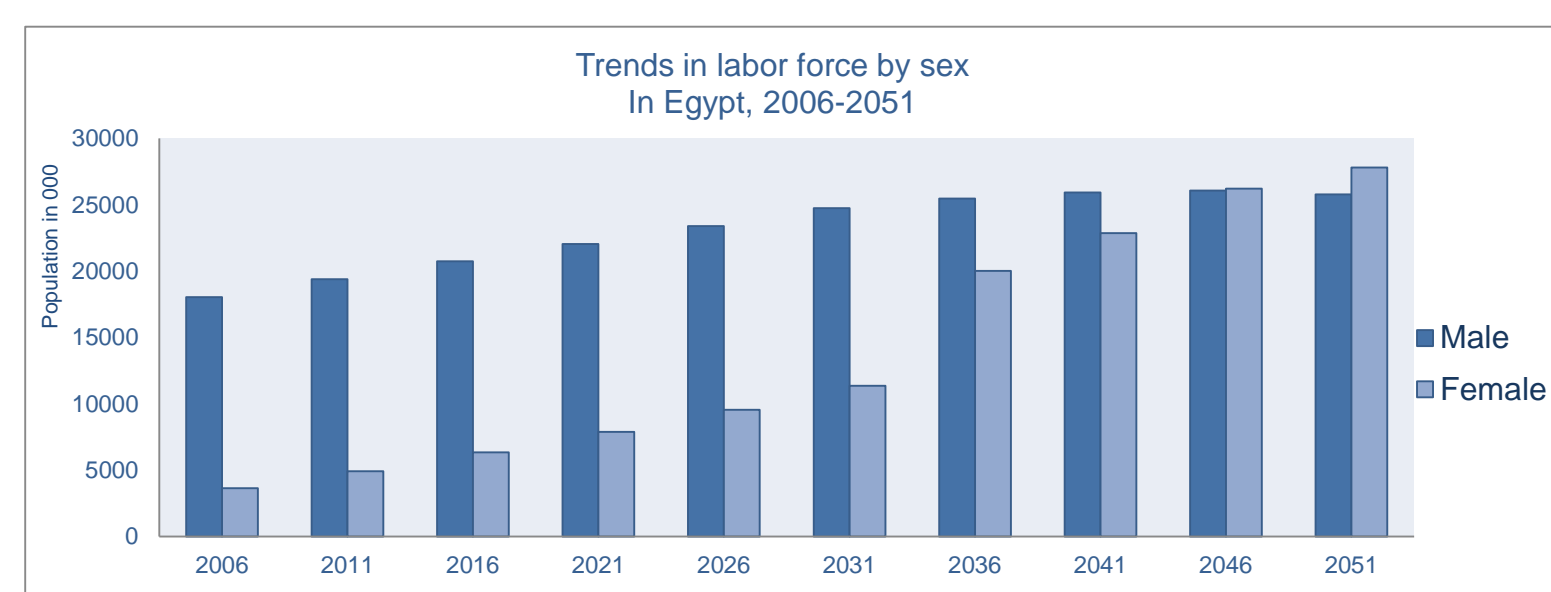
Trend A / Trend B Scenario

Trends in labor force by sex In Egypt, 2006-2051

	Population 15-64 in the labor force (in million)		Population15-64 by sex and education		Labor force participation rates by sex and education	
Education	Men	Women	Men	Women	Men	Women
Illiterate	1.1	1.2	2.4	5.0	47	23
Read &write	2.6	0.3	3.0	3.2	85	8
Basic	2.8	0.9	7.3	6.1	38	15
Secondary	15.6	9.7	20.6	23.0	76	42
Tertiary	3.7	2.9	8.1	6.6	46	45
Total	25.8	15.1	41.5	44	62	34

Ambitious A/ Trend B Scenario

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Basic	2.1	0.8	5.5	5.6	38	15
Secondary	16.1	9.3	21.3	21.8	76	42
Tertiary	5.0	5.1	10.9	11.5	46	45
Total	23.7	15.6	38.5	41	61	38

Trend A/ Ambitious B Scenario
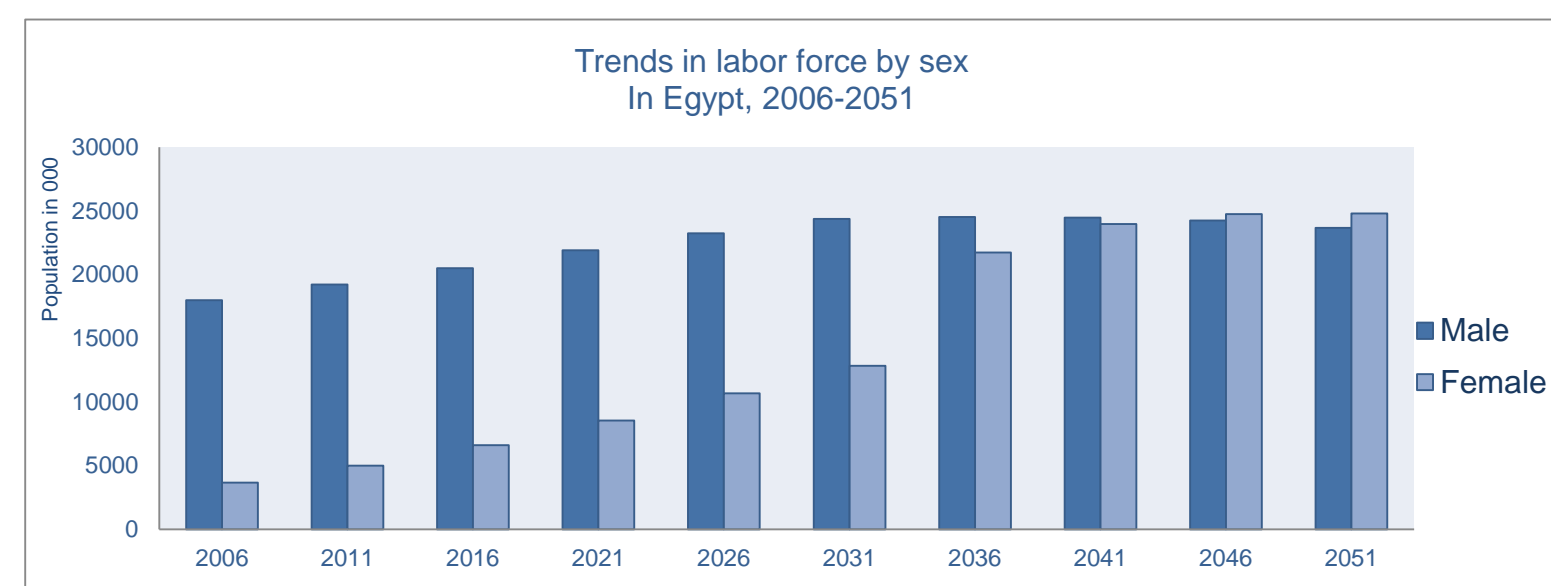
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Source: Authors' estimations

Conclusion:
The combined projection of population by levels of education and labor force participation shows the potential benefit for Egypt to invest in education to cope with the challenges of substantial population growth which is inevitable in the future. An educated labor force would also be an asset for the socio-economic development of Egypt.