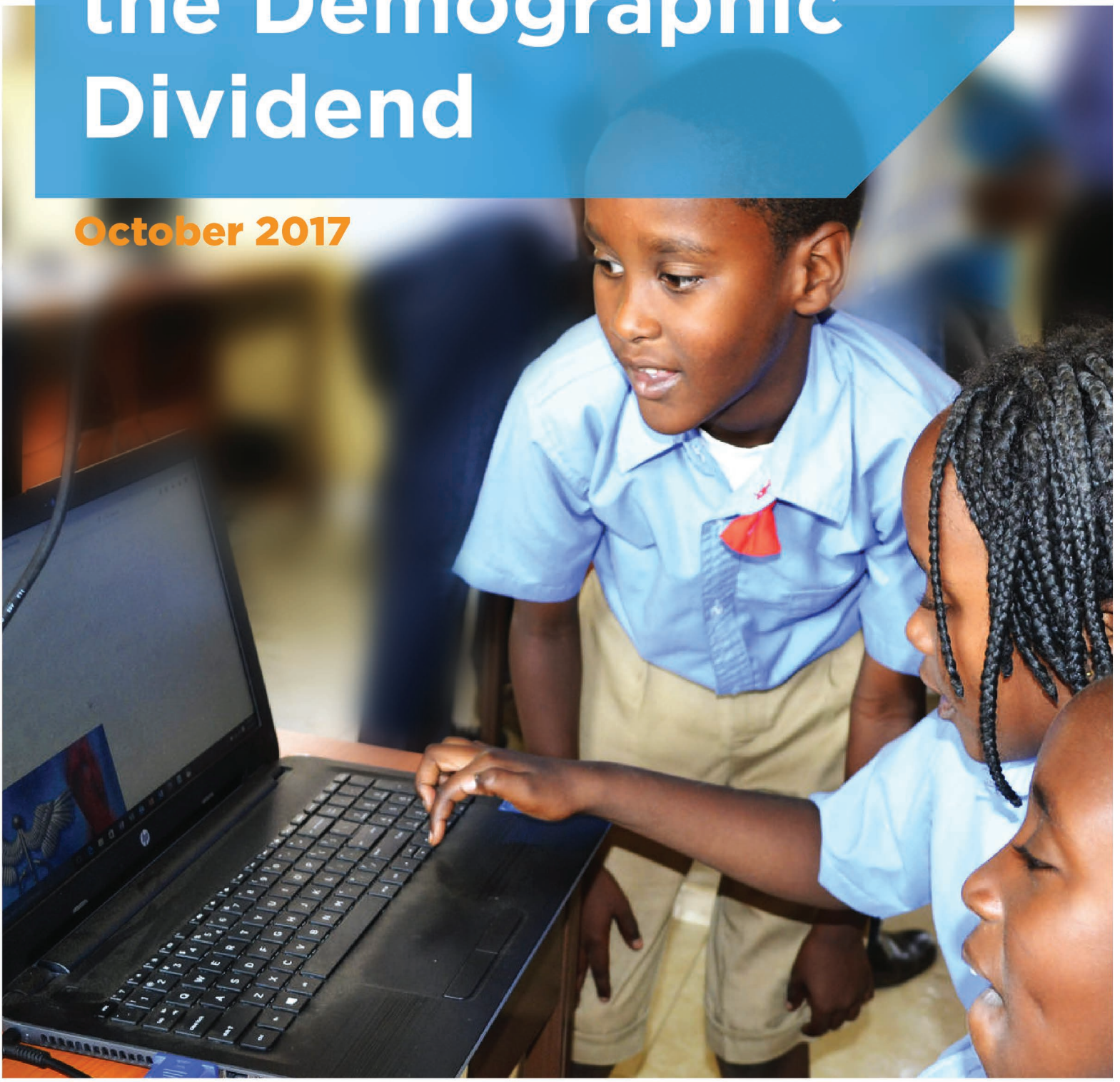
Unlocking Rwanda's Potential to Reap the Demographic Dividend

October 2017



REPUBLIKA Y'U RWANDA

UBUMWE - UMURIMO - UKUNDA IGIHUGU

UNFPA

UNLOCKING RWANDA'S POTENTIAL TO REAP THE DEMOGRAPHIC DIVIDEND

October 2017

Table of Contents

List of Figures ..... **vii**

List of Tables ..... **viii**

Acronyms ..... **ix**

Acknowledgements ..... **xi**

Foreword ..... **xii**

Executive Summary ..... **xiv**

1. INTRODUCTION **1**

1.1 Study Objectives 4

1.2 Study Methodology and Approach 4

2 DEMOGRAPHIC AND SOCIO-ECONOMIC BACKGROUND **6**

2.1 Demographic Profile 7

2.2 Education and Skills Development 11

2.3 Health Status 13

2.4 Economic Outlook and Opportunities 15

2.5 Governance and Accountability 18

3 GENDER EMPOWERMENT **21**

3.1 The Gender Dividend 22

3.2 Status of Gender Equity 23

3.3 Government Policy and Legal Framework on Gender 28

3.4 Programmes/Interventions to Promote Gender Equality 28

3.5 Role of Private Sector and Development Partners in Addressing Gender Issues 29

4 MODELLING THE POTENTIAL IMPACT OF THE DEMOGRAPHIC DIVIDEND FOR RWANDA **30**

4.1 Model Scenarios 31

4.2 Modelling Results 42

5 POLICY OPTIONS FOR HARNESSING THE DEMOGRAPHIC DIVIDEND IN RWANDA 52

5.1 Accelerating Fertility Decline 53

5.2 Creating a Healthy Workforce 54

5.3 Improving Education and Skills Development 55

5.4 Accelerating Economic Growth and Creating Quality Jobs 56

5.5 Strengthening Governance, Efficiency and Accountability 57

5.6 Promoting Gender Equity and Empowerment to Harness Maximum Dividend 58

6 CONCLUSION **59**

REFERENCES **62**

APPENDICES **68**

Appendix I: Description of DemDiv Model 68

Appendix II: Rwanda DD Modelling Workshop Participants' List 70

Appendix III: Summary of Characteristics of Policy Scenarios for Demographic Dividend Modelling for Rwanda 71

Appendix IV: Model Input Variables Used in the DemDiv Model for Rwanda 72

List of Figures

Figure 1.1: African Union Demographic Dividend Priority Investment Areas 4
Figure 2.1: Rwanda's and Malaysia's Age Structures, 1960 and 2015 10
Figure 2.2: Percentage of Males and Females Enrolled for Education in Rwanda, 2015 12
Figure 2.3: Trends in Malnutrition among Children below 5 Years, Rwanda, 1992-2015 14
Figure 2.4: Share of Gross Domestic Product by Sectors and Activities, Rwanda, 2016 16
Figure 2.5: Educational Attainment of Employed Population, Rwanda, 2014 18
Figure 2.6: Governance Indicators for Rwanda, 2012-2016 19
Figure 3.1: Income and Consumption by Age and Gender, Senegal, 2015 26
Figure 3.2: Combined Time Spent on Domestic Work and in the Labour Market by Gender, Senegal (2015) 26
Figure 4.1: Baseline and Projected Population Size by Policy Scenario 42
Figure 4.2: Baseline Population Pyramid and Key Features 43
Figure 4.3: Projected Population Pyramids for the Business-as-Usual and Economic Emphasis and Economic Emphasis Policy Scenarios 44
Figure 4.4: Population Pyramids for the Social Emphasis and Combined Policy Scenarios 44
Figure 4.5: Growth in Per Capita Gross Domestic Product (GDP) by Policy Scenario (USD) 46
Figure 4.6: Baseline Projected Gap between Jobs Created and the Working Age Population, 2015-2050 48
Figure 4.7: Growth in Projected Per Capita Capital Formation by Policy Scenario, 2015-2050 50

List of Tables

Table 2.1: Demographic Profile and Projections for Rwanda 8

Table 3.1: Rwanda's Global Ranking in Closing the Gender Gap 23

Table 4.1: Baseline and Target Indicators for Policy Scenarios 35

Table 4.2: Other Baseline Values for Model Output Indicators 40

Table 4.3: Summary of Modelling Results by Policy Scenario 51

Acronyms

AfDB	African Development Bank
AFIDEP	African Institute for Development Policy
AGOA	African Growth and Opportunities Act
AUC	African Union Commission
CPIA	Country Policy Institutional Assessments
CPR	Contraceptive Prevalence Rate
CREFAT	Le Centre de Recherche en Economie et Finance Appliquées de Thiès
DD	Demographic Dividend
DG	Director General
DHS	Demographic and Health Survey
EAC	East African Community
ECE	Early Childhood Education
EDPRS	Economic Development Poverty Reduction Strategy
EICV	Integrated Household and Living Conditions Survey
ESARO	East and Southern Africa Regional Office
ESSP	Education Sector Strategic Plan
FDI	Foreign Direct Investment
FP	Family Planning
GBV	Gender-Based Violence
GCI	Global Competitiveness Index
GDI	Gender Development Index
GDP	Gross Domestic Product
HDI	Human Development Index
HIV/AIDS	Human Immuno-Deficiency Virus /Acquired Immuno-Deficiency Syndrome
HIMO	High Intensive Labour Programme
HMIS	Health Management Information Systems
HPP	Health Policy Project
ICT	Information and Communication Technology
IIAG	Ibrahim Index of African Governance
ILO	International labour Organisation

IMF	International Monetary Fund
IMR	Infant Mortality Rate
JICA	Japan International Cooperation Agency
LCD	Life Cycle Deficit
MDGs	Millennium Development Goals
MINECOFIN	Ministry of Finance and Economic Planning, Rwanda
MMR	Maternal Mortality Ratio
MNCH	Maternal Neonatal and Child Health
NCDs	Non-Communicable Diseases
NISR	National Institute of Statistics of Rwanda
NTA	National Transfer Accounts
OECD	Organization of Economic Development
PHC	Population and Housing Census
PRB	Population Reference Bureau
RGB	Rwanda Governance Board
RGS	Rwandan Governance Scorecard
SME	Small and Medium Enterprise
SRH	Sexual and Reproductive Health
SSA	Sub-Saharan Africa
TB	Tuberculosis
TFR	Total Fertility Rate
TVET	Technical and Vocational Education and Training
U5MR	Under-Five Mortality Rate
UN	United Nations
UNDP	United Nations Development Programme
UNECA	United Nations Economic Commission for Africa
UNESCO	United Nations Educational, Scientific and Cultural Organization
UNFPA	United Nations Population Fund
UNICEF	United Nations Children's Fund
USAID	United States Aid for International Development
WEF	World Economic Forum
WFP	World Food Programme
WGI	Worldwide Governance Indicators
WHO	World Health Organization

Acknowledgements

The Rwanda Demographic Dividend study, 2017, was commissioned by the government through the Ministry of Finance and Economic Planning (MINECOFIN), under the leadership of the National Institute of Statistics of Rwanda (NISR). UNFPA ESARO and the UNFPA Rwanda Country Office provided financial and technical support for the study and commissioned the African Institute for Development Policy (AFIDEP) to provide technical leadership in conducting the study.

NISR chaired the Core Technical Team, which comprised government officials from various sectors and other stakeholders. The Core Technical Team provided technical oversight of the project and validated and approved the inception report and the final technical report. The Core Technical Team comprised of AFIDEP, who provided technical leadership of the study, UNFPA and senior representatives from MINECOFIN.

NISR convened sixteen members of the Core Technical Team to participate in a week-long, hands-on Demographic Dividend modelling workshop. The participants were drawn from MINECOFIN, Ministry of Gender and Family Promotion, Ministry of Education, Ministry of Labour, Ministry of Health, Rwanda Biomedical Centre, Rwanda Governance Board, UNFPA and UN Women. The full list of the workshop participants in provided in Appendix I.

The study used the DemDiv modelling tool developed by the Health Policy Project (HPP) at Futures Group with support from USAID to measure the potential impact of the demographic dividend on economic growth and other socioeconomic outcomes in Rwanda. The model results incorporated some feedback from consultations with senior government officials from MINECOFIN and UNFPA.

Foreword

The Demographic Dividend study on Rwanda assessed the socio-economic and human development potential of our country in the short, medium and long-term period using a comprehensive approach. It generated relevant policy and programme information to guide a well-informed policy required to propel Rwanda towards achieving its aspirations of being high middle income country by 2035 and high income country by 2050.

The primary objectives of this study were to assess Rwanda's prospects for harnessing the demographic dividend and demonstrate priority policy and programme options that the country should adopt in order to optimise its chances of earning a maximum demographic dividend in the context of its youthful population and medium, long-term socio-economic development aspirations.

The Government of Rwanda acknowledges that targeted and strategic actions are required to unlock the potential of the next generations of healthier, well-educated labour force, considering the youthful population of Rwanda aged 15-35 and children aged 0-14 accounts for 38% and 40% of our total population respectively compared to 22% of population above 35 years. We believe that investment in education is critical to ensure our young people acquire the skills and knowledge relevant to the current and future economy and job markets. Equally important is investing in health, including reproductive health, which is needed not only to trigger a demographic transition through declining fertility and mortality rates; but also to ensuree young people make a healthy transition from adolescence into adulthood.

The resulting change in age structure, characterised by a larger working population "labour force surplus" and fewer dependents, will give Rwanda an opportunity for rapid economic growth and stability; one which the Government, citizens and stakeholders are determined to seize and act upon. This will allow the country to have sustainable and inclusive socio-economic development, where no Rwandan is left behind.

Claver GATETE

Minister of Finance and Economic Planning

Executive Summary

Objectives of the Study

This report summarises results of a study carried out to assess the potential Demographic Dividend that Rwanda can earn under different policy scenarios and to determine the policy actions that the country can invest in to optimise its chances of harnessing the DD. The Demographic Dividend (DD) refers to the temporary economic benefit that a country can earn from a significant increase in the ratio of working-age adults relative to young dependents that is created by rapid decline in birth rates. The DD can be maximized if the fertility decline and change in the age structure is accompanied by sustained investments in education and skills development, health, job creation and good governance.

Economic Trends and Challenges

Rwanda's economy has grown at a steady average rate of 7.9 percent between 2001 and 2016, resulting in an increase in per capita GDP from $211 to $729. This sustained economic growth resulted in a decline in poverty headcount from 58.9 percent in 2001 to 39.1 percent in 2014. Income inequality also declined, with Gini Coefficient dropping from 0.51 in 2001 to 0.45 in 2014. During this time, the share of service sector to GDP increased from 46 to 48 percent while the share of agriculture declined from 37 to 30 percent. These economic trends are promising, however, much more efforts are needed for Rwanda to become a middle-income country, services and knowledge-based society, with a vibrant class of entrepreneurs.

The Government of Rwanda recognizes the importance of developing a quality population and minimising dependence burden as ctritical to achieving the Vision 2020. Rwanda's population is very youthful with 40.1 percent being under age 15; 20 percent between 15 and 24, and 68.7 below age 30 in 2015. The high dependency burden poses a challenge to economic growth, due to the high costs to the nation and households of essential needs for children, including education and health services. It also impedes the ability of the nation and households to save – an important factor that would increase investments and provide an impetus to accelerated economic growth.

Population Change and Challenges

Rwanda's population more than doubled from 4.8 million people in 1978 to 10.5 million in 2012 and is projected to have reached 11.3 million in 2015 and that it will reach 16.3 million by 2032. Given that Rwanda is already densely populated and dependent on Agriculture, this growth will have adverse effects on the environment, food security, and general wellbeing of the population. The rapid population growth is a consequence of high and slowly declining fertility rate amidst steadily declining death rates. The average number of births per woman decreased slowly from about 8 births in the 1980s to 5.8 in 2000 and further down to 4.2 in 2015 while under-five mortality rates declined from 196 to 50 deaths per 1000 births between 2000 and 2015. If Rwanda enhances investments to accelerate voluntary decline in birth rates of the magnitude experienced between 2005 and 2010 (when birth rates declined from 6.1 to 4.6 births per woman), the age

structure will change from the current one that is dominated by dependent children to one dominated initially by youth and then later by working age adults. This transformation in the age structure could enable accelerated economic growth through the DD, whose magnitude can be enhanced through concurrent investments in education, health, and job creation.

Opportunity for Harnessing the Demographic Dividend

The study involved a review of the country's demographic and economic opportunities and challenges; modelling the potential DD that the country can harness under different policy scenarios, and identifying key policy options to optimize the chances of earning a maximum DD. The modelling is based on four policy scenarios: 1) the Business as Usual scenario where slow progress in economic reforms and demographic transition prevails; 2) the Social Emphasis scenario where the country prioritizes social investments that reduce family size (including family planning and education) while making modest investments in the economic sector; 3) the Economic Emphasis scenario where investments are made to maximize Rwanda's global economic competitiveness, productive efficiency and governance but with limited investments in the social sectors; and 4) the Combined scenario where the country simultaneously prioritizes investments in economic reforms as well as the social sectors that enhance human capital development and lead to reduction of birth rates.

Methodology and Results

The results of the study show that Rwanda will achieve a favourable age structure change under the Social Emphasis and Combined scenarios that lead to a working-age bulge and a sizable reduction in child dependency. Under the Combined scenario, which is the best scenario recommended by the analytical team, the fertility rate will decline to 2.3 children per woman by 2050, the population will increase to 22.1 million people (2.4 million fewer than the size under the Business-as-Usual level of 24.5 million) and the proportion of children below 15 years will constitute 28 percent of the population. As a result, the dependency ratio will decline to 0.53, meaning that for every 100 working people, there will be 53 dependents. The low child dependency burden, both at household and national level, can free up resources for greater investments in education and health as well as enable greater level of savings.

According to the model results, the level of economic growth that the Government of Rwanda envisages in Vision 2020 and initial discussions towards formulation of Vision 2050 will only be achieved under the Combined scenario, which would generate a GDP per capita of US$ 4,015 by 2035 and US$ 12,555 by 2050. The GDP per capita achieved under the Economic scenario will be below target, at US$ 3,207 in 2035 and US$ 9,098 by 2050. It is worth noting that these results are derived from the assumptions made by the modelling team and should be interpreted within the illustrative parameters of the modelling tool; the country can exceed or fall short of the projected income levels based on actual investment policies implemented

by the country. The primary message of the modelling results is that in order to achieve its socioeconomic transformation aspirations, Rwanda should embrace an integrated development model that simultaneously prioritises economic reforms to accelerate growth and create ample jobs and investments in the social sectors to have an empowered, healthy, and globally competitive workforce. The demographic dividend, which is the additional GDP per capita that the country would earn by 2050 by investing in its human development, in addition to its investments in the economic sector, would amount to US $ 3,457 per capita.

Policy Options for Harnessing the Demographic Dividend

1. Accelerating Fertility Decline

A key first step for Rwanda to reduce the child dependency ratio and open the window of opportunity for harnessing the demographic dividend is to facilitate rapid voluntary fertility decline by ensuring universal access to family planning, keeping girls in school and enhancing female education, and reinforcing efforts in reducing child mortality. Between 2005 and 2010 Rwanda received global accolades for masterminding one of the most phenomenal increases in use of modern contraception from 10.3 to 45.1 percent of married women. This progress and momentum stalled and contraceptive use only increased by 2.4 percentage points to 47.5 percent between 2010 and 2014/15.

Short term policy actions

i. Build on its well documented capacity and stellar performance in increasing contraceptive use to reinvigorate the family planning programme, ensuring that its renewed 2017 FP2020 commitments are fully honoured and implemented.

ii. Address programme bottlenecks identified in the Family Planning Strategic Plan and the Mid-term Review of the Health Sector Strategic Plan, paying particular attention to scaling community based distribution of family planning services and enhancing the role of the private sector in delivering and resourcing family planning services.

iii. Given that increase in contraceptive use tends to slow down at higher levels of contraceptive use, the programme should focus on identifying and meeting the needs of the underserved populations (such as youth and those in hard-to-reach areas), improving quality of services to reduce discontinuation of use, and strengthening the capacity of the family planning programme to promote and provide long-acting and permanent methods of contraception. These methods will play a critical role in reducing fertility by enabling women who want to stop childbearing to achieve their reproductive intentions. The 2015 Demographic Health Survey (DHS) shows that currently about half of all Rwandese women of reproductive age do not want to have any more children and the wanted fertility rate is 3.1 while the actual fertility rate is 4.2.

iv. Adolescents and youth represent a critical underserved population that needs attention to ensure that Rwanda steps up its momentum in reducing birth rates. All stakeholders should support efforts to fully implement the comprehensive sexuality education programme in schools and enhance access to youth friendly reproductive health services by training facility and community based service providers to better serve young people.

v. All reproductive health policies should also be harmonised, with particular attention to reviewing Article 7, Chapter II (Rights in terms of human reproductive health) of the 2016 Reproductive Health Law, which states that "subject to provisions of other laws, every person having attained the majority age has the right to decide for oneself in relation to human reproductive health issues". The article could be used to restrict access of reproductive health services to adolescents below age 18.

Medium to Long term policy actions

vi. Reinforce interventions to reduce child mortality, focusing on improving maternity and delivery care and strengthening management of post-partum health complications to accelerate reduction of the slowly declining neonatal mortality rates.

vii. Strengthen multi-sectoral collaboration in implementing the integrated nutrition policy and the child nutritional programme to improve child health and leaning outcomes.

viii. Address the structural factors that promote dropout from school among girls and scale up mass education campaigns for the empowerment of women to reduce teenage fertility and early marriage and entrench the small family norm to reduce fertility rate to below the current desired fertility of three children.

2. Creating a Healthy Workforce

In order to reduce the double burden of ill health from both communicable and non-communicable diseases that Rwanda's labour force endures, efforts should focus on strengthening the functionality of the health system, including addressing the health workforce shortage, improving health infrastructure and ensuring sustainable financing.

Short term policy actions

i. Conduct regular recruitment and training of community health workers to replace those leaving the programme, ensuring improved livelihood opportunities and other incentives for the workers.

ii. Enhance health education to sensitise Rwandan people on prevention of emerging non-communicable diseases and strengthen the capacity of the health care system to manage these diseases, as articulated in the NCD policy.

Medium and long term policy actions

iii. Fully implement the health human resource policy and operationalize the comprehensive human resource information system to ensure adequate numbers of personnel are recruited, trained, equitably deployed and incentivised.

iv. Operationalize the health financing strategy to ensure sustainable funding of the health sector, with particular attention to improving management and coverage of the Community-Based Health Insurance scheme, performance-based financing, and public-private partnerships in health care delivery and financing.

3. Creating an Educated and Skilled Workforce

In order to develop a highly skilled and globally competitive labour force, immediate actions should focus on addressing the implementation hurdles of the recently rolled out competency based curriculum for basic education, extending the universal education principle to early childhood education, upper secondary school, and technical training (TVET) while increasing access to tertiary levels of education. Gender inequities should be addressed at all levels of the education pipeline.

Short-term policy actions

i. Ensure all in-service teachers are trained in learner-centred pedagogies to facilitate effective implementation of the new competency based curriculum for general and TVET secondary schools that was rolled out in 2016. Teacher training institutions should urgently align their training with the needs of the new curriculum.

ii. Address the resource constraints characterised by lack of teaching materials and infrastructure for delivering the competency-based curriculum.

iii. Enhance governance and performance monitoring measures including the strengthening the school inspection units. Explore use of ICT to improve evidence-informed decision making through enhanced data gathering (of enrolment, assessments and performance) and use.

iv. Strengthen the school feeding programme that has increased enrolment and retainment of children from poor families.

Medium to long-term policy actions

v. Improve infrastructure and learning resources to ensure universal enrolment in early childhood education, which provides vital foundation for effective learning at later stages of the education pipeline.

vi. Build more secondary schools and provide related learning resources to increase progression from primary to secondary school, addressing education quality and affordability challenges that lead to high repetition and dropout rates, especially in rural areas.

vii. Make massive investment in TVET including constructing more TVET centres and rebranding the programme to be market-oriented, lucrative and attractive to young people and the society at large.

viii. Improve access to and quality of tertiary education institutions, paying particular attention to development of advanced practical skills surrounding innovation, science and technology, and leadership as a backbone for building a globally competitive labour force.

ix. Ensure regular engagement with the private sector in development and implementation of education curriculum to address the skill mismatch between education training and market needs. Continuous assessment of current and future labour market needs should inform curriculum reforms.

4. Accelerating Economic Growth and Creating Quality Jobs

Accelerating inclusive economic growth that creates enough decent jobs for the growing youthful working age population is central to optimising Rwanda's chances of harnessing the demographic dividend and achieving its long-term development aspirations. Although the economy has grown steadily over the past two decades or so, more needs to be done in the short term to reinforce fiscal discipline and create a conducive and attractive business environment, which will be key to enhance productivity of businesses and purchasing power of the population. In the medium to long term efforts should focus on diversifying the economic base, expanding and strengthening the effectiveness of the private sector, improving the economic infrastructure (including energy, transport and communication), and addressing the shortage of high-level skills. These economic reforms will enhance economic productivity and attract foreign direct investment that is needed to propel sustainable growth in the long term.

Short term policy actions

i. Fully operationalise the Labour Market Information System to link the various stakeholders involved in skill development and job creation including the education sector, job market and job seekers.

ii. Promote workplace readiness programmes including internship, mentorship and on-job training.

iii. Invest in production, value addition and agro-processing to create quality jobs through sectoral linkages as articulated in the Crop Intensification Programme. Enhance agricultural production and profitability by promoting irrigation, increased use of fertilizers, mechanisation of agricultural practices, and securing of access to high-value markets for smallholder farmers.

iv. Provide opportunities for greater involvement of youth in entrepreneurship and job creation, including optimisation of the empowering role of information technology.

Medium to long term policy options for accelerating economic growth and job creation include:

v. Address the infrastructure limitations that hamper economic productivity and growth of the private sector including investing in consistent and sustainable energy generation and distribution, building roads and railways to link production zones to markets, and investments in technology to improve productivity.

vi. Promote small and medium sized enterprises by facilitating establishment of cooperative societies; more access to capital; training and capacity building and exploration of lucrative markets. This should build on various initiatives in this area including Rwanda Development Board's Business Development Advisors programme seeking to develop bankable micro business projects and financial support to SMEs.

vii. Diversify the economy by reducing overdependence on the agricultural sector and enhancing value-addition and manufacturing to take advantage of international bilateral trade opportunities, and the recently launched "Made in Rwanda" initiative.

5. Strengthening Governance, Efficiency and Accountability

Governance and accountability is a key cross cutting pillar that is central to the success of the other pillars of the DD. Good governance and entrenching the culture of accountability in all spheres of development is vital in bridging the policy to implementation gap, ensuring value for money in service delivery, and providing a conducive business environment to attract direct foreign investment, which is critical to expand the private sector and overall capacity of the economy to create ample quality jobs for the youthful labour force.

Short and long term actions

i. Reinforcing performance based accountability mechanisms in government to ensure effective implementation of government policies and programmes. This should include strengthening the National Monitoring and Evaluation Framework and ensuring that there is a robust integrated performance management system that will serve as a tool for enforcing performance accountability in an integrated manner. The performance based accountability principles should be extended to non-public sector.

ii. Entrench ownership of the country's development vision and shared responsibility in achieving the development aspirations in all layers of government, the private sector, other non-government entities, and the citizenly.

iii. Reinforce the central place of sustainable peace, national cohesion, and accountability in use of public resources and in service delivery in national building, which are critical for attracting long term foreign direct investment.

6. Promoting Gender Equity and Empowerment of Women

Gender equity and general empowerment of women in education, employment opportunities, leadership and other spheres of life are central to harnessing the DD and achievement of Rwanda's long-term development aspirations. Building on the progress the country has made in reducing gender inequities, future efforts should focus on increasing enrolment of women in tertiary education, enhancing employment of women in non-agriculture sector, and enhancing access to financial credit.

Short and long term actions include:

i. Eradicate all gender gaps in education especially at secondary and tertiary levels of education as well as in TVET institution.

ii. Scale up efforts to enhance economic empowerment of the most vulnerable poor women. Focus should be on addressing gender related bottlenecks in skill development, economic resources, and the labour market that subject women to the informal sector with the aim of steadily shifting women to the formal sector and labour market.

iii. Improve reproductive health services to reduce the disproportionate burden of reproductive morbidities and mortality (including HIV/AIDS, maternal health, and cancer) that women endure due to lack of services and imbalanced gender relations that are rooted in cultural values that place women in disadvantaged positions compared to men.

iv. Improve access to production assets to women, particularly credit facilities, farm equipment, and business ownership

v. Strengthen campaigns/programmes against gender based violence, especially in ensuring women understand and fight for their rights and the legal and security systems enforce existing laws aimed at protecting women.

1 Introduction

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Rwanda is classified as a low-income country with per capita gross domestic product (GDP) of USD 735 in 2015. The country's economy has grown at a steady average rate of 8.0 percent between 2001 and 2015. In 2016, GDP per capita was slightly lower at $729, growing at 5.9 percent (National Institute of Statistics of Rwanda, 2017). This sustained positive growth has resulted in a sizable decline in the poverty headcount from 58.9 percent in 2001 to 39.1 percent in 2014. These economic trends are promising, however, much more efforts are needed for Rwanda to become a middle-income country, services and knowledge-based society, with a vibrant class of entrepreneurs.

The Government of Rwanda recognizes the importance of developing a quality population and minimising dependence burden as ctritical to achieving the Vision 2020 (Ministry of Finance and Economic Planning, 2013). Rwanda's population more than doubled from 4.8 million people in 1978 to 10.5 million in 2012 and it is projected to have increased to 11.3 million in 2015 and to reach 16.3 million by 2032 (National Institute of Statistics of Rwanda & Ministry of Finance and Economic Planning, 2012b; 2012a). This rapid population growth is a consequence of a long period of high and slowly declining fertility rate amidst steadily declining death rates. Under-five mortality rates in Rwanda impressively declined from 196 per 1000 births in 2000 to 152 in 2005 and 50 in 2015. However, the average number of births per woman increased slightly from 5.8 in 2000 to 6.1 in 2005 and then decreased appreciably to 4.2 in 2015 (National Institute of Statistics of Rwanda, Ministry of Health, & ICF International, 2015). The sizable decline in fertility rate between 2005 and 2015 was mainly driven by an increase in the percentage of women using modern contraception from 10.3 percent to 47.5 percent over the same period.

One of the consequences of the high fertility rate amidst rapidly declining mortality is that Rwanda's population is heavily youthful, with 40.1 percent being under age 15; 20 percent between 15 and 24, and 68.7 below age 30. This translates to a total dependency burden of 76 per 100 people of working age in 2015. The high child dependency burden has important ramifications for economic productivity. Parents with many children tend to struggle to provide for the health, education and other needs of their children, which undermines the quality of human capital in the next generation of the workforce. High fertility rate is also associated with low levels of female education and limited participation of women in the formal labour market. Governments in high fertility countries also struggle in providing quality education and health services for children and have limited resources available for investing in development infrastructure and other enablers of economic growth.[1]

If Rwanda's birth rate continues to decline rapidly, the age structure will change from the current one that is dominated by dependent children to one dominated initially by youth and then later by working age adults. This transformation in the age structure of the population can accelerate economic growth through a mechanism called the demographic dividend (DD) (Bloom, Canning, & Sevilla, 2003). The logic is that as fertility rate and child dependency burden decline and the population has a working age-bulge, the economy will enhance its overall productivity. Additionally,

[1]Similarly, having relatively more non-productive elderly people compared to workers can also have a negative impact on economic growth and development. However, this effect may not be as debilitating if most of the elderly people had good jobs and accumulated savings during their productive ages.

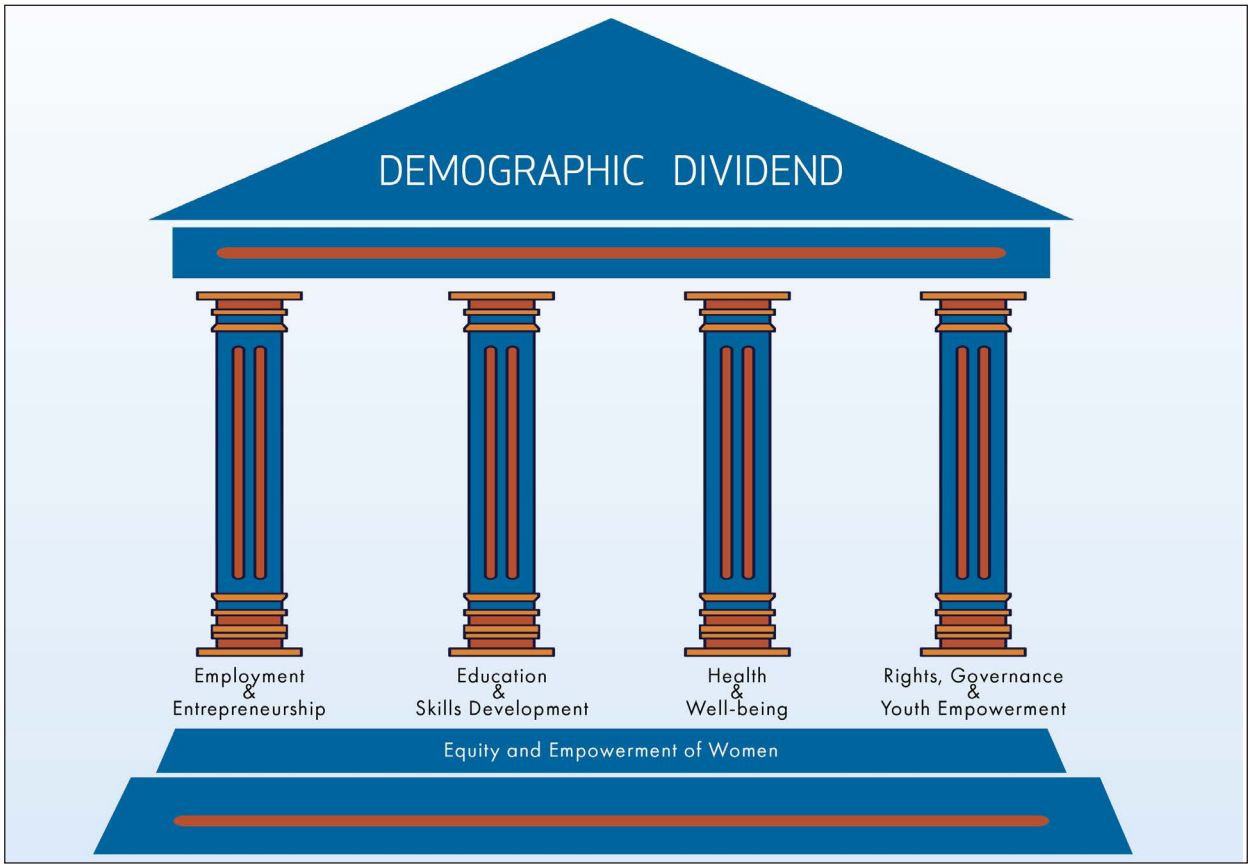
households and nations have more resources per child to invest in their education and health, thus enhancing the overall human capital (Canning, Raja, & Yazbeck, 2015). Households will also save more, increasing resources for capital accumulation and economic security at old ages. The reduction in fertility rate also facilitates higher levels of female education and participation of women in the formal labour market. The DD can last between 20 to 50 years and its magnitude is dependent on intensity of investments in human capital to increase productivity, creation of mass quality jobs for the working-age bulge, and an environment that encourages investments and savings (Lee, Mason, & Miller, 2003). Indeed, the DD is not automatic or guaranteed; investments that facilitate rapid decline in fertility rate will open the window of opportunity for harnessing an initial dividend, which can be enhanced through sustained reforms and investments to ensure that the working–age population is well educated, skilled, healthy and gainfully employed. It is estimated that between a quarter and a third of the unprecedented economic growth that East Asian countries such as South Korea, Singapore, Taiwan and Malaysia experienced between 1970 and 2000 could be attributed to the DD (Bloom & Williamson, 1998; Mason, 2001).

The African Union designated "harnessing the demographic dividend through investments in youth" as the theme for its summit in 2017. This was done to highlight the importance of the DD framework and its potential contribution towards the realization of the socioeconomic transformation goals articulated in the African Union's Agenda 2063 and various national development visions. The African Union's roadmap for harnessing the DD (African Union Commission, 2017) calls on African countries to domesticate the DD agenda and maximize their chances of harnessing the DD by prioritizing investments in the following four pillars:

1) Employment and Entrepreneurship
2) Education and Skills Development
3) Health and Wellbeing (including family planning)
4) Rights, Governance and Youth Empowerment

These pillars (depicted in Figure 1.1) are interrelated and each is integral to the success of the rest. As an adaptation to the African Union roadmap pillars, the chart in Figure 1 includes Equity and Empowerment of Women, presented as a horizontal bar to symbolize the cross-cutting importance of addressing gender inequities for harnessing the DD.

Figure 1.1: African Union Demographic Dividend Priority Investment Areas



Source: AFIDEP 2017 Development Perspectives.

1.1 Study Objectives

The primary objective of this study is to assess Rwanda's prospects for harnessing the DD and to identify priority policy and programme actions that the country can adopt to optimize its DD in light of its long-term, development aspirations. The specific objectives are:

1. To review Rwanda's demographic and economic opportunities and challenges, and assess their implications for the attainment of the country's development aspirations;
2. To assess the prospects of harnessing the DD in Rwanda using the DemDiv Model; and
3. Identify policy options for optimising the DD that Rwanda can earn.

1.2 Study Methodology and Approach

The study employed a combination of methodologies including desk reviews to collate and interpret secondary data and indicators; further analysis of existing data to fill particular evidence gaps; policy scenario modelling to demonstrate potential DD that the country can harness under different policy scenarios; and assessment of policy responses that Rwanda can adopt to optimize its chances of harnessing the DD.

Review of Literature and Policy Documents

The study involved a review of literature to identify policies and strategies that have helped other countries to harness the DD. It also involved review of national development plans and strategies to understand the development goals and targets, bottlenecks, tried and recommended solutions for addressing the challenges and how these link to the DD.

Collation and Analysis of Secondary Data and Indicators

Secondary data and indicators were collated and further analyses of existing data carried out to establish past trends and the current status of various development indicators. These data, along with the analysis of the policy framework, were used to set target indicators for the modelling exercise described below. National data sets were used, supplemented with international data sets where national data were not available. The national data were mainly derived from Population and Housing Censuses (PHCs), Demographic and Health Surveys (DHS), integrated household living conditions surveys, economic reports and national accounts reports.

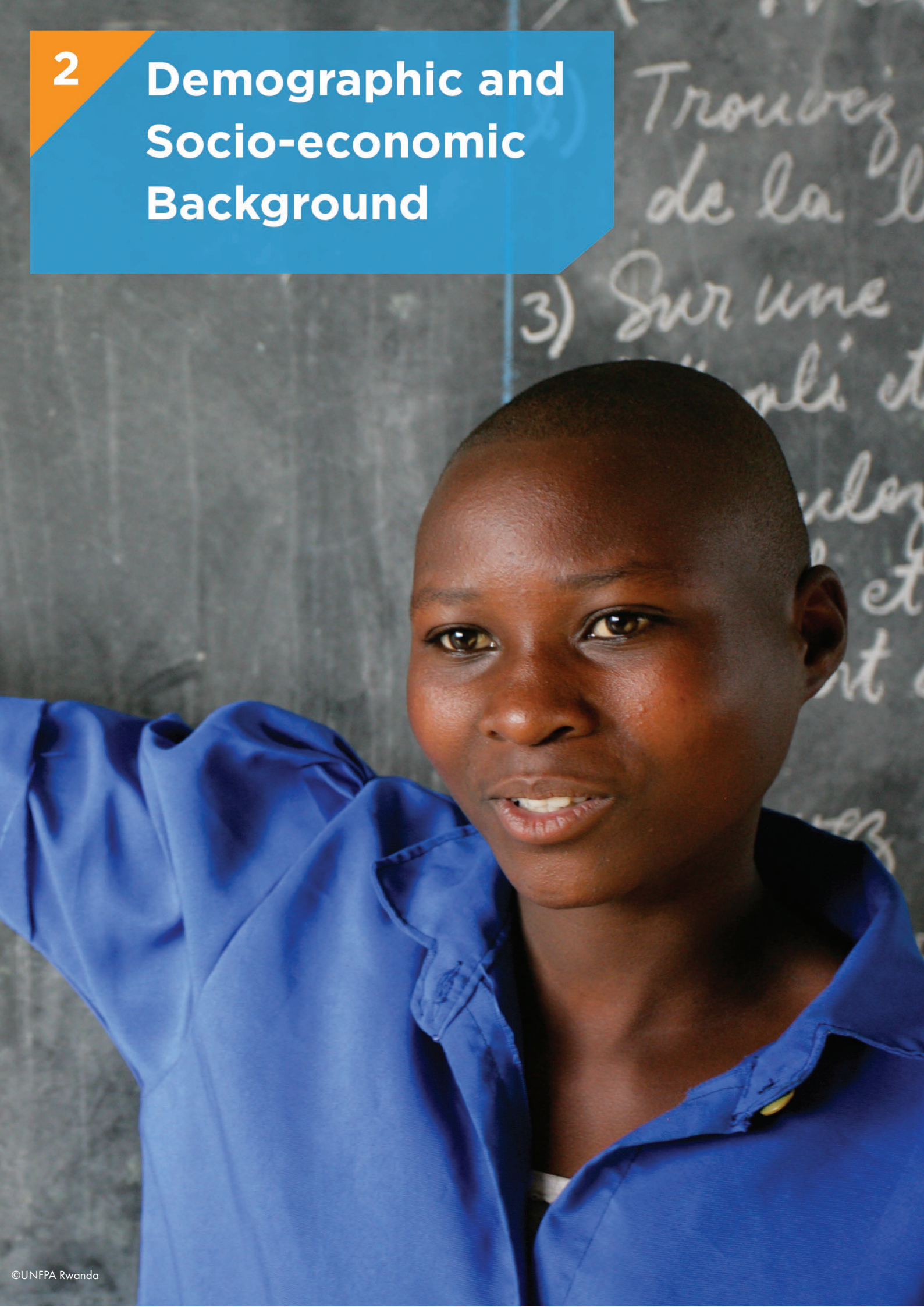
Modelling the Potential Demographic Dividend

The DemDiv modelling tool created by the Health Policy Project (HPP) at Futures Group with support from USAID (Moreland *et al.*, 2014) was used to demonstrate the potential DD that the country can harness under different policy scenarios. DemDiv is structured as a two-part model that integrates and projects demographic and economic changes to estimate employment, investment and total factor productivity, which feed into the estimation of GDP and GDP per capita. The model is scenario-and projection-based, comparing the impact of different policy scenarios on future development trajectories. It allows the design of multiple scenarios showing how the combined power of policy investments in family planning, health, education and the economy can generate a DD. A detailed description of the model, including its limitations is given in Appendix I.

Stakeholder Workshops

The Ministry of Finance and Economic Planning (MINECOFIN), through the National Institute of Statistics of Rwanda (NISR), convened the Core Technical Team comprising over 20 government officials from various sectors and other stakeholders. Sixteen of the members of the Core Technical Team participated in a week-long, hands-on DD modelling workshop held in March 2017, where they were trained on how to set up and run the DemDiv modelling tool (list of participants in the workshop is provided in Appendix II). The participants agreed on the modelling period, policy scenarios used in the model, reviewed the trends data and policy framework and agreed on the baseline and target indicators used in various policy scenarios. After running the model, the participants deliberated and agreed on policy options that the country can explore to harness the DD. The final results presented in this report also benefited from feedback from various senior government officials, including a results validation workshop where representatives from key government ministries and agencies provided feedback.

2 Demographic and Socio-economic Background



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2.1 Demographic Profile

Rwanda's demographic profile is characterised by rapid population growth, youthful age structure, and rapidly growing urban population. The population's high population growth rate and high child dependency burden have been created by a long period of high and slowly declining fertility amidst rapidly declining child mortality rates. Urbanization is driven by people born in urban areas, migration from rural to urban areas, and physical expansion of urban geographical areas.

Under-five mortality rates in Rwanda impressively declined from 196 per 1000 births in 2000 to 152 in 2005 and 50 in 2015. The average number of births per woman increased slightly from 5.8 in 2000 to 6.1 in 2005 and then decreased appreciably to 4.2 in 2015 (National Institute of Statistics of Rwanda, Ministry of Health, & ICF International, 2015). The sizable decline in fertility rate between 2005 and 2015 was mainly driven by an increase in the percentage of women using modern contraception from 10.3 percent to 47.5 percent over the same period. Fertility rates vary sub-nationally with 2015 data showing that women living in urban areas have an average of 3.6 children while those living in rural areas have an average of 4.3 children and those living in the East and West provinces have 4.6 children. Women with at least secondary education have 3 children while their counterparts with no formal education have 5.1 children. Similar differences are noted across household wealth categories.

Rwanda's population has more than doubled from 4.8 million to 10.5 million people between 1978 and 2012 (National Institute of Statistics of Rwanda, *et al.*, 2012b). As Table 2.1 shows, the population is further projected to increase to 15.7 million in 2030, and to 26.8 million in 2070. The rapidly growing population and consequent high population density (415 inhabitants per square kilometre in 2012), will continually pose huge economic and environmental constraints.

Table 2.1: Demographic Profile and Projections for Rwanda

Population by broad age- ('000)	1980	2015	2030	2050	2070
0-14	2,469	4,517	5,338	5,471	4,864
15-34	1,702	4,087	5,549	6,863	7,023
35-64	850	2,302	4,131	7,212	9,413
65+	107	356	695	1,642	3,416
Total	7,108	11,263	15,713	23,238	26,786
Proportion of children and young people					
0-14	48.0	40.1	34.0	25.8	19.7
10-24 years	29.4	32.5	29.9	23.9	19.3
Dependency ratio	101.5	0.76	0.66	50.5	50.4
Fertility and Mortality Rates					
Total Fertility Rate	8.43	4.2	3.0	2.21	1.81
Under-Five Mortality Rate	217	50	40	25	18

Source: National Institute for Statistics Rwanda, 2012 PHC Population Projections; United Nations, Department of Economic and Social Affairs, Population Division, 2017.

The country's agriculture sector is particularly vulnerable due to degradation of agricultural land and fragmentation of farm sizes, which are currently at less than 0.2 hectare per rural dweller (National Institute of Statistics of Rwanda & Ministry of Finance and Economic Planning, 2012b).

Rwanda's population is very young, with a median age of 19 years and about 41 percent of the population being below 15 years in 2012. This presents a high total dependency burden for the country whereby 100 persons in the working ages of 15 to 64 years are supporting 80 dependents (children below 15 years and elderly persons aged 65 years and above (National Institute of Statistics of Rwanda *et al.*, 2012b). The high dependency burden poses a challenge to economic growth due to the high costs to the government and households to provide essential needs for children including education and health services. It also impedes the ability of the nation and households to save – an important factor that enables investments and capital accumulation and provide an impetus to socio-economic growth.

Rwanda's population is mainly rural, with only about 17 percent living in urban areas in 2012 (National Institute of Statistics of Rwanda & Ministry of Finance and Economic Planning, 2012b). However, with a high annual urbanisation rate of 5.9 percent (exceeds the averages of 4.2 percent and 2.1 percent for SSA and the world, respectively), the urban population is projected to grow to 30 percent in 2032, driven by rural-urban migration of young people in search of better social and economic opportunities, natural increase of the urban population through births, and geographical expansion of the urban areas through reclassification (National Institute of Statistics of Rwanda & Ministry of Finance and Economic Planning, 2012a). Historically, urbanization has offered important opportunities for economic and social development, acting as engines of economic growth. In Rwanda however, cities and other urban centres are struggling to provide an enabling environment for innovation, rapid economic growth and job creation, and many urban residents lack basic social services, including affordable housing. The 2016 UN Habitat report shows that more than half of Rwanda's urban population (53 percent) live in slum conditions, with poor access to water and sanitation. On the positive side, the country has almost halved the proportion of urban population living in slums, from 96 percent in 1990 to 53 percent in 2014 (UN-HABITAT, 2016). The government seeks to continue addressing its urbanization challenges and optimise linkages between rural and urban economies through the Urbanisation and Rural Settlement Strategy (2013-18).

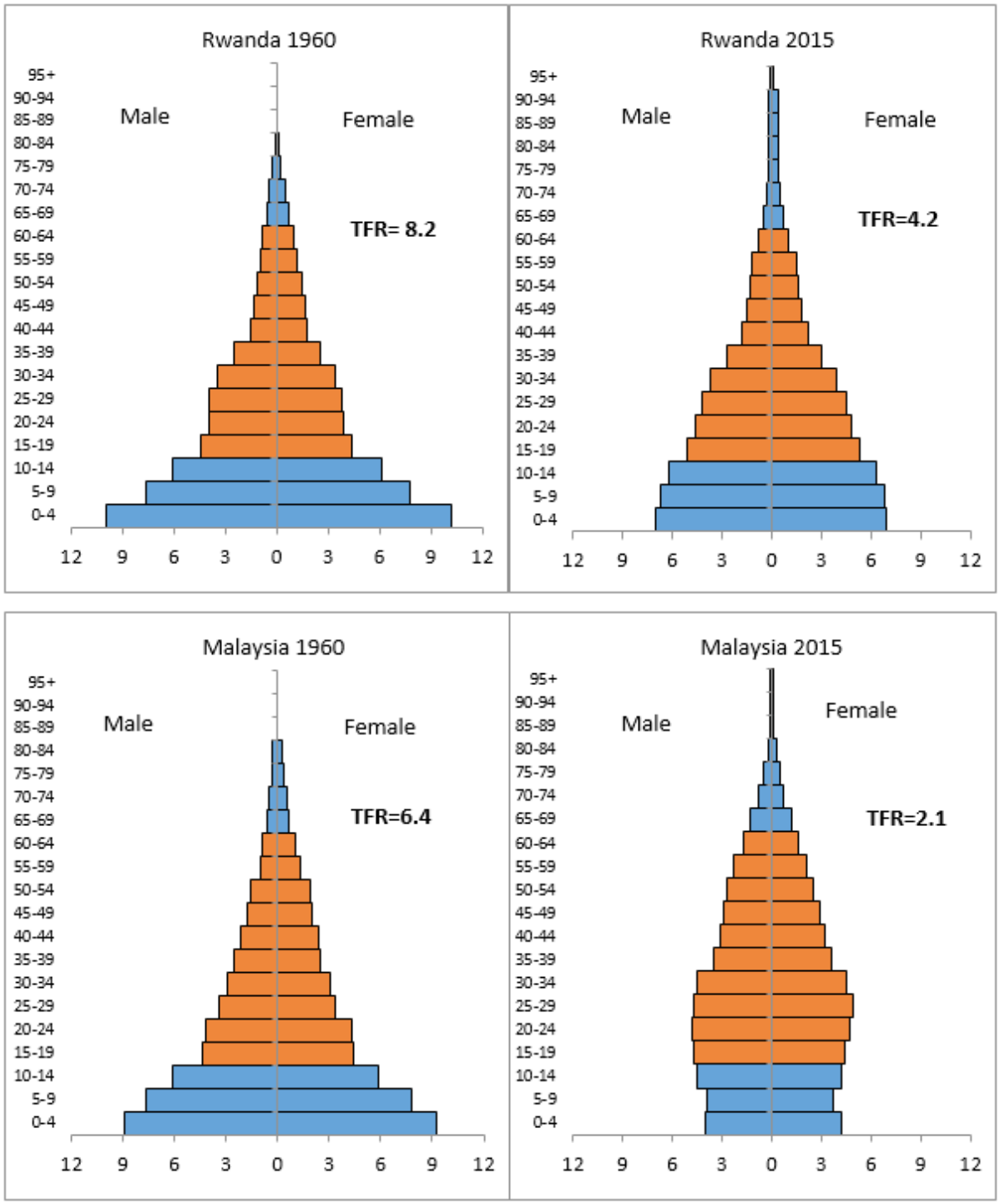
Although the prevailing population characteristics present hurdles to development, Rwanda can exploit its population dynamics to advance its economic prosperity goals if it makes strategic investments to accelerate fertility rate decline and enhance the quality of its human capital. A rapid decline in fertility rate from the current level would change the age structure to one with more working age population relative to dependents and open a window of opportunity for accelerated economic growth through the DD. The country could earn a sizable DD and boost its average incomes as has been done by some East Asian countries such as Malaysia, Indonesia, South Korea, and Thailand. As Figure 2.1 shows, in 1960, the population pyramids for Malaysia

and Rwanda were very similar and total fertility rate was roughly the same - around 6.2 children per woman. While Malaysia's total fertility rate has dropped from 6.2 in 1960 to about 1.9 in 2015, Rwanda's fertility rate during this period has only dropped by about three children. The resulting population pyramids in 2015 are quite varied, with the one of Malaysia reflecting a much more favourable ratio of working-age population to dependents.

In order for Rwanda to have a favourable age structure that can propel its envisioned economic transformation, is vital to accelerate the rate of fertility decline. As observed from the 2015 DHS, decline decelerated between 2010 and 2015, with the fertility rate declining by less than half a child. To accelerate the rate of fertility decline a number of measures can be adopted, including, increasing uptake of modern contraceptives, reducing teenage childbearing, keeping girls in school and improving their progression to secondary school, and accelerating on-going progress in child survival. Although Rwanda's teenage childbearing rates are lower than for most countries in the region, it is a major concern that the teenage fertility rate increased from 40 to 44 births per 1000 girls aged 15-19 years while the proportion of women aged 15-19 who had started child bearing increased from 6 percent to 7.3 percent between 2010 and 2015 (National Institute of Statistics of Rwanda *et al*. 2015). Teenage girls living in the city of Kigali and in East Province, girls with no formal education and those living in 20 percent poorest households have disproportionately high rates of teenage fertility. High teenage fertility not only contributes to high total fertility rate, but curtails the potential of girls in education and participation in economic production, thus acting as a hurdle to economic growth.

The contraceptive uptake rate has slowed in the last five years, increasing slightly from 45.1 percent in 2010 to 47.5 percent in 2015 among married women. There are marked variations in contraceptive use. For example, women in rural areas had a CPR of 46.7 percent, compared to 51 percent among urban dwellers. Similarly, 45 percent of women in poorest households used contraceptives compared to 50 percent among those in richest households. Contraceptive use also varied by age, with teenage girls having the lowest contraceptive prevalence rates at 32.8 percent, compared to a high of about 51 percent among women aged between 25 and 39 years. In addition, about 19 percent of all women who wanted to delay or stop childbearing in 2015 were not using an effective family planning method and are categorised as having an unmet need for family planning. Another challenge with the FP programme is heavy donor reliance, which could potentially jeopardize the sustainability of the programme if local resources are not promptly allocated to cover any possible gap that may be created by possible withdrawal of donor support. Notably, the country did not achieve its target of increasing CPR to 70 percent as set in the FP strategic plan 2012-2016. There is therefore need to refocus efforts on the family planning programme to ensure that women and men have access to their contraceptive methods of choice to avoid unplanned pregnacnies. Access to contraception among adolescents could be enhanced by revising Article 7, Chapter II (Rights in terms of human reproductive health) of the 2016 Reproductive Health Law that states that "subject to provisions of other laws, every person having attained the majority age has the right to decide for oneself in relation to human

Figure 2.1: Rwanda's and Malaysia's Age Structure, 1960 and 2015



Source: NISR, PHC 2012 Population Projections; UN Department of Economic and Social Affairs, Population Division, 2017.

reproductive health issues". There is a danger that this clause could be used to restrict access to reproductive health services, including contraception, to adolescents below age 18.

Reduction in child mortality is a critical precondition for fertility rate decline because parents typically are assured that the few children they have will have a decent chance to survive beyond childhood. Rwanda has made good progress in reducing child mortality and is among African countries that achieve the child survival targets under the Millennium Development Goals (MDGs). The infant mortality rate (IMR) declined from 86 per 1000 live births in the year 2005 to 32 per 1000 live births in 2015 while the under-five mortality rate (U5MR) declined from 152 to 50 deaths per 1,000 live births over the same period. However, the neonatal mortality rate (deaths in the first month of life) is not declining at the same rate, and currently represents about 40 percent of all deaths occurring in children below five years. Given that most of the causes of child deaths are known, there is need to step-up target interventions to address the high neonatal mortality rate.

2.2 Education and Skills Development

Rwanda needs a well-educated and skilled labour force to harness the DD. Education, training and skills development are the key aspects of developing a globally competitive and productive workforce. Investing in education at all levels, with emphasis on the tertiary level, enables a country to maximise the productivity potential of its citizenry (Barro & Lee, 2013; Oketch, McCowan, & Schendel, 2014). According to ILO, effective skills development requires a holistic approach characterised by continuous pathways of learning; development of core skills; development of professional and technical skills; portability of skills; and employability (Brewer, 2013; ILO, 2014).

Rwanda has made progress in increasing enrolment in primary schools with the net enrolment rates increasing from 73 percent in 2000 to almost universal at 97.7 percent in 2016 (Ministry of Education, 2016). This resulted from various policies such as abolition of school fees in 2003, school infrastructure development, teacher recruitment, capitation grants, increased availability of teaching and learning materials, promotion of girls' education, and increased parent involvement. There is also a sizable increase in secondary school enrolment rate from 14 percent in 2008 to 28 percent in 2015 (Ministry of Education, 2016) especially in lower secondary school. Rwanda is committed to ensuring gender parity at all levels of education, a goal which is most clearly laid out in its 2003 Constitution and the Vision 2020 development plan.

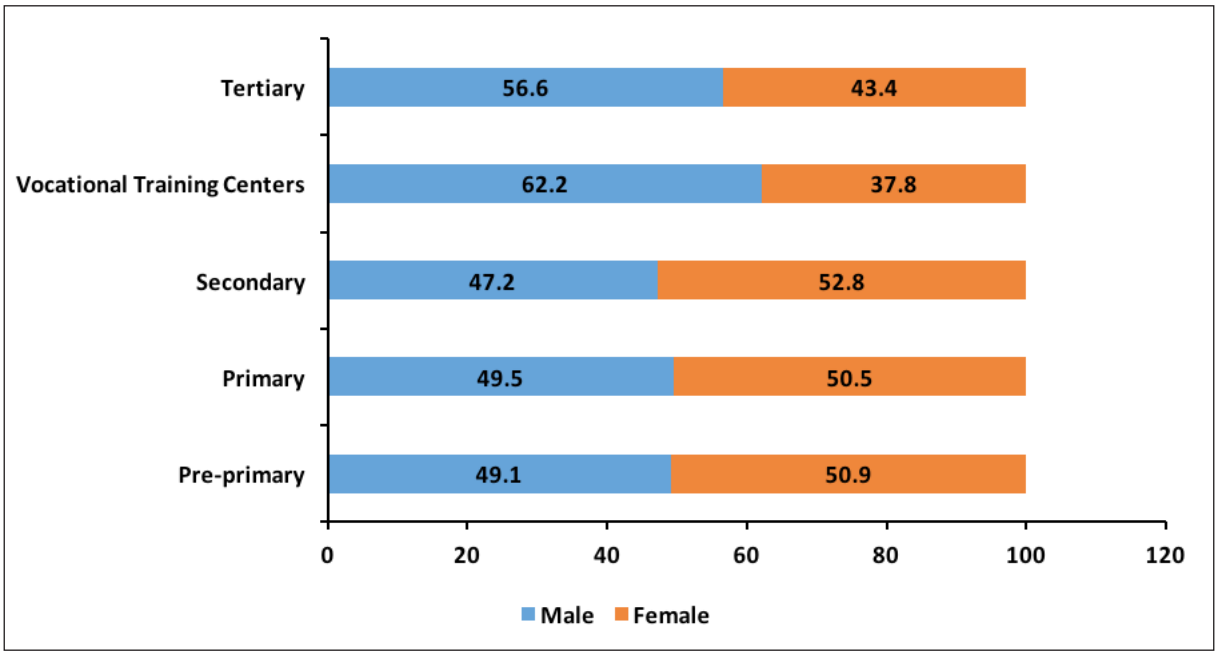
Despite the progress, the education sector still grapples with some challenges. In 2016, only 17.5 percent of all children aged three to six years, who were eligible for pre-school, were attending such schools. This is below the 2015/2016 Education Sector Strategic Plan (ESSP) target of 25 percent in 2016 (Ministry of Education, 2012, 2016). In addition, secondary school enrollment still remains low particulary in upper secondary school. Relatively low transition rates from primary to secondary school, repetition, and school dropout rates contribute to the low secondary net enrolment ratio. The estimated transition rate in 2015 from primary to secondary was 71.1 percent (Ministry of Education, 2015). The expansion of school infrastructure and participation at primary school level has not been accompanied by similar expansion at secondary school level

resulting in inadequate facilities to meet the demand for secondary school education. At tertiary level, student enrolment is still very low although it has increased from 73,600 students in 2011 to 90,803 in 2016 (Ministry of Education, 2016).

The number of students enrolling in TVET schools has increased over time from 51,773 in 2010 to 94,373 in 2015, representing an increase of 82.2 percent (Ministry of Education, 2015). However, this falls far short of the ESSP target of 122,664 students enrolled in TVET centres in 2016. The 2018 target is set at 60 percent of students in junior secondary schools enrolling in the TVET stream while 40 percent continue to senior secondary education (Ministry of Education, 2016). The 2015 Education for All Review found that TVET programs were becoming popular among young people although a low public perception of TVET relative to higher education institutions persists (Ministry of Education, 2015). Increased student access brings with it congestion in institutions, coupled with limited harmonization of TVET programs with advances in technology. Accessible and quality TVET programs can contribute immensely to harnessing the DD by enabling youth acquire the practical, technical and soft skills and competencies they require to secure employment and set up entrepreneurship ventures.

Gender imbalance is another challenge in the education sector. Rwanda has been successful in closing the gender gap at primary and secondary education levels but not at tertiary education levels. Figure 2.2 shows that at secondary school level, girls constitute 52.8 percent of those enrolled. The opposite is true at tertiary level, and vocational training Centres, with men constituting 56.6 percent and 62.2 percent of those enrolled, respectively (Ministry of Education, 2015).

Figure 2.2: Percentage of Males and Females Enrolled in Education System, Rwanda, 2015



Source: Ministry of Education, Rwanda Education Statistical Yearbook, 2015

Given the central importance accorded to quality human capital for the achievement of Rwanda's long term development aspirations, the government has embarked on a major education reform initiative to improve the quality and relevance of education in producing a skilled and globally competitive work force. In 2016 the government launched the new skill and competency-based curriculum to replace the old knowledge based curriculum for all primary and secondary schools as well as TVET institutions. Early assessments of the secondary component of the programme highlights the need to enhance training of teachers in new student-centred pedagogies, development of assessment tools, and improvement of the education infrastructure and learning materials to facilitate affective delivery of the new curriculum (Mastercard Foundation, 2017).

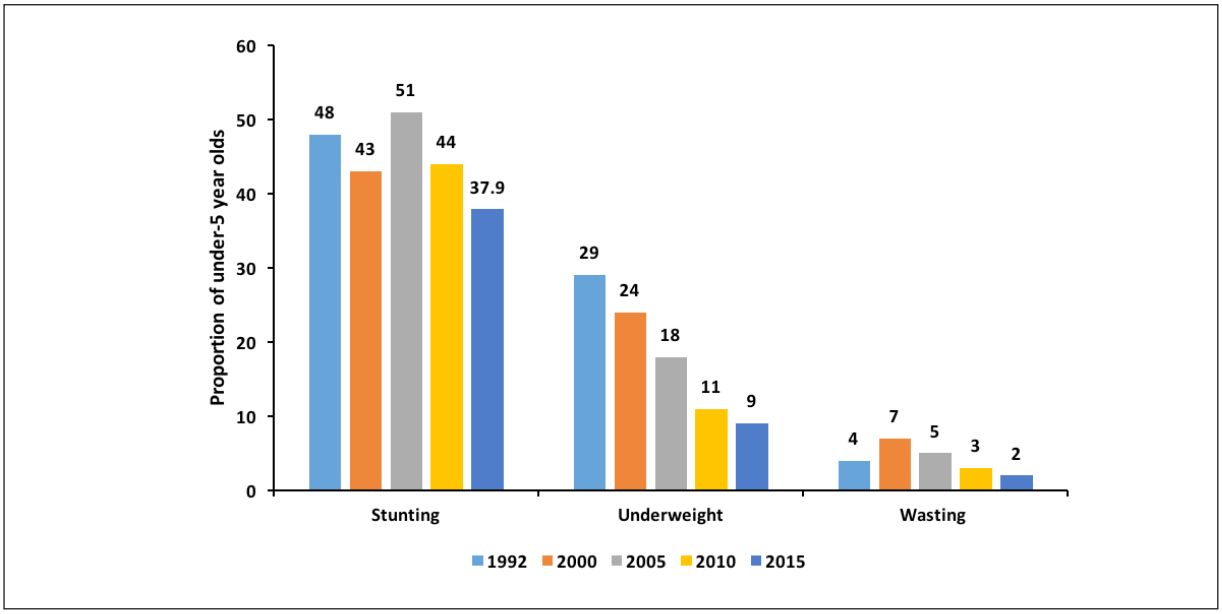
2.3 Health Status

A healthy workforce is critical to enable countries optimize their economic productivity and earn a substantial DD. Several studies have documented the impact of health on economic growth. It has been shown that a one-year increase in health expectancy could raise GDP by up to 4 percent (Bloom *et al.* 2004). Investing in health contributes to reducing poverty and improving overall economic growth. For example, intensifying investments in health and specifically in maternal, new-born and child health has a multiplier effect (Wilhelmson and Gerdtham, 2006).

Rwanda considers its population as its fundamental resource and banks on it for its future development. The country has made very significant improvements in its health status indicators over the last decade. Child mortality has declined markedly, and reduction in maternal mortality, under MDG 5, was one of the goals in which the country achieved the millennium development goals target. Maternal mortality ratio (MMR) declined from 1071 maternal deaths per 100,000 live births in 2000 to 210 maternal deaths per 100,000 live births in 2015 (National Institute of Statistics of Rwanda *et al.*, 2015). Similarly, there has been an impressive drop in HIV prevalence (from 13 percent in 2000 to 3 percent in 2011) and reduction in incidence of endemic diseases such as malaria and TB. All these achievements are associated with improved access to health services like immunization through community-based services, community based insurance, integration of maternal and child health services, and improved data collection and utilisation in decision-making. Improved and continuous training of health care providers to offer quality care generally and specifically emergency obstetric care and good management throughout pregnancy and post-partum period has played a key part in observed improvement in maternal health outcomes. This progress has led to an increase in life expectancy at birth, rising from 53.7 years in 1991 to 64.5 years in 2012 (National Institute of Statistics of Rwanda & Ministry of Finance and Economic Planning, 2012a).

Despite these achievements, the country still grapples with key health challenges, including high rates of stunting among children below five years and increasing levels of non-communicable diseases. Malnutrition is an underlying factor of child mortality, has severe effects on the cognitive development of children, and affects their productivity later in life. As the Cost of Hunger Study

Figure 2.3: Trends in Malnutrition among Children below 5 Years, Rwanda, 1992-2015



Source: NISR, Demographic and Health Survey, 2014-15

showed, about 503.6 billion Rwandan francs (RWF), equivalent to 11.5 percent of GDP, were lost in 2012 as a result of child under nutrition (UNECA, & WFP, 2014). In 2015, two in every five children aged below five years in Rwanda were stunted (Figure 2.3). The government realises the importance of addressing malnutrition to further reduce child mortality and several initiatives have been put in place, including, developing a multi-sectoral nutrition action plan to eliminate malnutrition, food supplementation using fortified food and One-Cow per poor family programme, among others.

Rwanda is now facing an increasing disease burden from Non Communicable Diseases (NCDs). The common NCDs in Rwanda include cancers, cardiovascular diseases, chronic respiratory diseases, diabetes, and kidney diseases. The main risk factors for NCDs include tobacco use, unhealthy diet, harmful alcohol consumption, injury, physical inactivity and obesity (Ministry of Health, 2015d). According to Rwanda's Health Management Information Systems (HMIS) data in 2013, NCDs accounted for at least 51.9 percent of all district hospital outpatients' consultation and 22.3 percent of district hospital inpatients (Ministry of Health, 2015c). The WHO Global Health observatory shows that Rwanda had an NCD death rate of 607 deaths per 100,000 people in 2015 (World Health Organization, 2017). Health services and personnel are currently ill equipped to diagnose and treat NCDs at early stages, coupled with inadequate information to the population on prevention and management of NCDs. Efforts are now gaining steam to train health workers to prevent, diagnose and manage NCDs.

Poor water and sanitation conditions are major contributors to the burden of disease and expose people to water-borne diseases and related ailments. The 2015 DHS report shows that 73 percent of households use an improved source of drinking water but only 10 percent of households have

running piped water in their dwelling, yard, or plot (National Institute of Statistics of Rwanda *et al.*, 2015). In terms of sanitation, slightly over half (54 percent) of the households have access to an improved, unshared toilet facility (57 percent in rural areas and 42 percent in urban areas). These figures are far short of the Vision 2020 target of 100 percent. More therefore needs to be done if Rwanda is to achieve the universal access to improved water and sanitation facilities for its population.

Rwanda has made relatively good progress in improving access to health care services; about 75 percent of the population lives within 5kms to the nearest health facility. Several health infrastructure and systems challenges however exist in Rwanda (Leuchowius, 2014; Ministry of Health, 2015b; National Institute of Statistics of Rwanda *et al.*, 2015). One of the most critical is the shortage of qualified medical staff namely doctors, nurses, technicians and laboratory staff). According to the Human Resource for Health Policy (2014), Rwanda is way below the WHO recommendation of a minimum of 2.5 health providers per 10,000 people, with only 0.6 physicians per 10,000 people in 2013. A related challenge is the skewed distribution of health care providers (Ministry of Health, 2014). Most specialised care providers are in urban areas, particularly Kigali City, leaving out the rural districts, where the majority of Rwandans live, with limited access to specialised care. Another important bottleneck is the lack of diagnostic medical equipment and maintenance technicians. There is a combination of a very high import dependency and a heavy dependency on foreign donor support. According to WHO, donor inputs account for well over 70 percent of health sector funding. The government recognises that this is not sustainable and has sought long-term, sustainable solutions, including the national health insurance programme, *Mutuelles de Santé*, performance-based financing, and fiscal decentralisation. The health insurance cover has increased utilisation of health care services, and also decreased the percentage of households facing catastrophic health expenditure by more than 1.5 percent between 2005 and 2010 (Ministry of Health, 2015a). A recent study shows that individuals with health insurance coverage were more than twice as likely to receive both inpatient and outpatient care services compared with the uninsured (Wang Wenjuan, Gheda Temsah, & Emily Carter, 2016).

2.4 Economic Outlook and Opportunities

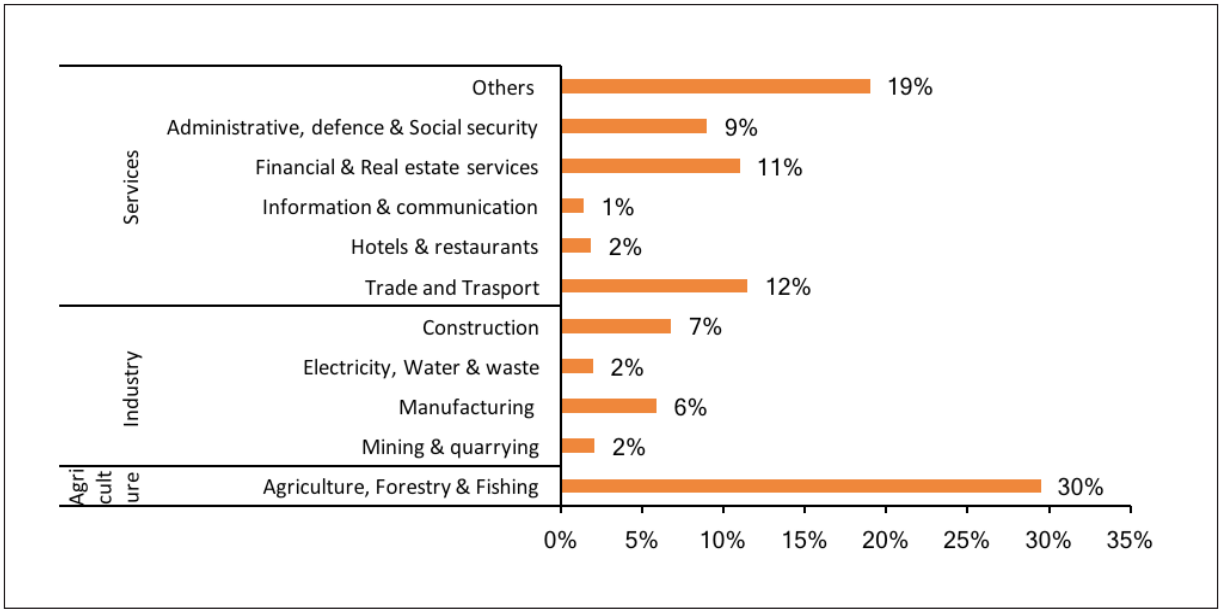
Economic reforms including creation of decent jobs, creating an enabling environment for the private sector to operate and improving competitiveness in doing business, are key ingredients for achieving socioeconomic transformation. Rwanda is classified as a low-income country with limited mineral resources. Vision 2020 aims to transform Rwanda from a subsistence agricultural economy to a middle-income, services-and-knowledge-based society, with a vibrant class of entrepreneurs. The Vision identifies the challenges that need to be addressed to achieve its targets of increasing per capita GDP to US$ 1,240, reducing poverty level to 20 percent, creating more off-farm jobs and promoting the private sector as the engine of growth by 2020.

Economic Status

Rwanda has experienced steady economic growth since the turn of the century, with growth in GDP averaging 8 percent between 2001 and 2015 (National Institute of Statistics of Rwanda, 2015b). Rwanda's economy grew by 8.9 percent in 2015, with a GDP per capita of US$ 735 based on the 2014 rebased estimates (National Institute of Statistics of Rwanda, 2017). There was a slight decline both in growth rate and GDP per capita in 2016, at 5.9 percent and US $729, respectively.

Rwanda's economic growth is driven by the tertiary sector, with services contributing 48 percent of GDP, while agriculture contributed 31 percent, with industry sector contributing the least at 16 percent (National Institute of Statistics of Rwanda, 2017) (Figure 2.4). Vision 2020's prioritization of the service sector (Republic of Rwanda, 2012), has seen increased investments in service sector, particularly in ICT use and in hotel and conferencing sub-sectors. Similarly, share of employment in the industry and services sectors increased between 2010 and 2014 while it declined in the agriculture sector, which still employs more than two thirds (68 percent) of the workforce (National Institute of Statistics of Rwanda, 2016).

Figure 2.4: Share of Gross Domestic Product by Sectors and Activities, Rwanda, 2016



Source: NISR, 2017: 2016 GDP National Accounts

Rwanda has experienced a period of rapid reduction in poverty levels and income inequality. The proportion of the population living below the poverty line decreased from 56.7 percent in 2005 to 39.1 percent in 2014, almost a 20 percent change in 10 years. The population that is extremely poor (living below the food poverty line) more than halved over the same period. In addition, income inequality declined with the Gini Coefficient declining from 0.55 to 0.45 over the same period (National Institute of Statistics of Rwanda, 2015b).

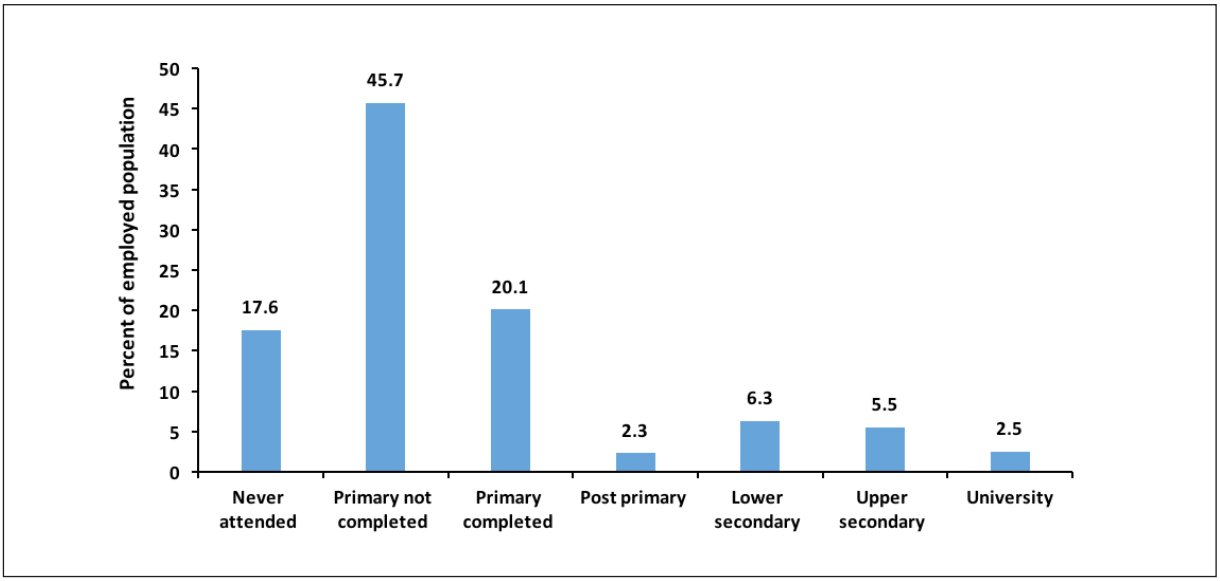
Rwanda's economic progress facilitated by its political stability, good macroeconomic conditions, rule of law and favourable environment for doing business, prudent fiscal and monetary policies and debt relief have helped contain fiscal deficits and lower inflation. The country has promoted accountability and regulation of government activities, which, coupled with friendly business climate and a good policy environment, has attracted many investors into the country. Rwanda is ranked second best after Mauritius among African countries in the Ease of Doing Business Report by World Bank (World Bank, 2017). The country has automated business registration services and improved electronic systems for filing and paying taxes.

Rwanda is classified as low risk in debt distress, which attracts both domestic and foreign investors (AfDB, OECD, & UNDP, 2016). In the World Economic Forum's Global Competitiveness Index (GCI), the country ranks third best performing country in sub-Saharan Africa after Mauritius and South Africa, with a score of 4.41 out of a best score of 7 (World Economic Forum, 2016a). Rwanda's competitiveness improved ranking by five places or more since 2015, and is the best performing country in Africa under the institutions and labour market efficiency pillars in the 2016/2017 report. As such, the country is classified as ready to harness the DD due to high-quality policy and high projected economic growth rates (World Economic Forum, African Development Bank, & World Bank, 2017).

Despite the high economic growth, several challenges exist that hamper rapid economic expansion and growth, including unemployment, poorly skilled human capital, poor infrastructure and heavy reliance on donor aid. Relatedly, Rwanda is ranked low in human development, with the human development report scoring Rwanda at 0.498 and ranking 159 out of 188 countries (UNDP, 2016b).

The past economic growth has created a number of jobs averaging 200,000 jobs per year between 2000 and 2012. However, most of the jobs are in the informal sector and the rate has not been sufficient to meet the demand by the labour market entrants. Although unemployment is low, about 31 percent of those employed were underemployed in 2014. According to the Integrated Livelihood Survey 4 (EICV 4), 2 percent of the population aged 16 years and above were unemployed (National Institute of Statistics of Rwanda, 2016). The burden of unemployment is skewed towards the youth and women, mostly those residing in urban areas. The unemployment rate among young people between the ages of 16 and 30 was at 3.3 percent. About 9 percent of the population in urban areas was unemployed compared to 0.6 percent in rural areas, with women bearing a bigger burden of unemployment compared to men, at 16 percent and 5.6 percent respectively. Underemployment is high because almost nine in every ten employed people work in the informal sector mainly in subsistence agriculture. With the growing number of the working-age population, the country will face a serious unemployment challenge unless the current levels of unemployment and under-employment are reduced.

Figure 2.5: Educational Attainment of Employed Population, Rwanda, 2014



Source: NISR, EICV, 2014

One of the contributing factors to unemployment is inadequate and poorly skilled human capital. According to the GCI, Rwanda scores very low on higher education and training, which is one of the indicators under efficiency driven economies. The top challenges for doing business in Rwanda include access to financing, inadequately educated workforce and tax rates, according to the 2017 African Competitiveness Report. As Figure 2.5 above shows, majority of the employed population only have primary school education and below.

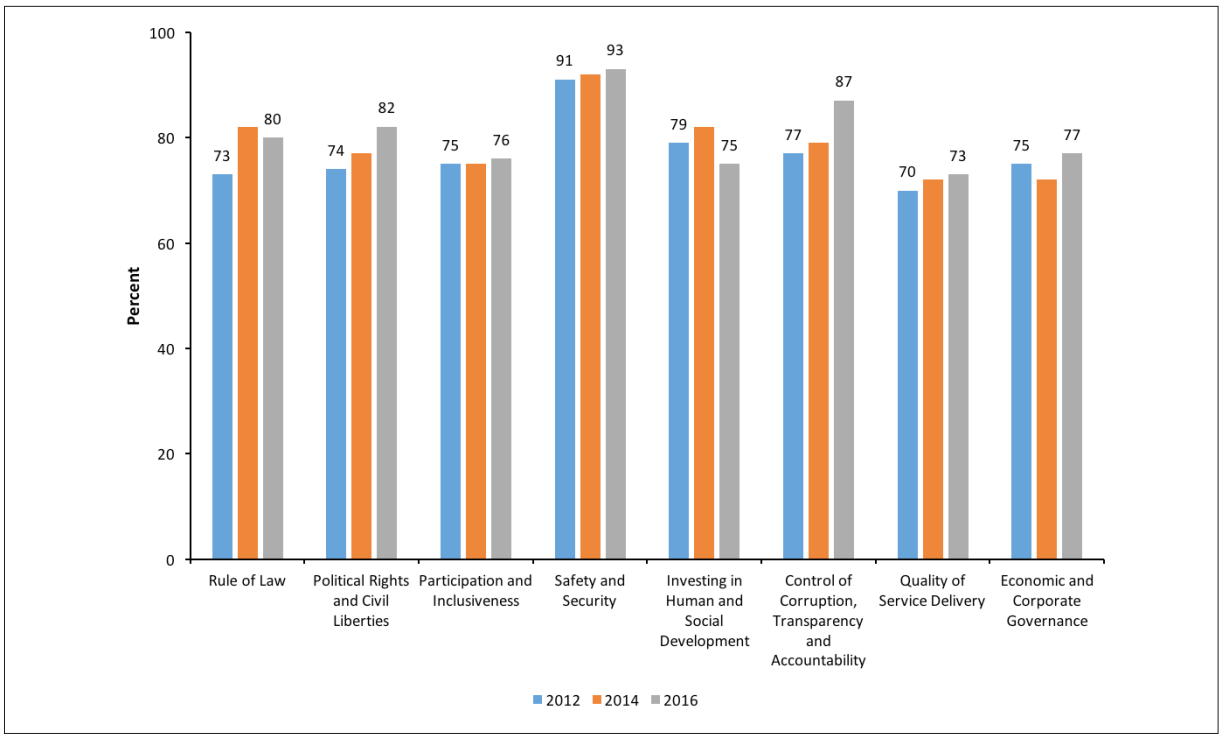
Poor infrastructure and lack of access to electricity are major constraints to investment. Only about 34.5 percent of the population has access to electricity, against a target of 70 percent for 2017/2018. The prudent implementation of the Rural Electrification Strategy and involvement of the private sector in power generation are some of the strategies that are being put in place to increase access to electricity. The transport sector is one of the key drivers of economic growth, but because of poor infrastructure and geographical constraints, Rwanda has the highest transport costs in the region, estimated at 40 percent of the value of her imports or exports against 12 percent and 36 percent for Kenya and Uganda, respectively. Improving the quality and reliability of transport is critical to reducing transport costs and in attracting domestic and foreign investment (AfDB, 2013). The government recognises this and has been committing almost a tenth of Rwanda's annual budget to the sector.

Another challenge that could affect sustainability of the economy is reliance on aid. According to the 2016/2017 budget, about 16 percent of the budget is funded by foreign assistance in form of grants (National Budget, 2016). These challenges are identified in the GCI as the factors dampening Rwanda's competitiveness. Rwanda ranks low in infrastructure and higher education and training.

2.5 Governance and Accountability

Good governance and accountability are essential for sustainable and inclusive economic growth. They ensure equitable allocation and distribution of public resources and the efficient delivery of public services, which, among other things, creates a conducive environment for private sector investment and economic growth. The Government of Rwanda recognises the critical role of good governance as a driver for development and this is reflected in designating "Good Governance and a Capable State" as the first pillar of Vision 2020. Through this pillar, the Government of Rwanda seeks to ensure accountability, transparency, effectiveness and efficiency in deploying resources and delivering services. To track the country's performance in these areas, the Rwanda Governance Board (RGB) produces a Rwandan Governance Scorecard (RGS) every two years. The scorecard uses eight observed dimensions of governance. Figure 2.6 presents performance trends for the country for these eight indicators (Rwanda Governance Board, 2016).

Figure 2.6: Governance Indicators for Rwanda, 2012-2016



Source: Rwanda Governance Board, Governance Scorecard, 2012-2016

Almost all indicators have been positive over time (2012-2016). However, Rule of Law and Investments in Human Capital and Social Development have slightly deteriorated. The most improved indicators are Control of Corruption, Transparency and Accountability, which was the best performer with a percentage increase of 7.52 points. This is followed by Political Rights and Civil Liberties, which improved by 4.78 percentage points. The Economic and Corporate Governance indicator recorded a 4.62 percentage increase while Participation and Inclusiveness, Quality of Service Delivery, and Safety and Security indicators slightly improved by 1.65, 0.93 and 0.66, respectively.

Globally, there are multiple sets of indicators of good governance that are tracked by different organisations (Arndt C. & Oman C., 2006), including the World Bank's Worldwide Governance Indicators (WGI) and Country Policy Institutional Assessments (CPIAs). The Ibrahim Index of African Governance (IIAG) provides annual assessments of governance performance for African countries. Trends in the WGI rankings are used to provide comparative insights for Rwanda relative to a selection of other countries. The WGI indicators bear some congruence with the RGS indicators and include: (i) Regulatory Quality; (ii) Political Stability and Absence of Violence; (iii) Government Effectiveness; (iv) Voice and Accountability; (v) Rule of Law; and (vi) Control of Corruption.

The RGS findings are somewhat in agreement with performance on the WGI indicators. The country scores on the governance indicators are used to assign a percentile rank to individual countries relative to all others included in the measure. Rwanda's percentile ranking on corruption has been improving over time, with the latest being 75 percent in 2015 (World Bank, 2016b). This indicates that in that year 75 percent of the counties that were assessed had scores either equal to or below that of Rwanda. Rwanda leads other countries in the East African Community (EAC), ranking 1st place over the last three years. Rwanda was ranked as the best reformer globally, according to the Worldwide Governance Indicators (World Bank, 2016b). However, the country has a low percentile ranking for *Voice and Accountability* which is at 17. This indicates that in 2015, of the total number of countries that were assessed on voice and accountability, only 17 percent had scores that were equal to or below that of Rwanda

3 Gender Empowerment Profile

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3.1. The Gender Dividend

In Rwanda, women constitute about 52 percent of the total population according to the 2012 Population Census. Generally, Rwanda has been lauded globally for its efforts on empowerment of women. Women have been recognised as key drivers of Rwanda's economic recovery and efforts have been made to ensure they play a catalytic role in the socio-economic development of the country. Among such efforts are legal reforms granting women property rights and enabling them to inherit property, including land. Rwanda is also one of 30 countries in Africa to have ratified the African Union Protocol on the Rights of Women, which provides broad protection for women's human rights, including their sexual and reproductive rights. Further, the Constitution, adopted in 2003, pro-actively promotes gender equality, outlaws any form of gender discrimination, and enshrines the principle of equality within marriage. It also stipulates that women hold at least 30 percent of decision-making positions.

These reforms have led to some exceptional gains, including having women occupy 64 percent of Rwanda's parliamentary seats and 40 percent of cabinet positions (Republic of Rwanda, 2017). According to the 2016 Human Development Report, Rwanda's Gender Development Index (GDI) was 0.992 and the country was grouped under GDI group one which constitutes countries with high equality in HDI achievements between women and men (UNDP, 2016b). These results are corroborated by the World Economic Forum's report on Gender Gap, which ranks Rwanda fifth globally, mainly as a result of its improvements in the Economic Participation and Opportunity Sub-index, and the Political Empowerment Sub-index where it ranked eighth in both cases out of the 144 countries that were ranked in the 2016 Global Gender Gap Report. On the other hand, Rwanda did not perform very well in the Education Attainment Sub-index and in the Health and Survival Sub-index where it ranked 110 and 89, respectively relative to the other 144 countries (World Economic Forum, 2016b). Table 3.1 shows the disaggregation of these rankings by sub-index.

According to a recent study, Sub-Saharan Africa could add an additional 12 percent, (an estimated $300 billion) to its annual GDP in 2025 if the employment gender gap is closed between men and women (McKinsey & Company, 2015). UNDP's Africa Human Development Report 2016 estimates that total annual economic losses due to gender inequality in the labour market have averaged $95 billion per year since 2010 in sub-Saharan Africa and may have been as high as $105 billion, or 6 percent of the region's GDP in 2014 (UNDP, 2016a). A 2017 study by the IMF has shown that Rwanda's economy grows 2.2 percent faster than other African economies and 0.25 percentage point of this growth is attributable to gender equality measures. These important data call for increased and more targeted investment in women's and girls' education, employment and entrepreneurship.

With the growing evidence of the positive effect of increasing gender parity on economic growth the concept of a gender dividend is increasingly being used. According to the Population Reference Bureau (PRB), the gender dividend is the increased economic growth that could be realised with

Table 3.1: Rwanda's Global Ranking in Closing the Gender Gap, 2016

Sub-Index	Rank (out of 144)
Economic participation and opportunity	**8**
Labour force participation	1
Wage equality for similar work	1
Estimated earned income	8
Legislators, senior officials, and managers	50
Professional and technical workers	95
Educational attainment	**110**
Literacy rate	108
Enrolment in primary education	1
Enrolment in secondary education	1
Enrolment in tertiary education	110
Health and survival	**89**
Sex ratio at birth	1
Healthy life expectancy	100
Political empowerment	**8**
Women in parliament	1
Women in ministerial positions	15
Years with female head of state (last 50 years)	52

Source: WEF; Global Gender Gap Report, 2016

investments in women and girls (Kate Belohlav, 2016). It results from increasing participation in formal work and the level of productivity of women. Consequently, reducing fertility rate to free up women's time, improving access to education for women and girls and addressing the pay gap between men and women for the same type of job contributes to the gender dividend and to overall economic growth.

3.2 Status of Gender Equity

In this section we give an overview of women's status compared to men in various aspects of health, education, employment and in human rights in Rwanda. The social dimensions of gender equality involving trends in health and education are key determinants of women's equality and empowerment. Overall, gender inequality in social services translates into fewer opportunities for women, in particular, and society, as a whole, to achieve well-being.

Health

Women tend to fair worse than men on disease burden associated with sexual and reproductive health while men fair worse on infectious diseases such as tuberculosis. In Rwanda, the HIV prevalence rate among the population aged 15 to 49 years old is at 3.6 percent for females and 2.2 percent for males. HIV prevalence among young girls aged 15 to 24 years is double at 1.3 percent while the prevalence among young men is at 0.6 percent (National Institute of Statistics of Rwanda *et al.*, 2015). Although HIV prevalence is higher in women, the proportion of women

with comprehensive knowledge of HIV prevention is lower than among men, at 67 percent and 69 percent, respectively. Prevalence of obesity or overweight among adult population aged 15 to 49 years is higher among females (16.3 percent) compared to males (3.6 percent).

Education

It is commonly accepted that girls' and women's education positively affects several aspects of development and has impact on economic growth: education reduces high fertility rates, promotes use of modern contraceptives, lowers infant and child mortality rates, lowers maternal mortality rates, increases labour force participation rates and earnings, and fosters further educational investment in children (World Economic Forum, 2013). It has been estimated that between US$16 billion to US$30 billion is lost annually due to gender gaps in education in Asia and the Pacific region (Asian Development Bank and ILO, 2011). Investing in advancing girls' education would lead to lifetime earnings of the current cohort of girls of up to 68 percent of annual GDP. Likewise, closing the inactivity rate between girls and boys would also increase GDP by up to 5.4 percent by some measures (Chaaban and Cunningham, 2011).

Although Rwanda has achieved near gender parity at primary and secondary school level, big gender gaps remain at tertiary and TVET education levels. More girls are enrolled in secondary schools, but this reverses at tertiary level and vocational institutions, with boys constituting 56.6 percent and 62.2 percent of those enrolled, respectively. This implies that more girls drop out of school after secondary level, and few proceed to levels where they acquire skills that can help them achieve their potential in life. Literacy data shows that 60 percent of women compared to 72 percent for men are literate (Ministry of Education, 2016). These gender differences are also reflected in the proportion of the adult populations with no education (22.8 percent of males versus 27.9 percent of females); those with secondary education (11.4 percent of males and 10.2 percent of females); and tertiary education (2.4 percent of males and 1.5 percent of females). Addressing these gender inequities in education will go a long way in enhancing economic opportunities for women and enhance Rwanda's chances of harnessing the DD.

Employment and economic activities

Many African women are trapped at the lower end of the spectrum of economic opportunities, which often perpetuates low socio-economic status for their families. Addressing gender inequalities in the labour force would have far reaching socioeconomic benefits and enhance Rwanda's chances of harnessing the DD. According to McKinsey & Company (2011), greater female participation in the U.S. workforce since 1970 accounted for a quarter of the growth in GDP.

In Rwanda, women account for 55.2 percent of the 4,492,000 economically active populations. Labour force participation rate is almost equal for males and females revolving around 87 percent. Similarly, the employment rate among the active population aged 16 years and above is also

similar at around 86 percent for both male and females. However, more women compared to men were unemployed in 2014, at 2.4 percent and 1.6 percent respectively. This difference is more pronounced in urban areas where unemployment for women is at 12 percent twice that of men at 6 percent only (National Institute of Statistics of Rwanda, 2015a). In 2014, 44 percent of female-headed households were categorised as poor compared to 37 percent of male-headed households.

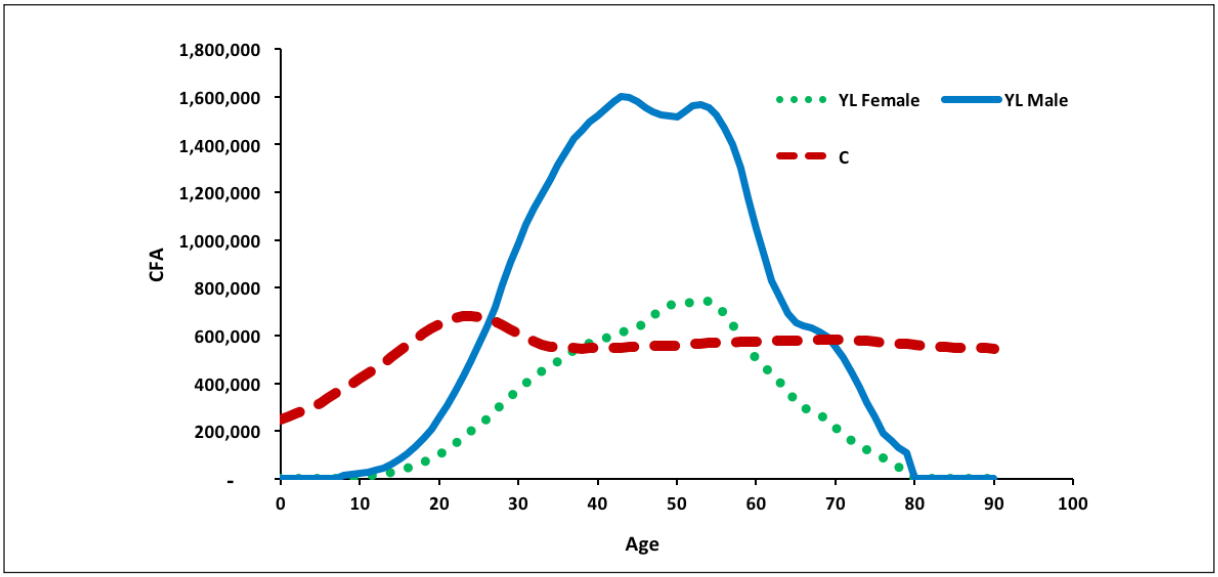
The 2015 WEF gender report showed that Rwanda scores poorly in including women in professional and technical occupations (World Economic Forum, 2016b). This is attributed to lower levels of female educational attainment. The 2014 EICV shows that more women (79.1 percent) than men (54.4 percent) derive their livelihoods from agriculture (National Institute of Statistics of Rwanda, 2016). Although the law guarantees women equal rights with men on land access, ownership and utilisation, social obstacles continue to inhibit gender equality in practice. For example, there is some resistance to allowing daughters to inherit land from their parents and resistance to allowing women to exercise their new authority to own and use land (Polavarapu, 2011). According to a 2012 report by JICA, the main challenges faced on gender equality in the agriculture sector are that the voices of women cannot be reflected in the process of sales from cash crops; access to credit for female farmers to be involved in the industry is limited; and it is difficult for women to participate in cooperatives for various reasons. Women are also often excluded from decision-making on utilisation of income earned from cash crops although they participate in various farming activities and selling of produce (JICA, 2012).

On financial inclusion, both formal and informal, about 14 percent of women are still excluded, compared to 10 percent among men. Sixty-three percent of women are formally served compared to 74 percent of men; meaning women are less likely to be formally served financially. The percentage of women taking a loan from a commercial bank is only 3 percent (that is about 100,000 thousands women aged 16 years and above) compared to 5 percent of men in the same category (Access to Finance Rwanda, 2016). This means limited access to credit to expand their businesses, and thus women tend to run small low capital enterprises.

A key factor in labour market gender gaps is the fact that women tend to perform the bulk of unpaid dependent care and household work. These are substantial time burdens for women in comparison to men that often prevent women from seeking better opportunities in the labour market. On average, in Rwanda women work for 53 hours per week thereby spending 10 hours more of work and unpaid work than men who only work for 43 hours per week. On domestic unpaid work, women on average spend almost three times the mean hours per week spent by men; 21 and eight hours respectively. This means that women are overworked yet they are paid less. Information is not available on existence of wage differentials between men and women for similar jobs due to lack of disaggregated wage statistics. Anecdotal evidence however shows that wage gap exists between men and women.

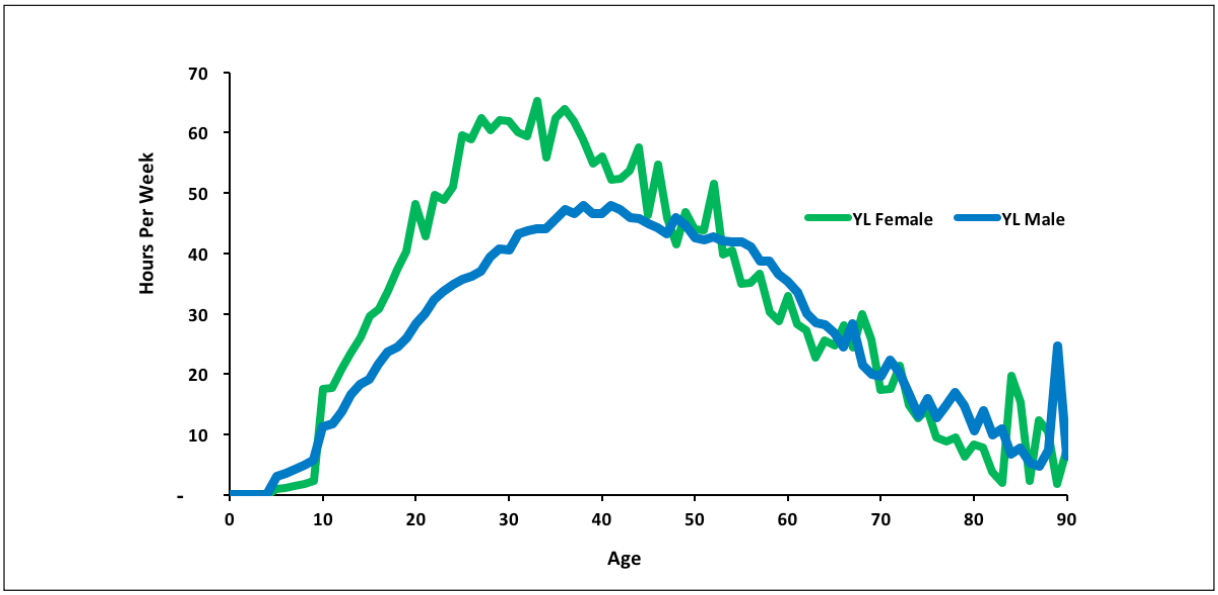
Similar results have been observed in Senegal where more rigorous analysis on counting women's unpaid work has been done using the national Transfer Accounts methodology that is used to analyse the DD (CREFAT, 2016). The data in Figure 3.1 show that women's income profile is significantly lower than that of men throughout the life cycle while the data in Figure 3.2 show that women work more than men when we combine both labour income and domestic work. The data in Figure 3.1 show a very pronounced lifecycle deficit for women. In fact, on average, a woman is dependent (lower labour income relative to consumption) from childhood until the age of 35, while the young age dependency for a man ends at 26 years. Similarly, the old age

Figure 3.1: Income and Consumption by Age and Gender, Senegal, 2015



YL=Labour income; C=Consumption
Source: National Transfer Accounts Estimates, CREFAT 2016

Figure 3.2: Combined Time Spent on Domestic Work and in the Labour Market by Gender, Senegal, 2015



Source: National Transfer Accounts Estimates, CREFAT 2016

dependency starts earlier for women at 58 years compared to men at 68 years. Thus, the period over which the individual generates a surplus is much shorter for women (22 years) than it is for men (41 years). In other words, women spend much more time as dependents relative to men over the life cycle.

Senegalese men are far better represented in the paid labour market where they work up to 42 hours on average per week during their most active working-ages in contrast to women who work more than 60 hours on average per week both for paid and unpaid work. In contrast, women, spend most of their time on domestic work, particularly on care of children and the elderly as well as cooking and cleaning. Considering the total time worked in both spheres (paid labour market and unpaid domestic work), the results show that women work more than men. Globally, women's unpaid work is estimated to contribute $10 trillion a year or 13 percent of global gross domestic product (GDP). Women worldwide tend to assume greater responsibility for unpaid care work (McKinsey & Company, 2015).

For Rwanda, investing in NTA and counting women's work data and analytical frameworks would be valuable in generating similar evidence to enhance understanding of the gender dividend, the importance of addressing the big gender inequalities in labour income and unpaid work for women and men if the country is to harness the DD.

Gender based violence

Economic empowerment and gender-based violence[2] (GBV) are closely linked. Economically disempowered women are vulnerable to gender-based violence; conversely, GBV is economically damaging, both on a micro and macro level. Survivors are left to deal with physical injuries and emotional scars, while social and legal services struggle to respond. In Bangladesh, for example, the costs of gender-based violence are estimated at 2.1 percent of the country's GDP.

In 2015, 48 percent of women experienced physical and/or sexual intimate partner violence in Rwanda in their lifetime. This is an improvement from 56 percent in 2010 but still unacceptably high (National Institute of Statistics of Rwanda *et al.*, 2015). Although Rwanda has the lowest rates of child marriages in the region, the practice still exists in the country with 21 percent of women aged 20 to 24 years reporting that they were first married or in union by 20 years. According to the Civil Code, the legal minimum age for marriage is 21 years for both men and women. This calls for enhanced enforcement of the marriage law.

[2]Gender-based violence is an umbrella term for any harmful act that is perpetuated against a person's will, and that is based on socially ascribed (gender) differences between males and females. Examples include sexual violence; domestic violence; trafficking; forced/child marriage; and harmful traditional practices such as female genital mutilation, honour killings, widow inheritance, and others.

3.3 Government Policy and Legal Framework on Gender

Recognising that women are key players in the reconstruction and development of the country, several policies, laws, programs and approaches have been formulated to maximise the participation of women and advance their economic status and well-being. These include the National Constitution (2003) which contains provisions for equal rights between men and women, the Law on Matrimonial Regimes, Donations, Succession and Liberalities (1999) that stipulates gender equality in property ownership in marriages and inheritance, New Civil Code; the Organic Land Law (2005) which ensures equality to land ownership; and the Law for the Prevention, Protection and Punishment of Gender Based Violence (2008).

Rwanda has also adopted several key policies and strategies aimed at promoting gender equality. Vision 2020 and the Economic Development and Poverty Reduction Strategy 2 (2013-2018) identify gender equality as one of the crosscutting issues the government needs to address, as it is linked to sustainable development. Other policies include National Gender Policy (2010), National Policy for Family Promotion and National Policy against GBV.

The country has established an institutional structure at different levels devoted towards promoting gender equality to mainstream gender into the nation's development policy, legal framework and development plans. The Ministry of Gender and Family Promotion under the Prime Minister's Office is mandated to play a leading role in implementing the National Gender Policy, Gender Monitoring Office, National Women Council, and The Forum of Rwandan Women Parliamentarians. In addition, gender focal persons are identified within the sectoral ministries and key governmental institutions whose responsibility is mainstreaming a gender perspective into their respective institutions.

Rwanda's gains in policy and legal reforms for gender equality are outstanding achievements that serve as a good model for other Sub-Sahara African countries. However, despite this progress, the economic situation of most women is not at par with that of men. For example, the Equality in Marriage Law does not apply to women not in legal unions, and thus they have no claim on their husband's assets, including land, or land held jointly for themselves or their children.

3.4 Programmes/Interventions to Promote Gender Equality

Under the National Gender Policy, the government initiated a number of programs, such as the High Intensive Labour Program (HIMO), Women Guarantee Fund, One Cow per poor Household, Basket weaving, facilitating women's cooperatives to access loans through financial literacy mentorship, skills development to produce bankable proposals and cooperative management, among others, aimed at reducing poverty and economically empowering women. Implementation of these programmes led to the reduction of women economic dependence on men, reduced poverty levels among poor women but also promoted gender equality at household

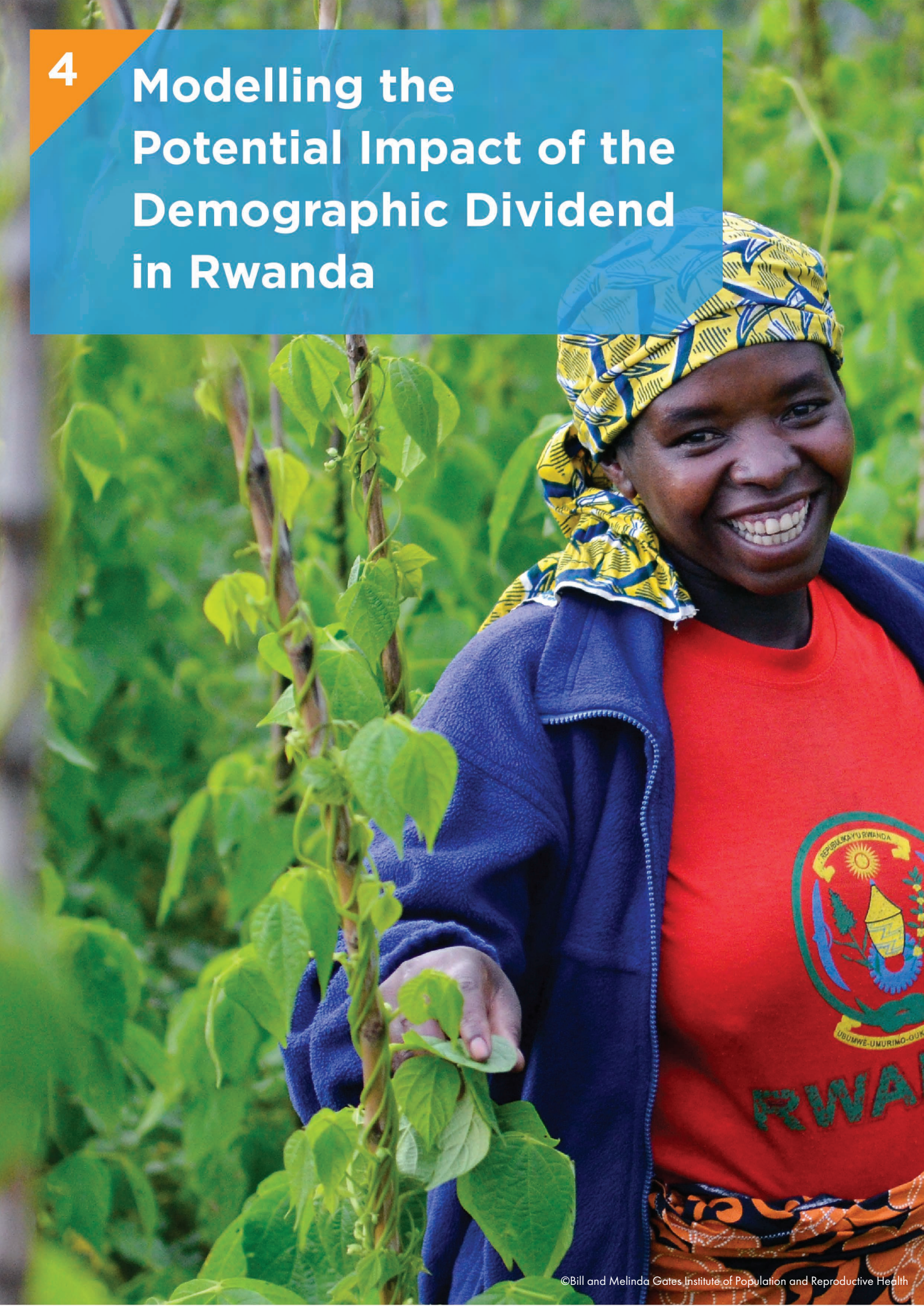
and community level. Similar improvements have been observed in the health, education and justice as it pertains to women.

Poverty among women reduced from 66.3 percent in 2001 to 60.2 percent in 2006 and it further reduced to 43.8 percent in 2014 for households headed by women (National Institute of Statistics, 2016a). There has been an increase in women's participation in governance sector. Women's representation in Rwandan parliament is the highest in the world and stands at 64 percent; it is at 38 percent in senate and 40 percent in the cabinet. However, at local government level, the representation is still very low where only 5 out of 30 district mayors are women (National Institute of Statistics, 2016a).

3.5 Role of Private Sector and Development Partners in Addressing Gender Issues

Improving women's economic status requires a holistic, multi-sectoral approach at different levels that simultaneously supports the strengthening of women's earning capacities in wage employment and entrepreneurship, but also addresses the underlying causes that disproportionately place women in economically disadvantaged positions. Given the role the private sector plays in job creation, entrenching gender equality will go a long way in reducing the discrimination faced by women in the labour market. This includes providing women with access to formal financial services tailored to women's needs and constrains.

4 Modelling the Potential Impact of the Demographic Dividend in Rwanda



The study used the DemDiv modelling tool (Moreland *et al.*, 2014) to measure the potential impact of the demographic dividend on economic growth and other socioeconomic outcomes in Rwanda. The modelling was based on four policy scenarios, selected to demonstrate the net and combined effects on economic growth and other development outcomes when focusing on different configurations of investments in economic and social development. The model gives results for a 40-year projection period.

4.1 Model Scenarios

After various considerations including the availability of relevant data, the year 2015 was chosen as the baseline for the projections. Targets for the most optimistic of the policy scenarios were mainly derived from five successful high income countries that collectively present various qualities that Rwanda would like to emulate, including high human capital development, technology intensive industries, high FDI, high productivity, visionary leadership and good governance, among others. These countries are Singapore, South Korea, Finland, Estonia, and Israel. With technologically driven, efficient, prosperous and forward-looking economies that Rwanda aspires to have, these countries are also balanced and diversified and therefore are less susceptible to economic shocks. The four policy scenarios used in the model are as follows:

I. **Business-as-Usual scenario:** Modelled on a case where the status quo, characterised by the persistence of high child-dependency ratios and relatively modest economic performance, persists over time. The country, though making some progress on most of the economic and social development indicators, would continue to perform well below its full potential. There would be no decisive action to address the widely acknowledged development bottlenecks in order to break away from the business-as-usual culture characterised by heavy reliance on foreign aid and low level of human capital. Rwanda would continue making only modest improvements in all sectors. In general, we assume that economic, education and family planning indicators would improve, but the improvement would be minimal and hence the country would not achieve the targets set out for its envisioned socio-economic transformation.

II. **Economic Emphasis scenario:** Represents a case where the country maximises its economic competitiveness and is decisively aggressive in addressing the economic challenges to development. It would put in place policies, systems, and resources to fully implement the economic programmes necessary to attain the ideals envisioned for its long-term development goals and operationalised through medium-term plans. In this scenario, Rwanda's progress was benchmarked against the indicators of five developed and economically advanced nations that the country would like to emulate namely Finland, Singapore, Estonia, Israel, and South Korea. This scenario represents the best economic case for Rwanda in terms of reforming the economy to enhance productive efficiency and accelerate economic growth, job creation, and poverty reduction. On the other hand there is little emphasis on social investments under this scenario, and therefore the education and family planning indicators are held constant at the same levels under the Business-as-Usual scenario.

III. **Social Emphasis scenario:** This scenario is designed to assess the net impact of maximum investments in the social sectors, particularly interventions that reduce family size and improve human capital, including family planning and education, while making modest investments in the economic sector. In this case, the investments and performance in the economic sector are at a similar level as the Business-as-Usual scenario. In particular, we increased modern contraceptive use from the 2015 level of 47.5 percent to 69.1 percent in 2050 and 72.2 percent by 2055. We assumed that since almost half of the women are already using contraceptives, CPR will increase at a slower pace. Evidence shows that increases in contraceptive use slows down at higher levels of contraceptive prevalence when non-users of family planning are mostly those not predisposed to use contraception due to self-assessment of fecundity, concern about side effects, and for religious or cultural beliefs (Ross, Abel, & Abel, 2004). The current highest levels of contraceptive use for middle income and developed countries are estimated between 65 percent and 82 percent. In 2015, the countries with high rates were: China (84 percent), United Kingdom (84 percent), Norway (82 percent), Portugal (82 percent), Brazil (77 percent) and Thailand (77 percent) (PRB, 2016). This means that as the CPR increases, the rate of increase will slow down, and therefore it is assumed that Rwanda will experience a much slower rate of increase of CPR compared to previous rates of increase. This is already being observed in the 2010/2015 period where the annual rate of change was 0.48 compared to 6.96 in 2010/2005. We also make the assumption that if Rwanda is to achieve the desired status of a technologically-driven middle income economy, then by 2055, young people, on average, should receive at least two years of post-secondary school training and certification. Thus the expected years of education would increase from the baseline level of 11 years to 14 years by 2055.

IV. **Combined scenario:** This scenario provides the best policy option for attaining the country's desired socioeconomic transformation to become a high-income country. The scenario adopts the best target indicators for economic competitiveness, education, and family planning and it enables assessment of the net impact of maximum prioritisation of family planning and education beyond effects of prioritisation of economic reforms namely the DD. This scenario entails determined commitment and action to develop high-quality human capital in Rwanda, comparable to high-income countries. The scenario envisions enabling women and their partners to avoid unintended pregnancies through universal access to effective methods of contraception. Furthermore, there are comprehensive reforms of the educational system resulting in increased years of schooling completed and access to quality education. These are critical to enhance the skills level and innovation of the labour force. Increasing completed years of schooling helps to keep girls in school, prevent early childbearing, and reduce fertility rate. For the education indicators, we assumed that for Rwanda to be economically competitive the country should achieve universal secondary education and a large proportion of the school-going population should attain at least two years of post-secondary training. The contraceptive prevalence rate was set at 72.2 percent, which would be among the highest

levels in the world. As the ideal scenario, the Combined scenario targets for education and family planning indicators are at the same level as in the Social Emphasis scenario, while the economic targets are the same level as in the Economic Emphasis scenario. Thus the Combined scenario should provide the best possible outcome.

The specific indicators used in the DemDiv model are presented in summary in Table 4.1. For each variable, we indicate the baseline value and the values used in the five policy scenarios. The meanings of the variables are defined in Appendix III.

Education Indicators

For economic growth to take root, countries have to nurture pools of well-educated workers who are able to perform complex tasks and adapt rapidly to their changing environment and the evolving needs of the production system. In this model, we use two indicators to show the impact of education on development; expected years of schooling and the observed mean years of schooling for males and females.

The *Expected Years of Education* refers to the total number of years of schooling a child who is of primary school entry age today can expect to receive over their lifetime, assuming that the probability of her/him being enrolled in school at future ages is equal to the current enrolment rate at those ages. We adopted the expected years of schooling computed by NISR from 2012 PHC as the baseline figures for 2015. These were 11.2 years for females and 11.4 years for males.

The *Mean Number of Years of Schooling* is the average number of years of schooling for the adult population 25 years and older. We adopted the figures computed from 2012 PHC: 3.3 years for females and 4.4 years for males.

The big difference between expected years of schooling and mean years of schooling that favour the former is a clear indication that school attendance rates are much better for the younger generations in Rwanda than they were for the older generations. It also indicates that the school attendance of females in Rwanda has seen a dramatic shift with the younger generation achieving parity in education participation with their male counterparts.

Compared to the five successful high-income countries identified above, Rwanda has a long way to go in improving educational attainment for its citizens. All the five countries have universal access to tertiary education with the years of schooling averaging at more than 17 years. Given that Rwanda is starting at low levels, it is realistic to assume that universal tertiary education may not be attained in 40 years but still ideal to pursue a target of at least two years of post-secondary education on average for all young people in the future as well as the attainment of gender parity in education at all levels.

Thus in 2055, under the Combined and Social Emphasis scenarios (where optimum investments are made in education training and skills development), the *expected years of schooling* for both females and males is set at 14 years. Under the Business-as-Usual and Economic Emphasis scenarios, where minimal investments are made in the sector, the target is set at 11.8 years for females and 11.9 years for males. These reflect a 20 percent improvement on the baseline figures (11.2 years for females and 11.4 years for males) relative to 14 expected years of schooling in the Combined scenario.

In 2055, under the Combined and Social Emphasis, where optimum investments are made in education training and skills development, the *mean years of schooling* for both females and males is set to 12 years - the current level derived from the average of the five reference countries. Under the Business-as-Usual and Economic Emphasis scenarios where minimal investments are made in the sector, the variable is set at 5.0 years for females and 5.9 years for males. These reflect a 20 percent improvement on the baseline figures relative to 12 years of completed schooling in the Combined scenario.

Family Planning Indicators

In this category, we focus on three indicators: the Contraceptive Prevalence Rate (CPR), the Period of Postpartum Infecundability (PPI) and Sterility. Family planning is a very important intervention for fertility rate decline since it enables women and their partners to prevent unplanned births.

Contraceptive Prevalence Rate: This analysis incorporates the use of both modern and traditional contraception among married women and those in union. The model assumption for contraceptive effectiveness is 95 percent for modern methods and 50 percent for traditional methods. The baseline contraceptive use levels for 2014 were 47.5 percent and 5.8 percent for modern and traditional methods, respectively.

The total demand for contraceptives in Rwanda has remained relatively unchanged between 2010 and 2015, at about 72.2 percent. Of this demand, about 74 percent was satisfied in both 2010 and 2015 with a contraceptive prevalence rate for all methods of 52 percent and 53 percent, respectively. Assuming that the total demand will remain about the same level, meeting the demand will result to contraceptive use for all methods increasing to about 72.2 percent by 2055. This assumption is based on evidence that suggests that increases in contraceptive use slows down at higher levels of contraceptive prevalence when non-users of family planning are mostly those not predisposed to use contraception due to self-assessment of fecundity, concern about side effects, and for religious or cultural beliefs (Ross et al., 2004).

Thus in setting 2055 projections for modern CPR, we set the Combined and Social Emphasis modern CPR at 72.2 percent which is in the historical range of the highest use of modern contraceptives globally. For the Business-as-Usual and Economic Emphasis scenarios that give less priority to social sector investments, we projected that the country will make 20 percent of the progress needed to achieve the best option, with modern contraceptive use increasing to 52.4 percent in 2055.

Table 4.1: Baseline and Target Indicators for Policy Scenarios

POLICY SCENARIO	REF. YEAR	INTERVENTION POLICY AREA													
		Education					Family Planning				Economic Sector				
		Expected Years Female	Expected Years Male	Mean Years Female	Mean Years Male	Mean Years (Male & Female)	CPR Modern Methods (Married women)	CPR Traditional methods (Married women)	PPI (Months)	Sterility (Percent All Women 45-49)	Labour Market Flexibility	ICT Use	Financial Market Efficiency	Public Institutions	Imports as % of GDP
Baseline	2015	11.2	11.4	3.3	4.4	3.9	47.5	5.8	11.8	1.9	5.2	1.2	3.8	5.5	35.0
Business as Usual	2055	11.8	11.9	5.0	5.9	5.5	52.4	5.0	11.6	1.9	5.4	2.0	4.0	5.6	35.0
Economic Emphasis	2055	11.8	11.9	5.0	5.9	5.5	52.4	5.0	11.6	1.9	6.1	5.3	5.0	6.1	35.0
Social Emphasis	2055	14.0	14.0	12.0	12.0	12.0	72.2	2.0	11.0	2.0	5.4	2.0	4.0	5.6	35.0
Combined	2055	14.0	14.0	12.0	12.0	12.0	72.2	2.0	11.0	2.0	6.1	5.3	5.0	6.1	35.0
Data Source		Census 2012					Rwanda Demographic and Health Survey,2014/15				World Economic Forum, Global Competitiveness Report 2015–2016				NISR GDP publications 2016

Traditional methods at 5.8 percent are assumed to decline overtime due to continued emphasis on use of effective modern methods, reaching 2 percent in 2055 under the Combined and Social Emphasis scenarios. Under the Business-as-Usual and Economic Emphasis scenarios, use of traditional methods of contraception will decrease marginally to 5 percent in 2055, representing 20 percent of the progress needed to reduce it to 2 percent achieved under the Combined scenario.

Postpartum Infecundability (PPI): The PPI is the duration after giving birth when a woman is not susceptible to pregnancy due to lactational amenorrhea and/or postpartum sexual abstinence. The 2015 DHS value in Rwanda for PPI was 11.8 months. This is the value used for the baseline in the model. Due to the counteracting effects of campaigns on exclusive breastfeeding for the first six months after birth, the increasing participation of women in formal employment and an expected continuation in decline in the period of postpartum sexual abstinence, the PPI is projected to change marginally over the next 40 years, decreasing to 11 months under the Combined and Social Emphasis scenarios. Only 20 percent of the progress needed to achieve this decline will be achieved under the Business-as-Usual and Economic Emphasis scenarios, with the value in 2055 set at 11.6 months.

Sterility: This is measured by the percentage of women in union who remain childless at the end of their reproductive years (ages 45–49). The percentage of Rwandan women who were childless in the 45–49 age group was 1.9 in 2015. Given the current low level of sterility, it was assumed that this level would remain stable under the Business-as-Usual and Economic Emphasis scenarios. Under the Combined and Social Emphasis scenarios, this would change marginally to 2 percent in 2055. With women increasingly delaying marriage and child bearing to concentrate on school and the labour market, the proportion of women who remain childless at the end of child-bearing years might increase slightly thus explaining the figure used in the Combined scenario.

Economic and Governance Indicators

The DemDiv economic sub-model captures a number of indicators to reflect the general economic situation and the extent to which the country has an enabling environment and infrastructure to promote job creation, economic productivity, and investments. These indicators were used as inputs to project the performance of the economy on a set of outputs, particularly GDP, GDP per capita, per capita investment, capital formation and employment.

Baseline estimates of output variables were obtained from official national statistics, except for the capital stock and capital stock depreciation rate, which were derived from the model dataset developed by the International Monetary Fund (IMF) (IMF, 2017). The share of imports to GDP was obtained from the NISR GDP Publications, 2016 (National Institute of Statistics of Rwanda, 2017).

The rest of the economic indicators were sourced from the Global Competitiveness Index (GCI), a cross-country database compiled by the World Economic Forum (WEF)[3]. Competitiveness is

[3]http://www3.weforum.org/docs/GGGR16/WEF_Global_Gender_Gap_Report_2016.pdf

defined as the set of institutions, policies and factors that determine the level of productivity of a country, and hence the level of prosperity that can be reached by the economy. It is a mix of economic indicators and the results of a survey of business leaders to measure how attractive a country is for investment. Although it does not cover every country in Africa, there is general convergence between it and the World Bank's Ease of Doing Business index. The database assesses the strengths and weaknesses of national economies by analysing the efficiency of various sectors and their contributions to productivity of the economy over time. The GCI database has many indicators/components that are grouped into 12 pillars of competitiveness. Each indicator, with the exception of imports as a percentage of GDP, is presented on a scale of 1 to 7, with 7 as the best performance. For this report and in line with the DemDiv model, we selected indicators from four pillars: *Institutions (1st pillar), Labour Market Efficiency (7th pillar), Financial Market Development (8th pillar), and Technological Readiness (9th pillar).*

The 12 GCI pillars are further organised into three sub-indices in line with three main stages of development: basic requirements (factors), efficiency enhancers, and innovation and sophistication factors. The three sub-indices are given different weights in the calculation of the overall index, depending on each economy's stage of development, as proxied by its GDP per capita and share of exports represented by mineral raw materials. Countries with GDP > $ 2,000 (where Rwanda falls), are classified under basic requirements (factor driven), and 60 percent of the weight is given to variables classified under this stage. These include institutions, infrastructure, macroeconomic environment, health and primary education. The efficiency enhancers include higher education and training; goods market efficiency; labour market efficiency, financial market development, technological readiness and market size. For a detailed description see appendix III.

The 2015-2016 figures for Rwanda were used as the baseline for GCI variables (World Economic Forum, 2016). Under the Business-as-Usual scenario, the country will continue to perform below its full potential and attain about 20 percent of the improvement it requires to catch up with the GCI indicators for the five benchmark high income countries. The Economic Emphasis scenario thus pegs Rwanda's target to the GCI indicators for these high-income countries with the exception of "imports as a percentage of GDP".

Labour Market Flexibility: This falls under the 7th pillar on Labour Market efficiency. Flexibility creates a positive effect on worker performance and on the attractiveness of the country for talent and high quality skills. This pillar is critical for ensuring that workers are allocated to their most effective use in the economy (based on their skills) and provided with incentives to give their best effort in their jobs. Labour market flexibility enables shifting of workers from one economic activity to another rapidly and at low cost and allows for wage fluctuations without much social disruption. It provides for equity in the business environment between women and men. The components that make up this pillar include cooperation in labour-employer relations, flexibility of wage determination, hiring and firing practices, redundancy costs and effects of taxation incentives on work.

Rwanda's labour market flexibility baseline index is 5.2. For this indicator, we set the target for the best scenario as 6.1, which corresponds to Singapore's 2015 value. Singapore has one of the world's most developed human resource bases and is ranked among best countries for attracting talent and FDI. We assume that Rwanda would like to emulate this aspect of Singapore by 2055. We also assume that under the Business-as-Usual and Social Emphasis scenarios, the index will increase to 5.40, representing 20 percent of the increase the country needs to make to reach 6.1 that is set as the Economic Emphasis and Combined scenario values projected for 2055.

Financial Market Efficiency: The 8th Pillar, financial market development, deals with allocation of national resources and foreign direct investments in the different sectors. An efficient financial sector should channel resources to those entrepreneurial or investment projects with the highest expected rates of return rather than only to those who are politically well-connected. To ensure financial efficiency, economies require sophisticated financial markets that can make capital available for private-sector investment from a sound banking sector, well-regulated securities exchanges, venture capital, etc. The banking sector therefore needs to be trustworthy and transparent and appropriately regulated to protect investors and other actors in the economy at large. The constituent components of this sub-pillar include: availability and affordability of financial services; local equity market financing; ease of access to loans; and venture capital availability.

As in many countries in SSA, financial market efficiency in Rwanda is in its early stages of development, yet it is a fast growing sector. Financial market is one of the priority areas in Rwanda's development vision, with an aim to diversify the economic base for the country. With the right policy measures in place, the country can expect rapid growth in the sector and the concomitant enhancement of economic growth that these developments can foster. The target for the best scenario is set at 5.0, which is the 2015 level for Finland, with world-renowned ability to attract big FDI and effective financial systems. Under the ideal conditions, we assume that the financial market efficiency index will increase from the baseline value of 3.8 to 4.0 under the Business-as-usual scenario and the Social Emphasis scenario. This represents 20 percent improvement compared to the desired value of 5.0 for the Economic and Combined scenarios.

ICT Use: The technological readiness pillar (9th pillar), measures the agility with which an economy adopts existing technologies to enhance the productivity of its industries, with specific emphasis on its capacity to fully leverage information and communication technologies (ICTs) in daily activities and production processes for increased efficiency and enabling innovation for competitiveness. ICT use constitutes proportion of the population using internet, the number of fixed broadband internet subscriptions per 100 people, internet bandwidth (kb/s per user) and the active mobile broadband subscriptions per 100 persons.

While Rwanda's baseline score for this measure is quite low at 1.2 out of 7, it is acknowledged that the ICT sector is a fast developing area and uptake over the next 40 years is likely to increase

rapidly as the country becomes more integrated in the global economy and ICT becomes central to doing business and to everyday life. In addition, the government's vision for developing an "innovation city" that will attract and house technology companies and institutions should promote a digital transformation. The assumption, therefore, is that the progress in this area by 2055 under the Economic Emphasis and Combined scenarios would likely mirror the 2015 value for Estonia, which has very advanced technological innovations, including being the headquarters for Skype, at 5.3. To attain a fifth of the progress needed to achieve the Combined Scenario of 5.3, the target for the Business-as-Usual and Social Emphasis scenarios was placed at 2.0. Another important consideration is that ICT plays a big role in the change in total factor productivity (TFP), which in turn affects GDP. This is based on regression equations in the model that showed that, of the three factors influencing TFP; institutions, goods market efficiency and technological readiness, ICT had the highest coefficient, almost double the impact of institutions on TFP. As such, ICT use is given a lot of weight in change of GDP in the model.

Public Institutions: This pillar represents the accountability mechanisms and strategies that have been laid out to promote and protect both local and foreign investments. The legal and administrative framework in which individuals, firms and governments interact to generate wealth determines the institutional environment. The effective functioning of public institutions influences investment decisions and the organisation of production. Government attitudes toward markets and freedoms and the efficiency of its operations are key. Excessive bureaucracy and red tape, overregulation, corruption, dishonesty in dealing with public contracts, lack of transparency and trustworthiness, inability to provide appropriate services for the business sector, and political dependence of the judicial system can impose significant economic costs to businesses. These would significantly slow the process of economic development.

Proper management of public finances also falls under this pillar and is critical for ensuring trust in the national business environment. The components of this sub-pillar are: i) property rights and intellectual property protection; ii) ethics and corruption that includes diversion of public funds, public trust in politicians, irregular payments and bribes in awarding of contracts, taxation payments, and favourable judicial decisions; iii) undue influence that affects judicial independence and favouritism in decisions involving government officials; iv) government efficiency that includes wastefulness of government spending, burdens of government regulation, efficiency in legal frameworks in settling disputes and challenging regulations and transparency in government policymaking; v) security (business cost of terrorism/crime/violence, and reliability of police services).

Good governance is the first pillar of Vision 2020, and is clearly mainstreamed in the development strategies, which stress that good governance and an effective and capable state as a basic condition to stimulate a harmonious development of the other pillars of the Vision. The Vision defines good governance to include accountability, transparency and efficiency in deploying scarce resources, but also respect for democratic structures and processes, commitment to the rule of law and

Table 4.2: Other Baseline Values for Calculating Model Output Indicators

Category	Indicator	Base Year (2015)	Data Year and Source
Health	Percentage married (female)	51.7	Rwanda DHS, 2014/2015
	Total fertility rate (TFR)	4.2	
	Percentage of high-risk births	25.9	
	Infant mortality rate (IMR)	32	
	Under-five mortality rate (U5MR)	50	
	Maternal mortality ratio (MMR)	210	
	Female life expectancy	67.5	NISR, PHC, Population projections, 2015
	Female-male life expectancy difference	3.8	NISR, PHC, Population projections, 2015
	Contraceptive Effectiveness Modern Methods	0.95	Assumptions
	Contraceptive Effectiveness Traditional Methods	0.50	
Economic	Capital formation per capita	194	National Accounts Report, 2017
	Initial employment	5,558,268	NISR, EICV 4, 2014*
	Initial employment growth rate	3.7	NISR, EICV 3&4, 2010 & 2014*
	GDP per capita (USD)	735	National Accounts Report, 2017
	Ratio of capital stock to pop 15+	4,096	IMF Investment and Capital Stock Dataset, 2017
	Initial GDP growth rate	7.6	Average GDP growth rate for the last 10 years drawn from the National Accounts Report, 2017
	Capital stock growth rate	8.3	Computed
	Labour Force Participation Rate	0.86	NISR, EICV 4, 2014*
	Capital stock depreciation rate	4.3	IMF Investment and Capital Stock Dataset, 2017
	Primary education costs as percent of GDP per capita	7.6	Estimated using MINECOFIN: Government expenditures on Education; NISR: EICV4: Household Expenditures on Education and MINEDUC: Statistical Yearbook 2016, Number of Students

**Base year is 2015 except where there is an asterisk the data is 2014*

the protection of human rights. Inclusion of an indicator on public institutions together with economic indicators is thus in line with the country's ideals. The 2015 score on public institutions for Rwanda is 5.5. Consequently, the target score under the Economic Emphasis and Combined scenarios is set at the 2015 level for Finland, at 6.1, which boasts well-functioning and highly transparent public institutions, and private institutions seen to be among the best run and most ethical in the world. Under the Business-as-Usual and Social Emphasis scenarios, the model projects that the capacity of Rwanda's public institutions to enforce accountability in service delivery and the use of public resources, and to ensure the protection of lives, investments, and property would improve modestly (from 5.5 to 5.6).

Under the GCI, Rwanda is classified under stage one with a basic factors driven economy. Rwanda ranks highest in institutions and lowest in infrastructure. Rwanda should therefore work on improving its infrastructure to attract more FDI and transform its economy. Under the efficiency enhancers, the country scores highest in labour market efficiency, and lowest in higher education and training. The GCI also shows that Rwanda scores low on technological readiness, which is one of the focus area to grow its economy. All these sectors that are struggling are clearly highlighted in the country's development plans and strategies on how to address the challenges clearly outlined. Poor infrastructure including transport, communication and technology, poorly developed human capital are some of the key constrains to economic transformation. Addressing these challenges will be paramount for Rwanda to achieve its aspirations of a prosperous country with high living standards.

Share of Imports as a Percentage of GDP: High levels of imports, as a percentage of GDP, can undermine socioeconomic development, capital formation and prospects for mass creation of jobs in the local economy. Imports as a percentage share of GDP in Rwanda between the year 2012 and 2016 were around 33 percent. In 2015, the baseline year, imports as a percentage of GDP increased to 35 percent, driven mainly by consumer goods. Rwanda should strive to import less consumer goods while at the same time exporting more products to ensure a positive balance of trade. With the continued push to promote local manufacturing, there is a possibility for the imports to be higher in the near future, driven by capital goods. However, concerted efforts to reduce imports of consumer goods, coupled with declining imports of capital goods as new industries decline over time, while at the same time increasing exports, is likely to maintain the average level of imports as a percent to GDP at the current level over the next 40 years. In modelling, this variable was not varied, and thus 35 percent was used for all the scenarios.

Other Baseline Indicators

Table 4.2 lists the other DemDiv model inputs that are used as baseline indicators for various outputs of the model. All data were drawn from national data sources and official reports, except the capital stock and the capital stock depreciation rate, a constant drawn from the IMF Investment and Capital Stock Dataset, 2016.

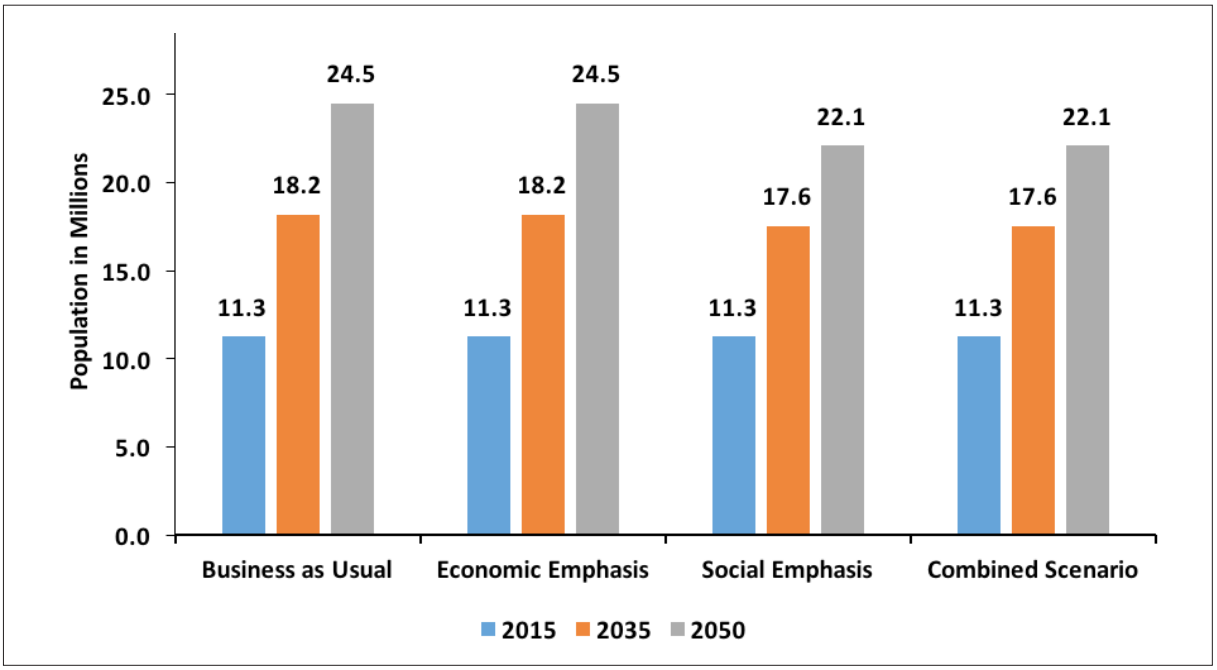
4.2 Modelling Results

The results presented here show the 2050 figures in line with Rwanda's long term development vision. This represents a 35-year projection from 2015. Of note is that the results presented in this section provide direction on the impact of government investment policies, rather than the actual numbers in terms of economic growth and population characteristics, which could be higher or lower depending on other factors that influence development in general.

Population Size and Structure

The starting point to earning the demographic dividend is the change in age structure from one dominated by child dependents to one dominated by the working-age population. Figure 4.1 shows the population projections under all the four scenarios. Population size under the Business-as-Usual and Economic Emphasis are the same in 2035 and 2050, at 18.2 Million and 24.5 million people, respectively because underlying FP assumptions are the same. This also applies under the Social Emphasis and Combined Scenarios with population size of 17.6 million and 22.1 million people by 2035 and 2050, respectively. Recognising the limitation of the model where it does not take into account the loop back effects on improved economic growth and education achievement on the population, it is possible that the population will be much lower than the figures showed in this chart if it follows integrated investments (DD) framework.

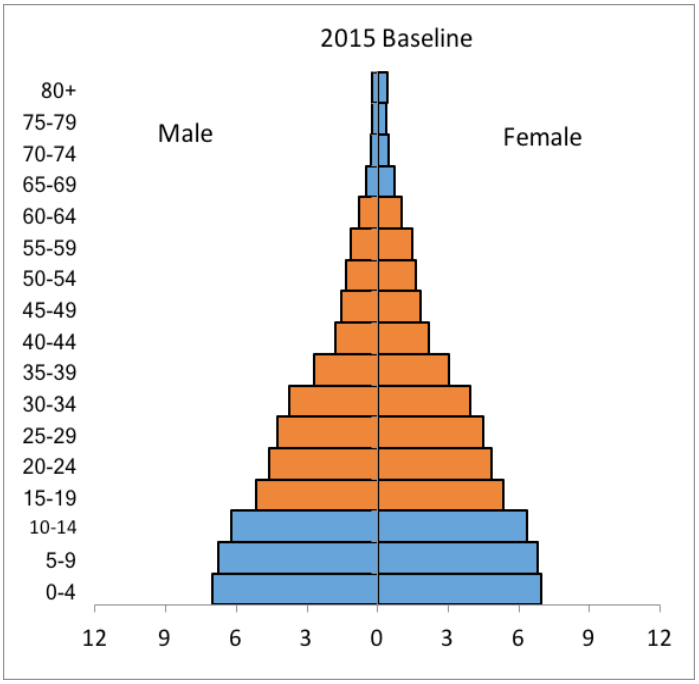
Figure 4.1: Baseline and Projected Population Size by Policy Scenario



Source: Modelling Results

Figure 4.2 illustrates the 2015 baseline age-sex distribution also known as the population pyramid and key population features in Rwanda. Figures 4.3 – 4.6 in relation, show the projected age-sex distribution of Rwanda's population for 2035 and 2050 for each of the four policy scenarios.

Figure 4.2: Baseline Population Pyramid and Key Features



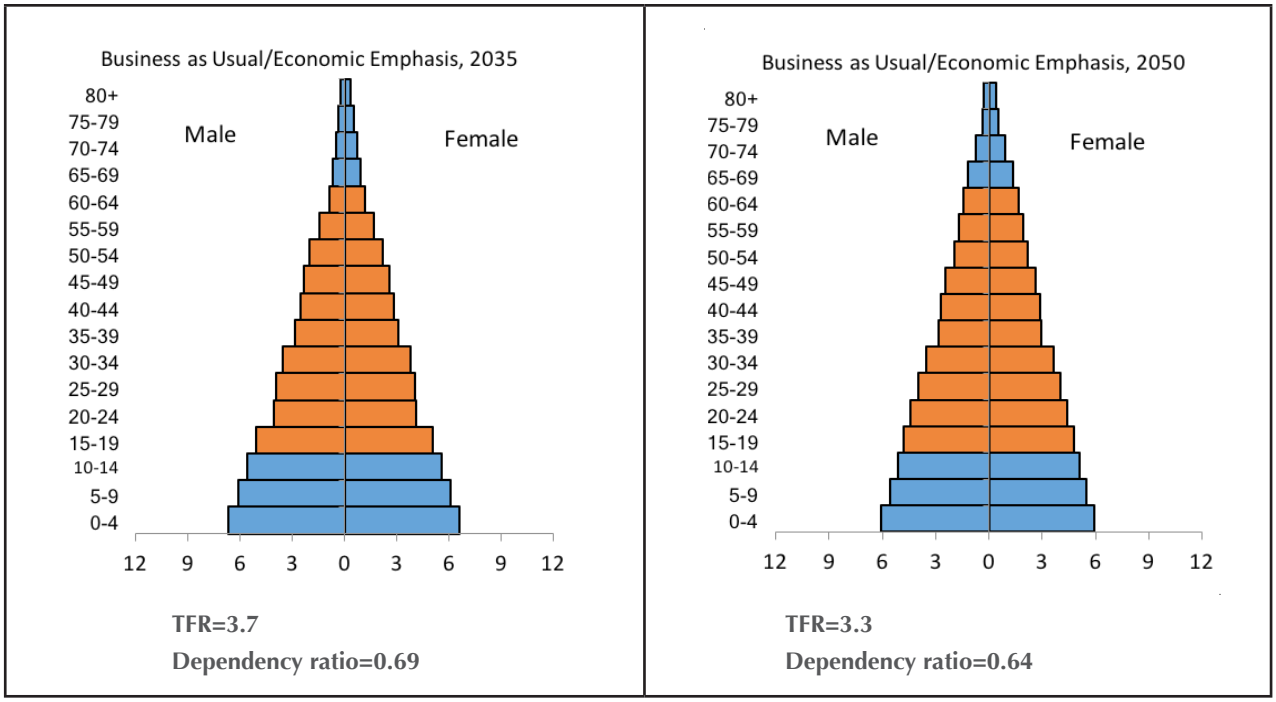
Key Features

Population: 11.3 million
Population ages 15+: 6.7 million
Population <15: 40 percent
Total fertility rate: 4.2
Female life expectancy at birth: 67.5 years
Dependency ratio: 0.76

Source: Modelling Results

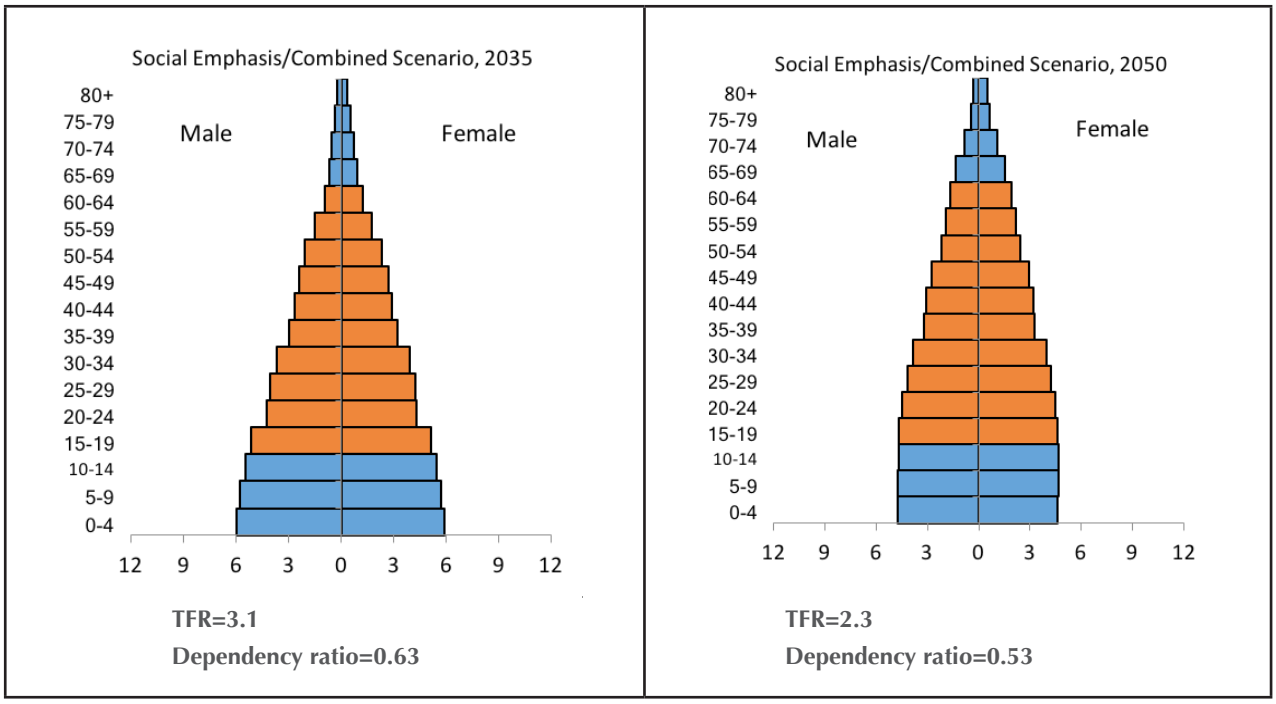
Under the *Business-as-Usual/Economic Emphasis* scenario (Figure 4.3), total fertility rate would decline from 4.2 in 2015 to 3.3 children per woman in 2050. The total population would rise to 24.5 million in 2050, up from 11.3 million in 2015, with the population below 15 years constituting 33 percent of the total population, seven percent lower than in 2015. This will result in a marginally lower dependency burden of 64 dependents for every 100 people of working age in 2050. Female life expectancy will increase by two years to 69.6 years in 2050 with declining mortality due to better access to health care. Clearly, though the projected progress under the both scenarios is positive, Rwanda will still be saddled by a high child dependency burden and will be performing well below its potential for socio-economic development. As a result, the current challenges facing the country will still continue unabated, with high poverty rates, high cost of social services due to the demand from many children at school and those requiring health care services and limited economic growth.

Figure 4.3: Projected Population Pyramids for the Business-as-Usual and Economic Emphasis Policy Scenarios



Source: Modelling Results

Figure 4.4: Projected Population Pyramids for the Social Emphasis and Combined Policy Scenarios



Source: Modelling Results

Total fertility rate would decline to 2.3 children per woman in 2050, which is close to the replacement fertility rate level, if the *Social Emphasis/Combined scenarios* (Figure 4.4) are to prevail. This represents a rapid decline in fertility rate that leads to a significant shift in the population pyramid leading to a working-age bulge and a meaningful reduction in child dependency burden. Under these scenarios, by 2050 the population will have risen to 22.1 million people (2.4 million fewer than under the *Business-as-Usual* and *Economic Emphasis* scenarios) and the population below 15 years will constitute 28 percent of the population. As a result, the dependency ratio will decline to 0.53, meaning that for every 100 working people, there will be 53 dependents. Under this scenario, female life expectancy will increase to 73.6 years. The low child dependency burden both at household and country level can free up resources for greater investments per capita in education and health as well as enable greater levels of savings. The end result of such changes would be higher quality human capital, with more savings that can be invested to create more jobs for the population.

Growth in Per Capita GDP

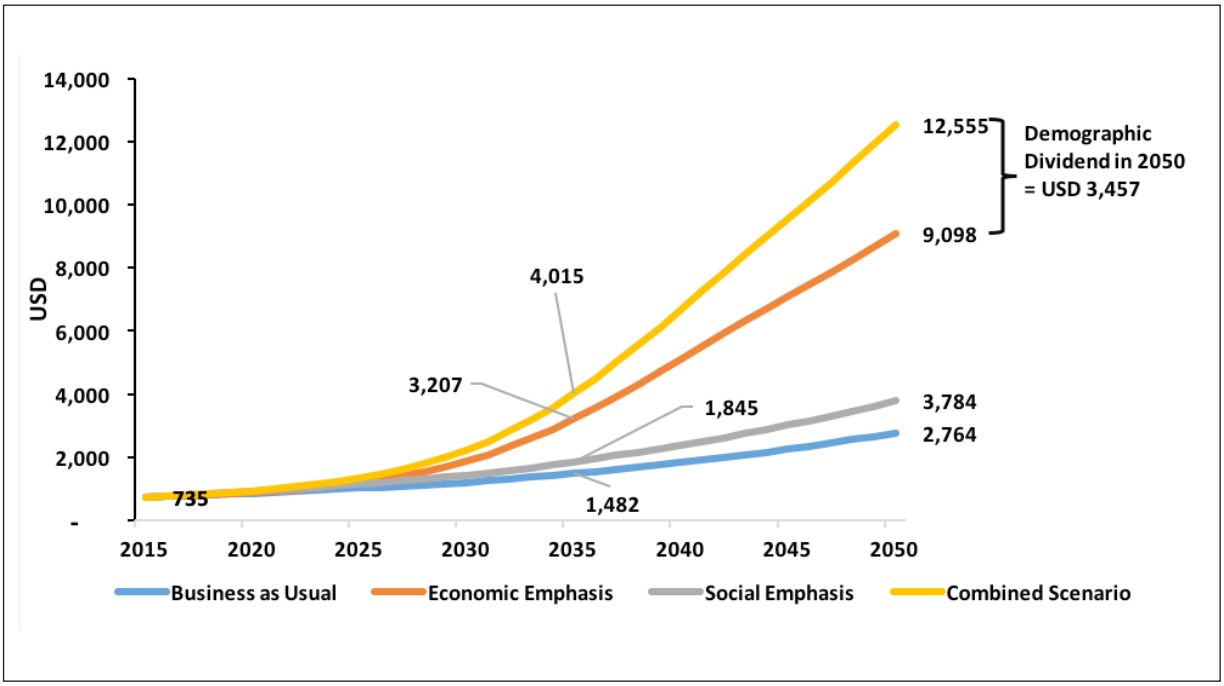
GDP is the key result from the DemDiv model that illustrates the potential impact of the demographic dividend under the different policy scenarios. In particular, the difference in GDP per capita between the Economic Emphasis scenario (where maximum efforts are placed in the economic sector with little investments in the social sector) and the Combined scenario (where optimal investments are made in the social sectors in addition to maximum investments in the economic sphere), estimates the demographic dividend that can be earned through a strategy of optimal integrated investments in multiple dimensions of socio-economic development relative to an economic emphasis strategy. Again the results below are not prescriptive, but rather indicative of the extent of the effects of various investments options by the government. The actual GDP and GDP per capita to be realised depend on actual investments. Thus it can be higher or lower than the model outcome.

The results show that GDP will grow from the 2015 level of US$ 8.3 billion to US$ 68 billion in 2050 under the Business-as-Usual Scenario, and slightly higher to US$ 84 billion under the Social Emphasis scenario. Under the Economic Emphasis scenario, GDP will be increase rapidly by 2050 to US $223 billion, and it will be highest at US$ 277 billion under the Combined scenario. When the population size is applied to the projected GDP, Rwanda will earn a massive dividend under the Combined scenario. As Figure 4.7 overleaf shows, GDP per capital will increase from the 2015 level of US $ 735 to US$ 2,764 in 2050 under the Business-as-Usual scenario. Under the Social Emphasis scenario, per capita income will increase to US $ 3,784, while under the Economic Emphasis, it will increase to US $9,098 by 2050. However, if integrated investments are made in all sectors, the income per capita will increase to US$ 12,555 by 2050. This implies

that if the government went beyond a strategic focus on investments in the economic sector, and embraced integrated implementation that simultaneously focuses investments in the social sector, the country would earn about an additional US$ 3,457 by 2050 above what it would earn by investing in the economic sector only. This is the potential demographic dividend that Rwanda can reap.

Rwanda aims at being a developed country with high living standards for its populace. According to the model results, this level of growth is likely to be achieved under the Combined scenario, with a GDP per capita of US$ 4,015 by 2035 and US$ 12,555 by 2050, which falls in the high-income country categorisation. The GDP per capita achieved under the Economic scenario will be below target, at US$ 3,207 in 2035 and US$9,098 by 2050. It is worth noting that for Rwanda to achieve, upper middle income and high-income level by 2035 and 2050, respectively, the country will have to grow on average at 9.98 percent for the whole projection period. The implication is that the country has to move fast to address the development challenges currently faced, so as to lay structures for economic take-off. This will require concerted and integrated efforts from all sectors and all players in the economy, including the private sector. It is worth noting that the model is not meant to give precise prediction of the per capita GDP that the country will achieve, rather the results are based on the assumptions agreed on by the modelling team to show the relative contribution of various broad scenarios to economic growth, and to highlight the importance of integrated development. based on the investment policies followed by the government, the actual results can be higher or lower than the model results.

Figure 4.5: Growth in Per Capita Gross Domestic Product (GDP) by Policy Scenario, 2012-2015



Source: Modelling Results

To see the effect of maximum investments in the education sector, we modelled two more scenarios; one on projected income per capita with business as usual investments in the economic sector and maximum investments in education sector (Combined scenario values), and another with maximum investments in the economy and education sector. The results showed that focusing on education only will increase income per capita to US$ 3,449 by 2050, which is higher by only US$ 685 than the Business-as-Usual Scenario. Combining maximum investments in education and economic sectors will yield a GDP per capita of US$ 11,411 by 2050. On the other hand, making maximum investments in the economic sector while at the same time making effective modern contraceptive use universally accessible will yield an income per capita of about US$ 10,187 by 2050. These additional scenarios show that investing either in education or family planning combined with the economic sector, will result in higher economic growth for the country. However, this will be below the potential the country can achieve if it simultaneously invested in the three sectors, which is the Combined scenario, yielding US$ 12,555 in 2050. This, therefore, calls for integrated investments in all the relevant sectors to develop quality human capital but also ensure economic reforms to create jobs for the labour force which together result to faster and higher economic growth.

Human Development

The HDI is a composite measure of average achievement in key dimensions of human development: a long and healthy life, being knowledgeable and having a decent standard of living, measured using life expectancy at birth, years of schooling, and per capita gross national income. Under the Business as Usual scenario, HDI would increase to 0.560 by 2050. At this level, Rwanda would be ranked at position 144 based on the 2011 global rankings compared to position 153 at baseline. HDI will increase to 0.63 in 2050, ranking Rwanda at position 93 globally, based on 2011 rankings, under the Economic Scenario due to the focus on the economic inputs resulting to higher economic growth which will increase HDI. Under the Social Emphasis scenario, HDI will increase to 0.68, ranking Rwanda 63rd globally based on 2011 HDI rankings. This is because of higher life expectancy under this scenario. The Combined scenario will result to a HDI of 0.76 in 2050, with a ranking of 38 globally based on 2011 rankings. This is because of the greater investments in the economic sector under the Combined Scenario than under the Social Emphasis scenario, with a higher economic output. Rwanda would thus graduate to be among the highly developed countries in the world under this scenario by 2050.

Working Age Population and Job-Creation Challenge

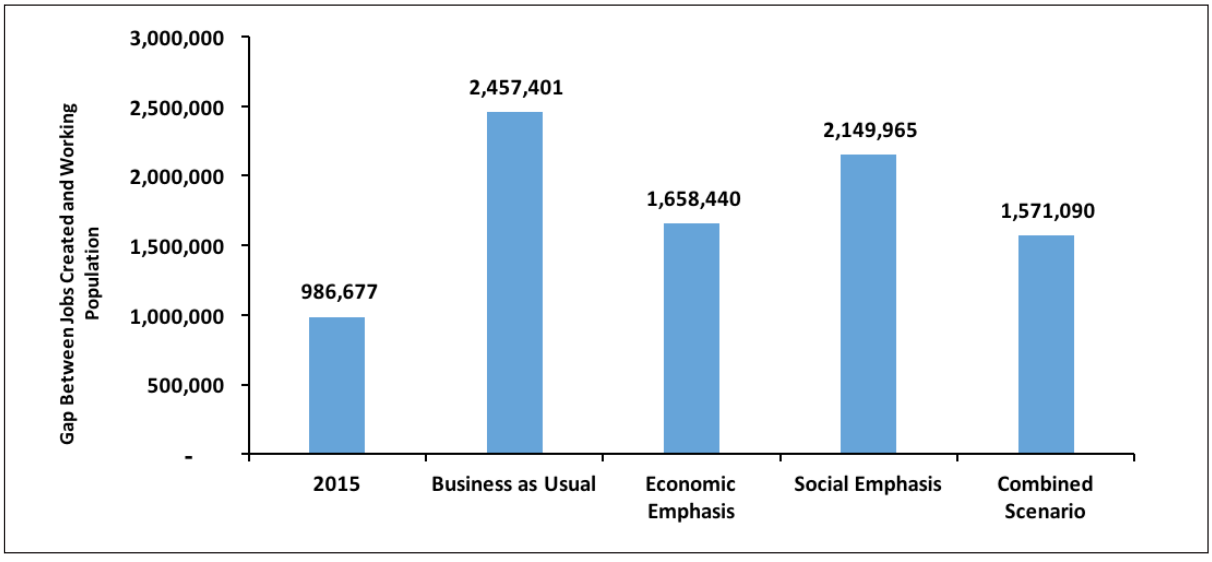
Although the sustained economic growth in the last decade has created some jobs (about 200,000 annually), the rate of growth in jobs has not been adequate to keep up with the demand for jobs by the ever growing number of young people who join the labour force annually. This challenge will become severe with the expected growth in the working age population as fertility rate declines in the foreseeable future unless concerted efforts are made to generate jobs rapidly. This

is because as fertility rate declines, the youth bulge created will increase the demand for jobs, exacerbating the unemployment crisis. This implies that creation of employment opportunities should be higher than the 3.7 percent achieved between 2010 and 2014. One aspect of the DemDiv model attempts to model the gap between the population employed and population in the working ages (15years+) over the projection period. This takes into account the changing age structure and the employment growth rate.

With an initial employment growth rate of 3.7 percent (Rwanda's employment growth rate between 2010 and 2014 computed from Integrated Household Living Conditions Surveys (EICV 3 and EICV 4)) at baseline, the model results show that the country will continue to grapple with a significant demand for job-creation under all the four policy scenarios that are characterized by significant increase of the working age population aged 15 years and above. According to the mid-term review of Vision 2020 implementation, 200,000 off-farm jobs were created annually between 2000 and 2012. Based on EICV4, 5,558,268 people were employed in 2015, against a working age population of 6,744,945, indicating a theoretical employment gap of 1,186,677 in 2015 (Its theoretical because most of the population below 20 years are still in school and therefore not looking for jobs, yet its included in the working age population). If the rate of creating jobs at 200,000 annually continues, the employment gap will be very huge, as summarised in Figure 4.8.

In 2015, the gap between the created jobs and the demand among population aged above 15 years was 987 thousand jobs. With the projected population growth, this gap will increase to 2.5 million by 2050 under the Business as Usual scenario, declining to 2.1 million under the Social Emphasis scenario. The job gap will be smallest under the Combined scenario, at 1.6 million due to slower population growth and more jobs created from increased investments in the economy of the country.

Figure 4.6: Baseline and Projected Gap between Jobs Created and the Working Age Population, 2015-2050



Source: Modelling Results

As earlier indicated, these numbers show that Rwanda will face an unprecedented challenge in creating enough jobs for its rapidly growing labour force. Although the model is not able to measure the type of jobs created (whether decent or not), it is clear that high quality jobs, not limited to subsistence agriculture or temporary constructions jobs, will be required to improve the general living standards of the population and ignite a socio-economic transformation of the nation.

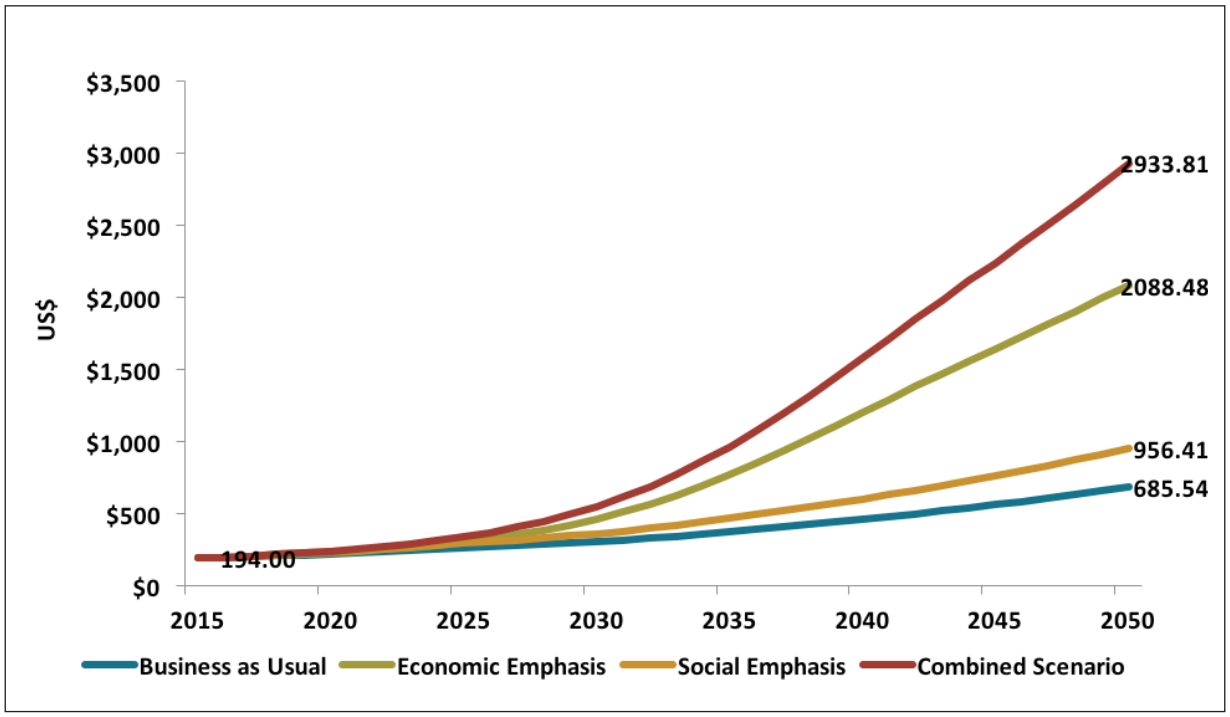
Capital Formation and the Second Demographic Dividend

For Rwanda to maximise its demographic dividend, the country has to focus not only in reducing its fertility rate to change its population age structure to one with more working age people, but also invest in developing its human capital through quality education and health care, and ensuring job-oriented economic reforms. The temporary working age bulge leads to the first demographic dividend. This is however transient, and as the demographic transition begins to tend towards ageing, the first demographic dividend can turn negative with increasing dependency burden from the aging population, slowing down economic growth. A second DD can occur if, because of longer life expectancy and the need to save for longer retirement, there is an increase in savings and investments by the working-age cohort (Bloom & Canning, 2001; Bloom, Canning, & Graham, 2003; Bloom & Williamson, 1998).

The second dividend evolves as the first dividend is waning, when there is a reduction in the working-age cohort due to population ageing (Mason, 2005). A country must have in place the right policies and a well-developed financial sector to incentivize savings and investments if it is to reap the second DD (Canning *et al.*, 2015). Unlike the first DD, the second dividend is not transitory, in that a permanent increase in capital and per-capita income could accrue as a result of population ageing (Lee *et al.*, 2003). To ensure that the country benefits from the second DD, it should foster a culture of savings and investments. This also entails attracting external investors in the country, by having a productive and skilled labour force, coupled with a favourable business environment. Increased investments, both domestic and foreign, will drive development of economic infrastructure and capital formation, which boosts economic productivity. Harnessing the first demographic dividend and maximising the second demographic dividend can therefore go a long way in providing Rwanda with a real stimulus for achieving the socio-economic transformation it envisions by 2050.

Figure 4.9 shows projections in per capita capital formation under the four policy scenarios. Fixed capital formation measures how much of the new value added in the economy is invested in fixed assets (less disposals of fixed assets) by the business sector and governments, rather than consumed. The results show that the per capita capital formation would rise from US$194 at baseline, to US$ 686 under the Business-as-Usual scenario, US$ 956 under the Social Emphasis scenario, US$ 2,088 under the Economic Emphasis scenario, and US$ 2,933 under the Combined scenario by 2050.

Figure 4.7: Growth in Projected Per Capita Capital Formation by Policy Scenario, 2015-2050



Source: Modelling Results

Summary of Modelling Results

The modelling results show that Rwanda can achieve the envisioned upper middle and high income status by 2035 and 2050, respectively. However, the country has to adopt an integrated approach to investments that both prioritises economic reforms and job creation as well as investing in human capital development. The country will need to facilitate rapid fertility rate decline to reduce dependency burden, and create a bulge in the working population. This is captured under the Combined scenario. With the decline in fertility rate and other investments in human capital development and economic reforms, Rwanda's income per capita will increase to the level of a high income country by 2050. This will not be achieved if the country takes on the Economic Emphasis or the Social Emphasis strategy.

Having a Social Emphasis strategy in combination with Economic emphasis leads to a smaller population size and a smaller child dependency burden that increases savings that can be ploughed into investments while reducing the costs of social services. Among others, these changes can enhance socioeconomic development leading to the harnessing of the DD. The DemDiv modelling results are summarised in Table 4.3 overleaf.

Table 4.3: Summary of Modelling Results by Policy Scenario

Indicator	Baseline (2015)	Business as Usual	Economic Emphasis	Social Emphasis	Combined Emphasis
Total Population (millions)	11.3	24.5	24.5	22.1	22.1
Population <15 (percent)	40	33	33	28	28
Dependency ratio (population ages 15–64 divided by population <15 and 65+	0.76	0.64	0.64	0.53	0.53
Total fertility rate (number of children per woman)	4.2	3.3	3.3	2.3	2.3
Under-five Mortality Rate (Deaths per 1000 live births)	50	30	30	12	12
Life expectancy at birth (female)	67.5	69.6	69.6	73.6	73.6
Human Development Index (HDI)	0.42	0.56	0.63	0.68	0.76
Expected years of schooling (Both male & female)	11.3	11.77	11.77	13.68	13.68
Mean years of education (Both male & female)	3.85	5.55	5.55	11.56	11.56
Per capita GDP (USD)	735	2,784	9,098	3,784	12,555
Gap between jobs created and the demand for jobs by working age population (millions)	0.99	2.46	1.66	2.15	1.57
Investment per capita (USD)	194	686	956	2,088	2,934

Source: Modelling Results

5 Policy Options for Harnessing the Demographic Dividend in Rwanda

This study sought to demonstrate the magnitude of the DD that Rwanda can earn under different policy scenarios and identify policy options that the country can adopt to harness the DD in line with its aspirations to graduate from a low income to an upper middle-income country by 2050. Below we highlight the policy options identified by the Core Technical Team and through the review of various policy and programme documents. Efforts to improve the health and ultimate productivity of the work force should adopt a life-cycle approach that recognizes that poor child health and malnutrition has long term effects on schooling, earning capacity, and general wellbeing.

5.1 Accelerating Fertility Decline

A key first step for Rwanda to reduce the child dependency ratio and open the window of opportunity for harnessing the DD is to facilitate rapid voluntary fertility decline by ensuring universal access to family planning, keeping girls in school and enhancing female education, and reinforcing efforts in reducing child mortality. In the immediate period the policy actions should focus on reinvigorating the stalled progress in contraceptive use and fertility decline. In the medium to long term policy actions should focus on addressing the structural factors that promote dropout from school among girls and reducing the slowly declining neonatal mortality rates.

Short-term policy options for accelerating fertility decline include:

i. Review and operationalize the FP2020 commitments and the FP Strategic Plan, and address programme bottlenecks identified in the mid-term review of the Health Sector strategic plan, with a focus on enhancing the role of the private sector in delivering and resourcing family planning and scaling the community based distribution of family planning.

ii. Improve contraceptive method mix and promote use of long-acting and permanent methods of family planning to satisfy the reproductive needs of women who want to stop childbearing or delay births for several years.

iii. Advocate for revision of Article 7, Chapter II (Rights in terms of human reproductive health) of the 2016 Reproductive Health Law that states that "subject to provisions of other laws, every person having attained the majority age has the right to decide for oneself in relation to human reproductive health issues", which might be used to restrict access of reproductive health services to adolescents below age 18.

iv. Ensure implementation of the comprehensive sexuality education programme in schools and enhance access to youth friendly SRH services by training facility and community based service providers.

Medium to long-term policy options for accelerating fertility decline include:

v. Reinforce interventions to reduce child mortality, focusing on improving maternity and delivery care and strengthening management of post-partum health complications to accelerate reduction of the slowly declining neonatal mortality rates.

vi. Strengthen multi-sectoral collaboration in implementing the integrated nutrition policy and the child nutritional programme to improve child health and learning outcomes.

vii. Address the structural factors that promote dropout from school among girls and scale up mass education campaigns for the empowerment of women and to reduce teenage fertility and early marriage and entrench the small family norm to reduce fertility rate to below the current desired fertility of three children.

5.2 Creating a Healthy Workforce

Rwanda's work force bears a double burden of disease from both communicable and non-communicable diseases, worsened by insufficient and unequal distribution of health workers, health facilities and health financing. In the short term, efforts to improve the health of the workforce should focus on reinforcing ongoing interventions aimed at improving the effectiveness of the health system in ensuring universal access to and quality of curative and preventive health services. In the medium to the long term, efforts should focus on building capacity of the health system to prevent and manage non communicable diseases, developing sustainable health financing models, including reinforcing public-private partnership in health care delivery.

Short term policy options for developing a healthy workforce include:

i. Conduct regular recruitment and training of community health workers to replace those leaving the programme, ensuring improved livelihood opportunities and other incentives for the workers.

ii. Enhance health education to sensitise Rwandan people on prevention of emerging non-communicable diseases and strengthen the capacity of the health care system to manage these diseases, as articulated in the NCD policy.

Medium to long-term policy options for developing and maintaining a healthy workforce include:

iii. Fully implement the health human resource policy and operationalize the comprehensive human resource information system to ensure adequate numbers of personnel are recruited, trained, equitably deployed and incentivised.

iv. Operationalize the health financing strategy to ensure sustainable funding of the health sector, with particular attention to improving management and coverage of the Community-Based Health Insurance scheme, performance-based financing, and public-private partnerships in health care delivery and financing.

5.3 Improving Education and Skills Development

The education sector in Rwanda has made progress towards achieving close to universal enrolment in primary schools and improving enrolment in secondary education. In order to develop a highly skilled and globally competitive labour force, which is central in enabling Rwanda's achieve its socioeconomic transformation agenda and harness the DD, immediate attention should focus on addressing the implementation hurdles in on-going efforts to improve the quality and relevance of basic education. In the medium to long term, the country should extend the universal education principle to early childhood education, upper secondary school, and technical training (TVET) while increasing access to tertiary levels of education and closing all gender gaps at post-secondary levels.

Short-term policy options for improving education and skills development include:

i. Ensure all in-service teachers are trained in learner-centred pedagogies to facilitate effective implementation of the new competency based curriculum for general and TVET secondary schools that was rolled out in 2016. Teacher training institutions should urgently align their training with the needs of the new curriculum.

ii. Address the resource constraints characterised by lack of teaching materials and infrastructure for delivering the competency-based curriculum.

iii. Enhance governance and performance monitoring measures including the strengthening the school inspection units. Explore use of ICT to improve evidence-informed decision making through enhanced data gathering (of enrolment, assessments and performance) and use.

iv. Strengthen the school feeding programme that has increased enrolment and retainment of children from poor families.

Medium to long-term policy options for improving education and skills development include:

v. Improve infrastructure and learning resources to ensure universal enrolment in early childhood education, which provides vital foundation for effective learning at later stages of the education pipeline.

vi. Build more secondary schools and provide related learning resources to increase progression from primary to secondary school, addressing education quality and affordability challenges that lead to high repetition and dropout rates, especially in rural areas.

vii. Make massive investment in TVET including constructing more TVET centres and rebranding the programme to be market-oriented, lucrative and attractive to young people and the society at large.

viii. Improve access to and quality of tertiary education institutions, paying particular attention to development of advanced practical skills surrounding innovation, science and technology, and leadership as a backbone for building a globally competitive labour force.

ix. Ensure regular engagement with the private sector in development and implementation of education curriculum to address the skill mismatch between education training and market needs. Continuous assessment of current and future labour market needs should inform curriculum reforms.

5.4 Accelerating Economic Growth and Creating Quality Jobs

Accelerating inclusive economic growth that creates enough decent jobs for the growing youthful working age population is critical if Rwanda is to harness the DD and achieve its long-term development aspirations. Although the economy has grown steadily over the past two decades or so, more needs to be done in the short term to reinforce fiscal discipline and create a conducive and attractive business environment, which will be key to enhancing productivity of businesses and purchasing power of the population. In the medium to long term, efforts should focus on diversifying the economic base, expanding and strengthening the effectiveness of the private sector, improving the economic infrastructure (including energy, transport and communication), and addressing the shortage of high-level skills. These economic reforms will enhance economic productivity and attract foreign direct investment that is needed to propel sustainable growth in the long term.

Short term policy options for accelerating economic growth and job creation include:

i. Fully operationalise the Labour Market Information System to link the various stakeholders involved in skill development and job creation including the education sector, job market and job seekers.

ii. Promote workplace readiness programmes including internship, mentorship and on-job training.

iii. Invest in production, value addition and agro-processing to create quality jobs through sectoral linkages as articulated in the crop intensification programme. Enhance agricultural production and profitability by promoting irrigation, increased use of fertilizers, mechanisation of agricultural practices, and securing of access to high-value markets for smallholder farmers.

iv. Provide opportunities for greater involvement of youth in entrepreneurship and job creation, including optimisation of the empowering role of information technology.

Medium to long term policy options for accelerating economic growth and job creation include:

v. Address the infrastructure limitations that hamper economic productivity and growth of the private sector including investing in consistent and sustainable energy generation and distribution, building roads and railways to link production zones to markets, and investments in technology to improve productivity.

vi. Promote small and medium sized enterprises by facilitating establishment of cooperative societies; more access to capital; training and capacity building and exploration of lucrative markets. This should build on various initiatives in this area including Rwanda Development Board's Business Development Advisors programme seeking to develop bankable micro business projects and financial support to SMEs.

vii. Diversify the economy by reducing overdependence on the agricultural sector and enhancing value-addition and manufacturing to take advantage of international bilateral trade opportunities, and the recently launched "Made in Rwanda" initiative.

5.5 Strengthening Governance, Efficiency and Accountability

Governance and accountability is a key cross cutting pillar that is central to the success of the other pillars of the DD. Good governance and entrenching the culture of accountability in all spheres of development is vital in bridging the policy to implementation gap, ensuring value for money in service delivery, and providing a conducive business environment to attract direct foreign investment, which is critical to expand the private sector and overall capacity of the economy to create ample quality jobs for the youthful labour force. Efforts to improve governance and accountability should focus on:

i. Reinforcing performance based accountability mechanisms in government to ensure effective implementation of government policies and programmes. This should include strengthening the National Monitoring and Evaluation Framework and ensuring that there is a robust integrated performance management system that will serve as a tool for enforcing performance accountability in an integrated manner. The performance based accountability principles should be extended to non-public sector.

ii. Entrench ownership of the country's development vision and shared responsibility in achieving the development aspirations in all layers of government, the private sector, other non-government entities, and the citizenly.

iii. Reinforce the central place of sustainable peace, national cohesion, and accountability in use of public resources and in service delivery in national building, which are critical for attracting long term foreign direct investment.

5.6 Promoting Gender Equity and Empowerment to Harness Maximum Dividend

Gender equity and general empowerment of women in education, employment opportunities, leadership and other spheres of life are central to harnessing the DD and achievement of Rwanda's long-term development aspirations. Building on the progress the country has made in reducing gender inequities, future efforts should focus on increasing enrolment of women in tertiary education, enhancing employment of women in non-agriculture sector, and enhancing access to financial credit.

Short and long term actions for harnessing the gender dividend include:

i. Eradicate all gender gaps in education especially at secondary and tertiary levels of education as well as in TVET institution.

ii. Building on the progress the country has made in enhancing participation of women in leadership positions in the public sector, scale up efforts to enhance economic empowerment of the most vulnerable poor women. Focus should be on addressing gender related bottlenecks in skill development, economic resources, and the labour market that subject women to the informal sector with the aim of steadily shifting women to the formal sector and labour market.

iii. Improve reproductive health services to reduce the disproportionate burden of reproductive morbidities and mortality (including HIV/AIDS, maternal health, and cancer) that women endure due to lack of services and imbalanced gender relations that are rooted in cultural values that place women in disadvantaged positions compared to men.

iv. Improve access to production assets to women, particularly credit facilities, farm equipment, and business ownership.

v. Strengthen campaigns/programmes against gender based violence, especially in ensuring women understand and fight for their rights and the legal and security systems enforce existing laws aimed at protecting women.

6. Conclusion

Rwanda aspires to graduate to middle income country status by 2035 and to high-income country by 2050. The country's vision 2020 aimed at achieving a GDP per capita of US$ 1,240 by 2020, with an annual GDP growth rate of 11.5 percent. Three years to the end of this long-term development strategy, it is clear that the country will not achieve some of the key targets it set for 2020. However, the six pillars for the vision 2020 are still relevant for the country in its quest for a developed, services and knowledge-based society, with a vibrant class of entrepreneurs by 2020. As the country develops the next long term development strategy, there will be need to identify and exploit its economic and demographic opportunities, including a largely youthful population.

Accelerating fertility rate decline to create a bulge in the working age population will provide a time-bound window of opportunity to reduce the dependent population, enhance economic productivity and accelerate economic growth through a mechanism called the demographic dividend. The demographic dividend is not automatic or guaranteed – the timing and magnitude of the dividend that a country can earn would ultimately depend on the extent of deliberate strategic investments that the country would make to ensure that the labour force is healthy, well-educated and skilled, and that the youthful population has ample quality jobs.

Buoyed by the Government of Rwanda's decision to put family planning at the centre of its development agenda, the country achieved a phenomenal increase in contraceptive use and unpreceded decline fertility decline between 2005 and 2010. Building on this success, the country should reinvigorate its family planning programme to arrest the stalled progress that was recorded between 2010 and 2015. Special focus should be on better targeting in addressing bottlenecks of contraceptive use among underserved populations, particularly youth and those in hard-to-reach areas. The programme should also expand the method mix and promote use of long-acting and permanent contraceptive methods to enable those who want to stop childbearing (currently half of all women of reproductive age) better empowered to do so.

Although the unemployment level is low at only 2 percent, the majority of the population is underemployed, and more than three quarters of the population work in low-productivity subsistence agriculture. This contributes to high poverty levels, and stagnates government efforts to stimulate economic growth. Although the government's focus is transformation from agriculture to the services sector, there is need to improve the productivity of the primary sectors through mechanisation and value addition so as to improve the living standards of majority of the Rwandese whose livelihoods depend on the agriculture sector.

The large youth cohorts joining the labour market in the country need to be sufficiently skilled to drive the envisaged socioeconomic transformation agenda; however, the quality of education they are receiving is unsatisfactory. Low human capital is one of the areas where Rwanda scores poorly in the global competiveness index and ease of doing business reports. Improving the quality and relevance of education at all levels and expanding access to secondary, TVET and tertiary levels will go a long way in driving economic growth in Rwanda. The roll-out of the competency based

curriculum in 2016 marked a major step towards addressing these challenges and turning the country's youth into a valuable asset and engine for meeting its development aspirations. For this to be the case, the government and its partners should urgently address the programme's implementation bottlenecks, ensuring particularly that all pre-service and in-service teachers are trained on learner-centred pedagogies that will ensure that the new curriculum imparts the practical skills in innovation, science and technology, strategic leadership, and entrepreneurship, which will be key in making Rwanda a globally competitive economy.

The gender dividend can make a significant contribution to the overall demographic dividend. Investments to facilitate voluntary decline in fertility through better family planning and promoting access to higher education for girls and improved child survival would provide an essential step towards earning the DD. Greater participation of women in formal, paid jobs would enhance economic growth overall; so investing in the realisation of women's rights to education and economic empowerment is a win-win strategy for the women, their families, communities, and the country at large.

In addition, the country should improve, economic infrastructure including energy, transport and communication systems to reduce the cost of doing business and attract foreign direct investment, which is key for expanding the country's relatively small private sector and create more jobs. Reliance on external aid can be crippling to government investments if donor assistance reduces, as has happened in the past, and thus there is need for the government to identify sustainable funding mechanisms and wean itself from donor reliance. The country's visionary leadership and good governance are among the attractive factors to investors. The country should reinforce this with robust performance management systems to ensure efficiency and accountability in service delivery. Improving civic participation in sharpening the country's development vision and in implementation of development programmes will ensure common purpose and inclusive economic growth. With these in place, Rwanda can take advantage of the DD to accelerate its journey towards becoming a high-income country with good living standards for all.

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Appendices

Appendix I:

Description of DemDiv Model

DemDiv addresses the complexity of the demographic dividend by linking age structure with social and economic development, enabling policymakers to quantify the changes that would be required to successfully achieve a demographic dividend. The model allows for comparisons of several different scenarios to show the varying benefits of different combinations of investments. It is structured as a two-part model that projects demographic and economic changes with equations to estimate employment and investment, along with an estimation of gross domestic product (GDP) and GDP per capita.

The model allows the user to design a logical story showing how the combined power of specific policy investments in family planning, education, and the economy can generate a DD that is not possible under the status quo. The model projects how these policy investments, together with population change, can contribute to growth in income per capita. Users can choose to design different scenarios to see the effects of different policies by manipulating the following variables:

- Family planning
- Girls' education
- Public sector governance
- Labour market efficiency
- Financial market efficiency
- Trade policy
- ICT infrastructure

The main outputs are:

Demographic Model	Economic Model
Population by age and sex Dependency ratio Infant and under-five mortality Total Fertility rate Life expectancy at birth Population growth rate	Labour force by age and sex Employment Investment GDP per capita GDP growth rate

The model is Excel-based but is linked to the Spectrum suite of population-based models. It comes with a database of nearly 90 countries of the main variables for the initial year.

Model Limitations (as identified by developers)

1. The statistical relationships that underlie the behavioral equations (e.g., TFP, employment, investment, and child mortality) were estimated using international cross-sectional data and are assumed not to change over time. In addition, the cross-sectional relationships are assumed applicable to any country in the dataset. Thus, for variables where country specific data is not included in the 'control' worksheet of the excel file, the results for the base year will be the default value in the model. This include variables like dependency ratio, HDI etc
2. Some linkages between population growth and the economy have not been incorporated into the model. These include childcare effects on labour supply, population-induced technical progress ("Boserup" effects), and the role of land in production, among others.
3. The economic model is a single-sector model. A two- or three-sector model that accounts for shifts in production, demand, and labour supply among multiple sectors (most obviously, agriculture and non-agriculture) may capture more sophisticated dynamics. In low-income countries, subsistence agriculture may serve as a default industry that absorbs excess labour, keeping absolute unemployment rates low, but also providing low wages and low productivity that do not generate significant economic growth. In developing DemDiv, we opted for a simpler model because of the ease of communicating its structure and results to users.
4. While the model includes equations to estimate two important factors of production—employment and capital—it is a partial equilibrium model and so does not model the labour and capital markets as would be the case with a computable general equilibrium model.

Other practical limitations

1. The model does not allow inclusion of gender dimensions in it, with only the education data differentiated by sex.
2. The model uses the theoretical working age population, and assumes that all the population 15+ is working, which is not the case given that most of the young people finish school by 22 years. This means that the dependency burden is underestimated.

Appendix II:

Rwanda DD Modelling Workshop Participants List

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Appendix III:

Summary of Characteristics of Policy Scenarios for Demographic Dividend Modelling for Rwanda

Policy Scenario	Key Characteristics
Business as Usual	▪ Characterised by slow progress in economic reforms, human capital development and reduction in fertility by 2050 ▪ Targets for economic, family planning and education indicators are higher than baseline indicators by 20 percent of the improvement needed to achieve 2050 Combined scenario targets
Economic Emphasis	▪ Represents optimisation of Rwanda's global competitiveness and governance indicators ▪ Target economic indicators for 2050 are based on economic indicators for high income benchmark countries except for Imports as a percentage of GDP. ▪ Imports as a percent of GDP are maintained at the current level of 35 percent throughout the projection period. ▪ Education and family planning indicators were held at the same level as the Business as Usual scenario.
Social Emphasis	▪ Economic indicators held to the same level as the Business as Usual scenario where little investments are made in the economic sectors. ▪ Target indicators for Education are set at the same level as Combined Emphasis scenario with the goal of achieving at least 14 years of completed education for Rwandan children i.e. at least 2 years of post-secondary school qualification ▪ Modern contraceptive prevalence rate to increase to 72.2 percent
Combined Emphasis	▪ Emphasises an integrated development model that concurrently maximises investments and reforms in the economic sector, family planning and education to prevent unplanned births, build high-quality human capital and increase productive population. ▪ Economic indicators held to the same level as the Economic Emphasis scenario ▪ Target indicators for education and modern contraceptive prevalence rate were set at the highest level equal to the Social Emphasis scenario

Appendix IV:

Model Input Variables Used in the DemDiv Model for Rwanda

Policy Area/Indicator	Description of Indicator/ Variable	Effects on Demographic Dividend
Demographic Model		
1. Family Planning	Contraceptive prevalence rate (proportion of women using modern contraception)	Reduces unplanned births and overall fertility; reduces child dependency ratio
		Improves maternal and child health by reducing high-risk births; improves overall health of the labour force
2. Period of Postpartum Infecundability	Duration (in months) after giving birth when women are not ovulating, and therefore not susceptible to conception, due to breastfeeding and/or postpartum sexual abstinence	Longer periods of postpartum sexual abstinence lower fertility, especially in population where contraceptive use is low in the postpartum period.
3. Sterility	The proportion of women who are not able to have children by the time they reach the end of their childbearing span (measured as the proportion of women aged 45-49 who are childless)	High levels of sterility can reduce fertility. This indicator is not likely to change that much, and does not have a big impact on fertility, except in contexts with high levels of sexually transmitted infections
4. Education	Number of years of schooling	Delays marriage and start of childbearing
		lowers fertility Improves health seeking behaviour and key for having a healthy workforce
		Improves skills, innovation and overall productivity of workers
Economic Model		
5. Labour Market Flexibility	Measurement (on a scale of 1-7) of labour market flexibility, including factors such as labour-employer relations, wage flexibility, hiring and firing practices and effects of taxation.	Policies and reforms in the labour market help attract FDI and crate an enabling environment for optimizing productivity of the labour force
6. Information and Communication Technologies (ICT) Use	Measurement (on a scale of 1-7) of use and capacity of Internet and mobile phone infrastructure	Efficiency of financial markets facilitates movement of funds and investments and promotes investments by local and foreign investors.

7. Financial Market Efficiency	Measurement (on a scale of 1-7) of efficiency of financial markets, including factors such as availability and affordability of financial services, financing through local equity market, ease of access to loans and venture capital availability.	Efficiency of financial markets facilitates movement of funds and investments and promotes investments by local and foreign investors.
8. Imports as a Percentage of GDP	Imports as percent of GDP. Total imports refer to the sum of total imports of merchandise and commercial services.	As economies advance, they specialize in industries and sectors where they have a comparative advantage and import products that they are not well placed to produce. At the early stages of economic transformation and industrialization, level of imports increases and falls and this may fall as developing countries develop capacity to produce a lot of the products that they import.
Governance and Accountability		
9. Public Institutions	Measurement (on a scale of 1-7) of public institution strength, including factors such as property rights, division of powers, corruption, regulatory burdens, transparency, waste in government spending and public safety.	Strong public institutions help enforce accountability in use of public resources, service delivery, and protection of public and private property and investments and in ensuring public safety, all key ingredients for promoting investments and economic productivity.

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