

KEY QUESTIONS

If the economy follows a low, moderate or high growth path over the next 10 years, what will be the likely impact on:

Sector employment?

Demand and supply of occupations and skills?

Job seekers with different skills and occupational preferences?

Skills gap and unemployment rates among various skill cohorts?

The size of various SETAs?

The demand for low, medium and high skills?

Job openings for various occupations and qualifications?

Job turnover for various occupations and skills?

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Skills Supply and Demand in South Africa: A 10 Year Forecast (2016-2025)

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In South Africa, there is a high priority for regular, coherent and systematic forecasts of demand and supply of skills. Despite ambitious measures to improve skills planning, there has been no good mechanism to provide credible information with regards to skill needs of the country until recently. The Linked Macro-Education Model (LM-EM), built with support from the Department of Higher Education and Training, is expected to fill this gap by providing an integrated framework that overcomes an important pre-requisite for skills planning, namely access to quantitative foresight about possible future paths of the economy and skills supply, demand and imbalances.

This issue of The Bridge summarises a forthcoming ADRS report on skills supply and demand in South Africa. Using the Linked Macro-Education Model of South Africa (LM-EM), we answer the key question: *what are the likely future trends in South Africa's economic growth, labour market performance, and the demand and supply of skills?*

KEY FINDINGS

Over the next 10 years, if economic performance is within the proposed Low and High scenarios:

- The labour force will gradually grow by about 4 million.
- Total employment will increase between 2.38 and 7.24 million.
- The share of high skill workers will increase from one-fifth to more than one-fourth of total employment by 2025.
- The average unemployment rate will be the lowest within the combined Managers and Professional occupations.
- At the lower end, only about one third of job openings will be due to the expansion of the economy, compared to more than 50% under the higher growth scenario.

Scenarios

To answer the key question, we present three possible future scenarios of the South African economy. The Low, Moderate, and High growth and employment scenarios have been designed as probable scenarios with specific assumptions regarding domestic and external factors that impact the South African economy.

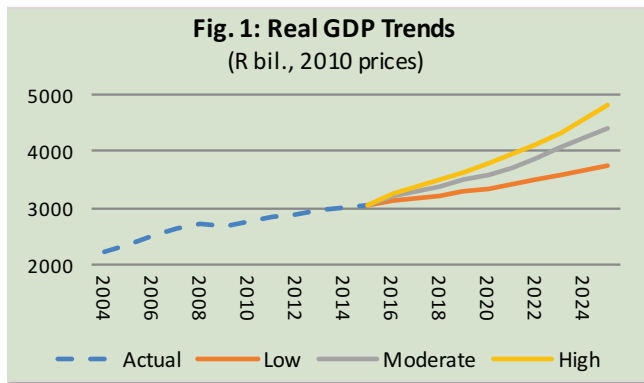
TABLE 1: SCENARIO DESCRIPTIONS

	Low Scenario	Moderate Scenario	High Scenario
Fiscal Policy	Fiscal policy targets lowering the debt-GDP ratio. Low annual targets for the deficit-GDP ratio.	Same policy rule as the Low scenario. Tolerates annual deficit-GDP ratio of up to 5 percent.	Same policy rule as the Low scenario. Tolerates annual deficit-GDP ratio of up to 7 percent.
Monetary Policy	Continuation of inflation targeting policy. The interest rate is allowed to vary to keep the inflation rate within the 3 to 6 percentage target band over time.	Same as the Low scenario.	Same policy rule as the Low scenario. However, the upper bound of the inflation target band is raised to 8 percent.
Public Investment	Investment by both general government and public corporations annually increase by 6%, starting with 2016.	In 2016, public investment will be 5% higher than the Low scenario. Thereafter, it will be annually higher than the Low scenario by 5 percent plus an additional 2.5 percent.	In 2016, public investment will be 7% higher than the Low scenario. Thereafter, it will be annually higher than the Low scenario by 7 percent plus an additional 3.5 percent.
Gov't Current Expend.	Increases annually by 6.2%.	In 2016, government final consumption expenditure will be 5% higher than the Low scenario. Thereafter, it will be annually higher than the Low scenario by 5 percent plus an additional 2.5 percent.	Same as the Moderate scenario.
Terms of Trade Shock		Relative to the Low Scenario, the terms of trade for South African goods and services will improve by 10 percentage points.	Relative to the Low Scenario, the terms of trade for South African goods and services will improve by 15 percentage points.
Production Technology		Assumes a relatively small slowdown (2 percent) in the pace at which the current trend in sector production technologies continue to become more capital intensive.	Assumes a relatively small slowdown (2.5 percent) in the pace at which the current trend in sector production technologies continue to become more capital intensive.
External Factors	Assumes an average annual real growth rate of 1% for OECD countries and 5% for Sub-Saharan African countries. Crude oil price gradually increase to 70 US dollar by 2025.	Assumes an average annual real growth rate of 2% for OECD countries and 6% for Sub-Saharan African countries. Crude oil price gradually increase to 70 US dollar by 2025.	Assumes an average annual real growth rate of 3% for OECD countries and 7% for Sub-Saharan African countries. Crude oil price gradually increase to 70 US dollar by 2025.
Education & Labour Market	<p>Matric graduation rates and higher education graduation rates for Africans and Coloured students gradually increase by about 6 percent and 4 percent respectively. For Asian and White students, the corresponding rates are assumed to continue their past trends and decline by about 3 percent and 1.7 percent over the next decade.</p> <p>Labour force participation rates for the four racial groups by gender, province and age will be the same as the rates for 2014.</p> <p>The rates for retirement, mobility, mortality and emigration are kept at their estimated baseline values for all occupations.</p>		

Scenario Results

Macroeconomic Outlook

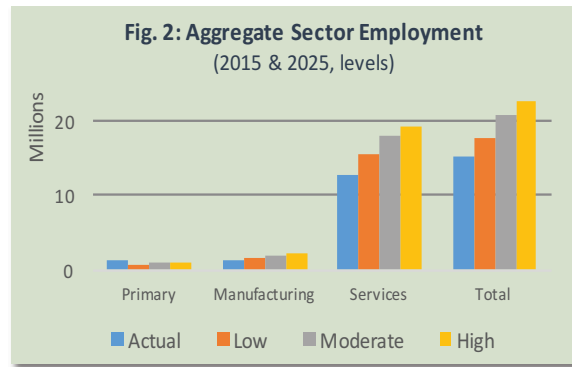
Under the Low, Moderate and High scenarios, the economy is projected to grow at average annual rates of 2%, 3.55%, and 4.38% between 2015 and 2025 respectively (Figure 1).



The primary sector’s share of total output is projected to decline from 10.6% in 2015 to between 7.5% and 8%, depending on the scenario. Over the next 10 years, the output share of the manufacturing sector is projected to grow by about 2% in the Low scenario, 3% in the Moderate scenario and 6.5% in the High scenario. The results reflect the extent to which the increase in public investment and improved performance of the trade sector lead to higher growth of the manufacturing sector under the Moderate and High scenarios. Relative to 2015, the service sector’s share of output is expected to change slightly under the Low and Moderate scenarios but to decline by about 3.5% under the High scenario.

Employment

Total employment is projected to increase from 15.37 million in 2015 to 17.75 (Low scenario),



20.93 (Moderate scenario), and 22.61 (High scenario) million in 2025, Figure 2.

Under the three scenarios, the primary sector’s share of employment is projected to gradually decline from 8.3% in 2015 to between 4.5 and 4.7 percent. The manufacturing employment share of 8.7% in 2015 is projected to decline to 8.5% under the Low scenario but to grow to highly significant levels of 9.0% and 10.3% under the Moderate and High scenarios. In line with changes in sector outputs, the service sector’s share of total employment is projected to adjust downward under the Moderate and High scenarios as the employment share of the manufacturing sector increases.

SETA Employment Shares (2015-2025)

Alternative growth paths of the economy that differently impact output and employment of economic sectors also affect the distribution of the employed among SETAs and the demand for occupations and skills. Figure 3 presents LM-EM’s projection of the allocation of total employment among 21 SETAs over the next 10 years.

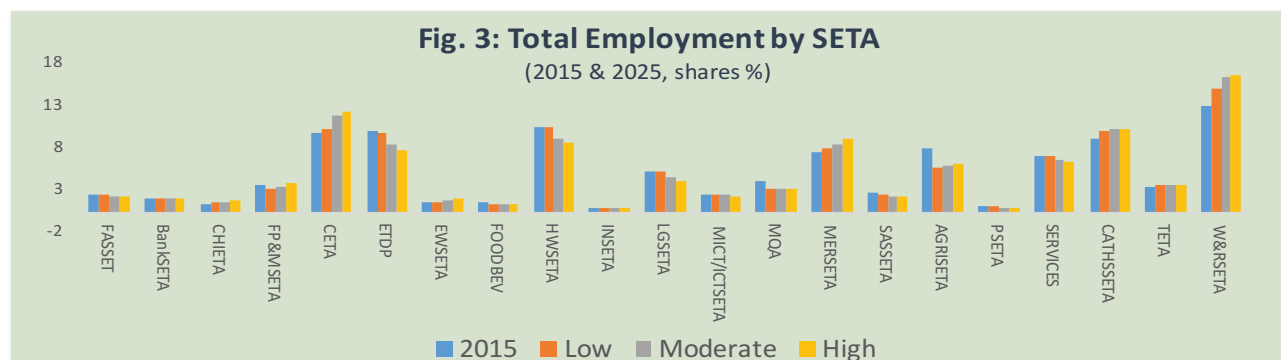


Table 2: Total Employment by Occupation (2015-2025)

Occupations	(Thousands)				CAGR (%)			Shares (%)		
	2015	2025			2015-2025			2025		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
Manager	1,263	1,536	1,827	1,972	3.32	6.35	7.72	8.65	8.73	8.72
Professional	813	936	995	1,027	2.39	3.43	3.97	5.28	4.75	4.54
Technician	1,456	1,655	1,731	1,770	2.15	2.92	3.31	9.32	8.27	7.83
Clerk	1,705	2,031	2,329	2,481	2.95	5.33	6.45	11.44	11.13	10.98
Sales and services	2,529	3,060	3,523	3,723	3.23	5.68	6.66	17.24	16.83	16.47
Skilled agriculture	86	57	67	73	-6.69	-4.19	-2.65	0.32	0.32	0.32
Craft and related trade	1,856	2,170	2,885	3,274	2.64	7.63	9.92	12.23	13.78	14.48
Plant and machine operator	1,312	1,461	1,774	2,018	1.80	5.15	7.43	8.23	8.47	8.93
Elementary and domestic worker	4,350	4,844	5,803	6,270	1.81	4.92	6.28	27.29	27.72	27.73
Total	15,370	17,749	20,933	22,607	2.43	5.28	6.64	100.00	100.00	100.00

Table 3: Total Employment by Qualification (2015-2025)

Qualifications	(Thousands)				CAGR (%)			Shares (%)		
	2015	2025			2015-2025			2025		
		Low	Moderate	High	Low	Moderate	High	Low	Moderate	High
No schooling	408	206	244	265	-6.61	-5.00	-4.24	1.16	1.17	1.17
Incomplete primary	1,194	741	888	970	-4.65	-2.91	-2.05	4.18	4.24	4.29
Complete primary	646	606	729	798	-0.64	1.22	2.13	3.41	3.48	3.53
Secondary incomplete	5,148	5,539	6,690	7,315	0.73	2.65	3.58	31.21	31.96	32.36
Secondary complete	4,796	5,604	6,653	7,194	1.57	3.33	4.14	31.57	31.78	31.82
Certificate & Diploma less than G12	95	90	105	113	-0.55	1.02	1.75	0.50	0.50	0.50
Certificate G12	390	800	936	1,005	7.46	9.16	9.94	4.51	4.47	4.45
Diploma G12	1,039	1,466	1,666	1,766	3.50	4.84	5.44	8.26	7.96	7.81
Degree	1,654	2,697	3,021	3,182	5.01	6.21	6.76	15.19	14.43	14.07
Total	15,370	17,749	20,933	22,607	1.45	3.14	3.93	100.00	100.00	100.00

Employment by Occupation

Table 2 summarises likely future demands for various occupations, if the economy follows a growth path between the Low and High scenarios over the next decade. For example, between 9 and 10 percent of additional employment will be in Managerial occupations, and the size of Professional occupations will expand to between 124,000 and 215,000. On average, for every job created for Managers, Professionals, or Technicians, the economy is projected to create 3 to 5 jobs in the remaining six occupations, combined.

Employment by Qualification (2015-2025)

Table 3 presents LM-EM’s projections of educational qualifications of the employed over the next 10 years.

Regardless of the scenario, the skills (i.e., highest level of education) composition of the employed is expected to gradually change, with the share of workers with low skills (Secondary Incomplete and less) declining and the share of high skilled workers (beyond Secondary Complete) increasing. However, for those with medium skills (Secondary Complete and Certificate and Diploma less than G12), their share is expected to remain relatively unchanged across scenarios.

The share of workers with low skills are projected to decline from their current 48.7% to between 40.5% and 41.8%, and the share of workers with high skills are expected to increase from the current 20.1% to 28% (Moderate) and 26.3% (High) by 2025.

Job Openings

Job openings, or the number of work opportunities in a given period, take into account both net employment changes due to economic growth (expansion demand) and replacement of those leaving jobs for retirement and other reasons (replacement demand).

The pace at which the economy is expected to generate job opportunities differ under each scenario, Figure 4. Under the Low scenario, job openings are expected to grow annually at an average rate of

Table 4: Components of Job Openings (Three Scenarios)

Job Openings		Total JO (2015-2025)	Average Annual	CAGR (%)	% of JO
Low	Expansion Demand	2,604,640	236,785	2.47	32.1
	Replacement Demand	5,518,932	501,721	1.43	67.9
	Total Job Openings	8,123,572	738,506	1.78	100.0
Moderate	Expansion Demand	5,788,279	526,207	13.81	49.6
	Replacement Demand	5,873,869	533,988	2.89	50.4
	Total Job Openings	11,662,148	1,060,195	7.62	100.0
High	Expansion Demand	7,463,111	678,464	16.68	55.2
	Replacement Demand	6,068,293	551,663	3.60	44.8
	Total Job Openings	13,531,404	1,230,127	9.52	100.0

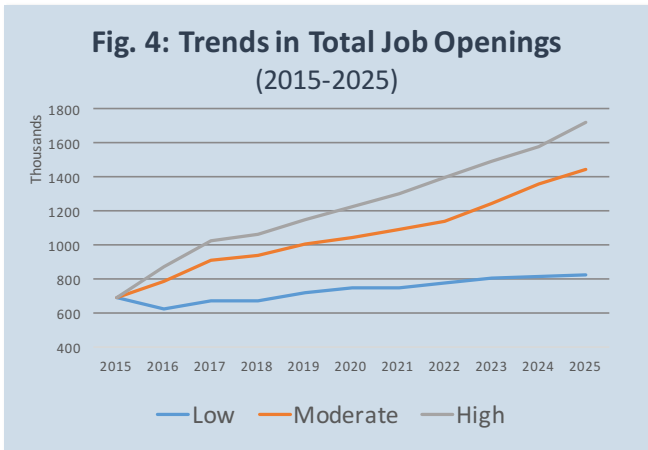


Fig. 4: Trends in Total Job Openings (2015-2025)

1.78%, while under the Moderate and High scenarios, the rates elevate to 7.6% and 9.5%, respectively.

Overall, the scenarios are expected to generate between 8.1 million (Low) and 13.5 million (High) job opportunities over the next 10 years, which amounts to average annual job openings of between 738,000 and 1,230,000 (Table 4).

The distribution of job openings between expansion demand and replacement demand is noteworthy (Table 4). In the Low scenario, only about one third of job openings are due to the expansion of the economy, while the remaining two thirds are from replacement demand. In the Moderate scenario, the total job openings over the next 10 years are generated equally by the scenario’s economic growth and labour turnover. Under the High scenario, more than 50% of job opportunities are due to economic expansion.

Job Openings by Occupation (2015-2025)

Given the three scenarios for the economy, what occupations are expected to be in high demand over the next 10 years? Across the scenarios, the top three occupations with the highest growth over the next

decade are projected to be Craft and Related Trade Workers, followed by Plant and Machine Operators and Managers (Figure 5).

The number of job openings in Craft and Related Trade Workers are projected to grow between 87 percent (Low) and 400 percent (High), or from about 65,000 workers in 2015 to 120,000 under the Low scenario and 323,000 workers under the High scenario.

For Plant and Machine Operators, the number of workers is projected to grow between 56 percent (Low) and 310 percent (High), or from 43,000 in 2015 to 67,000 under the Low scenario and 177,000 under the High scenario.

The number of job openings for Managers is projected to grow from 43,000 in 2015 to 55,000 (Low), about 108,000 (Moderate) and about 130,000 (High). These are equivalent to growth of 29 percent (Low), 151 percent (Moderate) and 202 percent (High).

With respect to occupations in high demand, it is worth highlighting that under the Low scenario, for two of three occupations, namely, Crafts and Related Trade Workers and Plant and Machine Operators, economic expansion is expected to account for 27% and 34% of job openings in these occupations. However, for the third category, i.e., Managers, economic growth generates more than half (52%) of the high level of job openings in this category.

In contrast, under both the Moderate and High scenarios, for three of the fastest growing occupations, between 51% and 68% (Moderate) and 60% to 73% (High) of their job openings are due to growth of the economy, i.e. expansion demand. In the case of job openings for Managers, less than 30% of these job openings are due to job turnover.

Job Openings by Qualification (2015-2025)

Under each scenario, the number of job openings

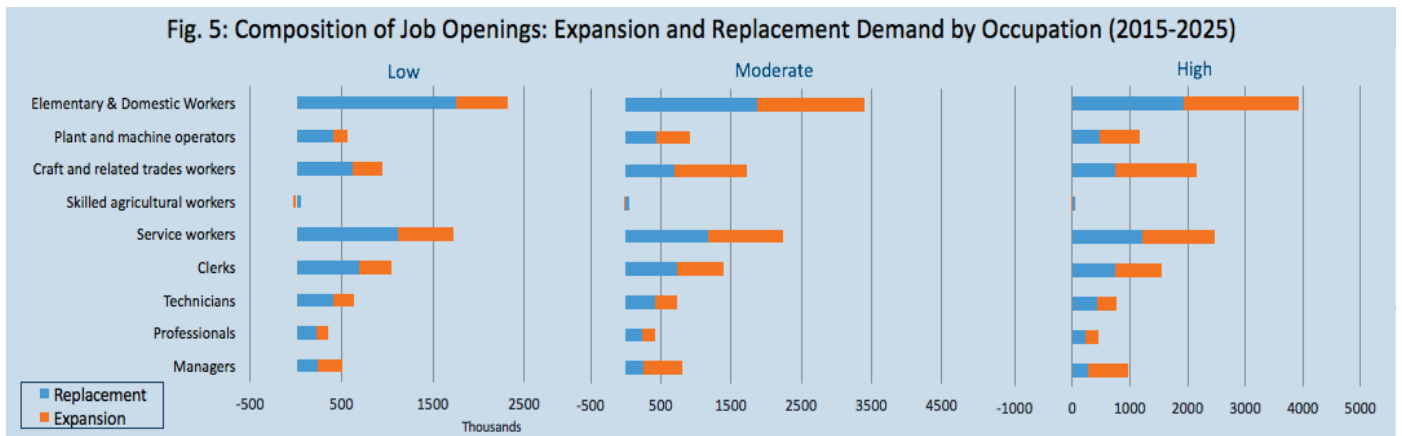
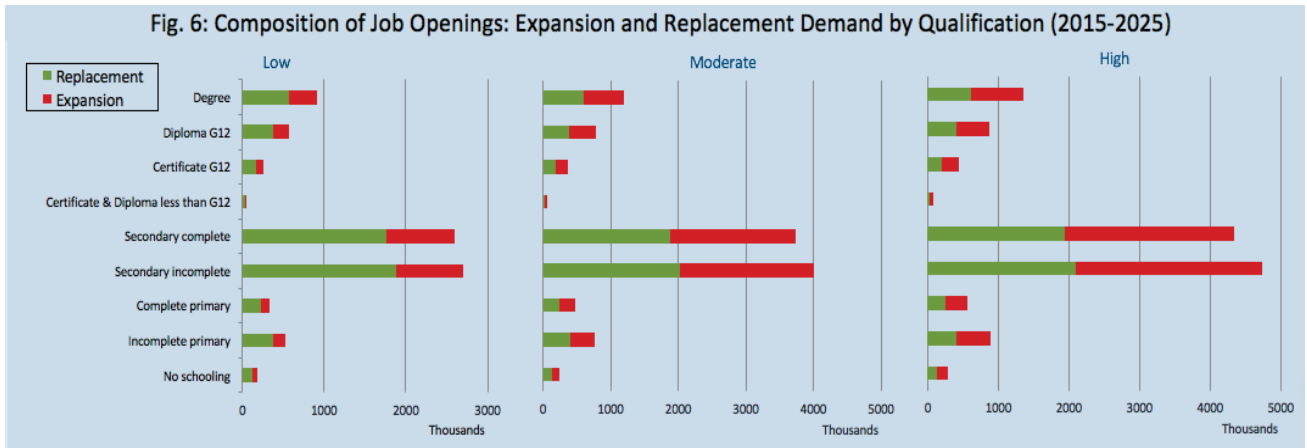


Fig. 5: Composition of Job Openings: Expansion and Replacement Demand by Occupation (2015-2025)



over the next decade is projected to increase for all educational qualifications, but at different rates. However, relative to total job openings under each scenario, the share of job openings for low skill workers is expected to gradually decline over the next 10 years by -3.7% (Low), -2.3% (Moderate), and - 1.6% (High). (Figure 6).

Relative to the Low scenario, job openings for individuals with medium level qualifications are expected to increase at a faster pace under the Moderate and High scenarios. Total job openings that require medium level education qualifications are expected to increase from a little more than 220,000 in 2015 to about 275,000 (Low), 480,000 (Moderate), and 570,000 (High) over the next 10 years. Across economic scenarios, the share of job openings in this skill category is projected to increase by about one percent over the entire 10 year period from 32.1% in 2015 to about 33% in 2025. Therefore, one-third of all job openings are projected to require Moderate level educational qualifications under each of the three scenarios.

If over the next decade, the job creation path of the economy is within the Low and High scenarios, about one out of every five job openings will require tertiary education.

Since about 80% of the employed in 2015 had low to medium levels of education, a large percentage of future replacement demand job openings will require at least low to medium skills, if those job openings are filled with individuals with similar educational backgrounds.

If the economy’s job creation path is within the employment band suggested by the three scenarios, then the largest annual share of replacement demand will be from workers with low skills, that

is, workers with Secondary Incomplete or less as their highest level of education. However, their share will gradually fall over time due to the projected gradual decline in the share of low skill workers among the employed.

Similarly, workers with medium skills (Secondary Completed and Certificate or Diploma less than G12), are projected to be the second largest contributors to the estimates of replacement demand during the next 10 years.

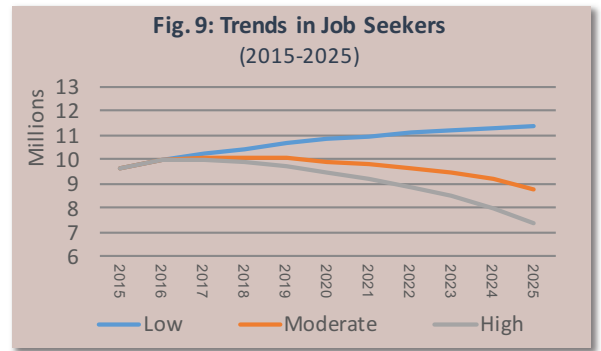
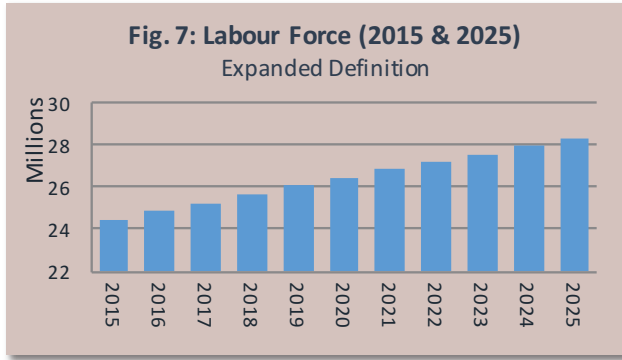
High skill workers projected to capture between 26 to 28 percent of total employment by 2025 will be the lowest but fastest growing contributors to replacement demand. Their share of total replacement demand will gradually rise from 18.1% in 2015 to as high as 23.7% under the High scenario in 2025.

Job Seekers

LM-EM’s labour supply module generates annual projections of the labour force and its distribution by qualification and occupation. It also generates annual projections of job seekers, i.e., the portion of the labour force in each period that is not already employed.

Labour Force Projection (2015-2025)

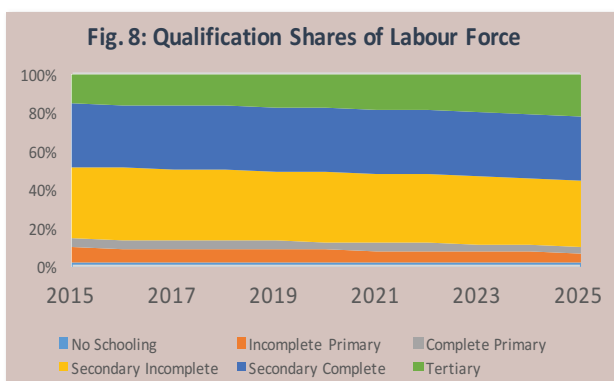
According to Statistics South Africa, under the expanded definition of unemployment, the labour force grew 16.1% from 20.88 to 23.62 million between September 2008 and September 2015. Based on the projections of the adult population over the next 10 years, current labour force participation rates for vari-



ous cohorts of the labour force, and assumptions on both the gradual increase in the matriculation rate among Africans and the gradual increase in higher education graduation rates among all population groups, the labour force is projected to gradually grow to 28.3 million in the next 10 years (Figure 7).

For four out of six qualification categories, (No Schooling, Incomplete Primary, Complete Primary, and Secondary Incomplete) shares of the total labour force are projected to gradually decline over the next 10 years. The largest decline is for those with Secondary Incomplete whose share is expected to decline from the estimated 36.9% in 2015 to 33% in 2025. Together the share of these four qualification categories in the labour force is projected to decline by 7.4% from 51% in 2015 to 43.6% in 2025 (Figure 8).

The shares of those in the labour force with Secondary Complete as their highest educational attainment are expected to grow from 32.7% in 2015 to 33.4% in 2025, and from 15.7% to 22.3% for those with Tertiary. Overall, the share of these two qualification categories in the labour force is expected to grow from 48.4% in 2015 to 55.8% in 2025 (Figure 8).



Job Seekers by Qualification (2015-2025)

Figure 9 illustrates the significant difference between the three scenarios in terms of their gradual impact on the size of job seekers. Under the Low scenario, the number of job seekers is expected to gradually grow from 9.59 million in 2015 to 11.36 million in 2025.

In the Moderate scenario, where total employment is projected to grow from 15.37 million in 2015 to 20.93 million by 2025, the number of job seekers is projected to gradually decline over the next 10 years by 788,000.

The High growth scenario is expected to have an even more significant impact on the size of job seekers. Under this scenario, the pool of job seekers is expected to decline by 2.2 million over the next 10 years. Table 5 presents LM-EM projections of job seekers by qualification.

The outlook for the size of job seekers with low, medium and high qualifications depends on future economic performance and the outputs of the education sector. For example, if graduation rates continue to grow, the low employment generation path of the Low scenario is expected to lead to a high number of job seekers with high levels of education. Under the Moderate and High scenarios the pool of job seekers with high skills signifi-

	2015	2025		
		Low	Moderate	High
Total Job Seekers	9,589,026	11,389,889	8,815,299	7,414,394
		by Qualification (% of total)		
No Schooling	1.99	2.16	2.38	2.56
Incomplete Primary	7.57	5.93	6.14	6.27
Complete Primary	5.04	3.98	3.96	3.91
Secondary Incomplete	42.87	34.82	34.34	33.74
Secondary Complete	34.03	36.10	37.07	37.99
Certificate & Diploma less than	0.21	0.69	0.75	0.80
Certificate G12	2.97	4.24	4.36	4.48
Diploma G12	1.55	2.38	1.21	0.32
Degree	3.78	9.91	9.95	10.09
Total	100.0	100.2	100.2	100.2

“ *These results highlight the persistence of the significant disparity between the rates of job openings and job seekers across potential growth paths. They also highlight the difference between the scenario results over the next 10 years.* ”

cantly shrinks relative to the Low scenario (Table 5). Under these scenarios, the largest decline is among job seekers with low skills.

Job Seekers by Occupation (2015-2025)

Under the three growth scenarios and relative to 2015, the specific pools of job seekers that seek employment as Plant and Machine Operators, Crafts and Trade Workers, and Service Workers are expected to decline over the forecast period. However, relative to the Low scenario, the reduction of these job seekers is expected to be more significant under the Moderate and especially the High scenario. Moreover, the Moderate and High growth scenarios are projected to lead to additional reductions in the pool of job seekers that seek employment in the occupation categories of Clerks and Elementary and Domestic Workers. The sizes of job seeker groups that are expected to seek employment in the remaining occupational categories (6 under the Low and 4 under the Moderate and High scenarios) are projected to grow over the next decade.

Overall, under the Low scenario, the expansion or contraction of job seeker groups, classified by their occupational

preferences, are relatively less favourable than the relevant outcomes under Moderate and High scenarios.

Labour Market Imbalance

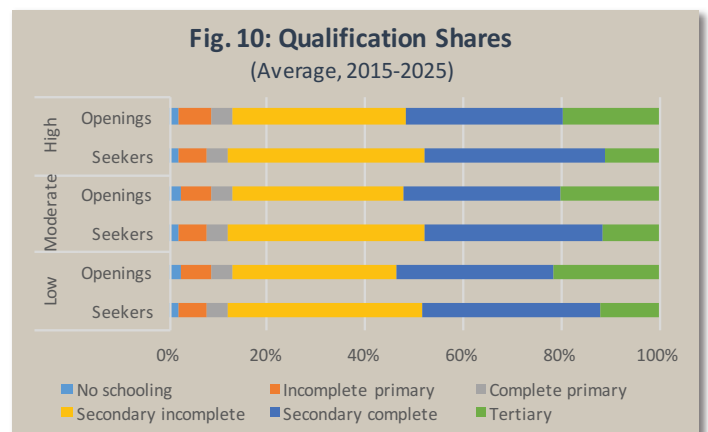
A comparison of the rates of job openings and job seekers across scenarios provides a broad overview of the future outlook for imbalances in the South African labour market. Over the next 10 years, on average, the number of job openings is expected to be equivalent to 2.8% (Low), 4.1% (Moderate) and 4.7% (High) of the labour force. On the other hand, the size of job seekers will be 40.5% (Low), 36.7% (Moderate) and 34.6% (High) of the labour force over the next 10 years, (Figure 10).

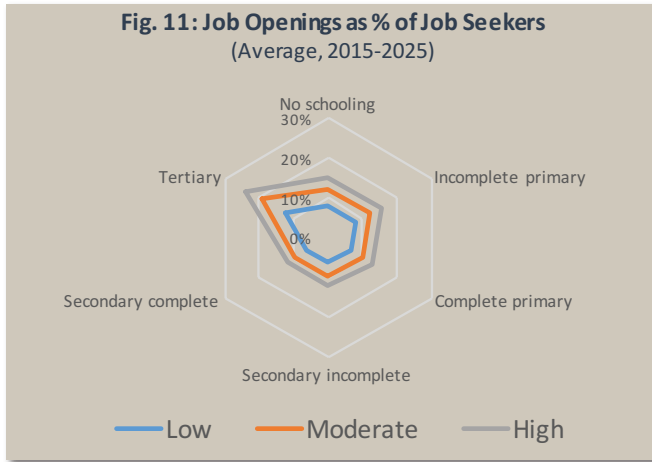
These results highlight the persistence of the significant disparity between the rates of job openings and job seekers across potential growth paths. They also highlight the difference between the scenario results over the next 10 years. For example, the number of job seekers relative to the labour force is expected to be 14 times higher than the number of job openings relative to the labour force in the Low Scenario, compared to 9 and 7 times under the Moderate and High scenarios, respectively.

Skills Gap (2015-2025)

Figure 11 uses job openings relative to job seekers by qualification to illustrate the gap between the two for each educational qualification over the next 10 years. It also allows for comparison of the skills gap, or qualification mismatch, across the Low, Moderate, and High scenarios.

As an indicator of the skills gap in the labour market, if there is a perfect balance between the number of job openings in a particular educational quali-





fication and the number of those seeking employment with similar qualifications, the value of the indicator will be one (100%). A value between zero and one reflects excess supply for a particular skill.

The combination of values on the six axes of the spider diagram (Figure 11) provides an overall view of a scenario’s performance on multiple dimensions. The higher the scenario’s percentage point on each qualification axis, the larger the scenario’s percentage of job openings relative to job seekers for that qualification. From the diagram the following results stand out:

Under the Moderate and High scenarios, the skill gaps improve for the labour market as a whole and for various education qualifications. For each scenario, the percentage of job openings relative to job seekers will be the highest for the tertiary education cohort of the labour force.

High scenario results show that overall job openings as a percentage of job seekers is expected to more than double under this scenario, from 7.2% in 2015 to 16% in 2025. Moreover, with the exception of those with No Schooling, LM-EM projects that for the other qualification groups, the percentage of job openings relative to job seekers will double to triple over the next 10 years. For example, for the Tertiary cohort, the percentage of job openings relative to job seekers is projected to almost double under the High scenario, from 18.5% in 2015 to 34% in 2025. For those in the labour market with Completed Secondary education, the percentage of job openings relative to job seekers is expected to grow from 6.7% in 2015 to 20% in 2025.

Unemployment Rate (2015-2025)

The unemployment rate is projected to gradually increase over the period under the Low scenario. By 2025, it is projected at 37%, which is two percent higher than the rate for 2015. However, under the Moderate and High scenarios the unemployment rate is projected to significantly decline to 26% (Moderate scenario) and 20% (High scenario) respectively by 2025 (Figure 12).

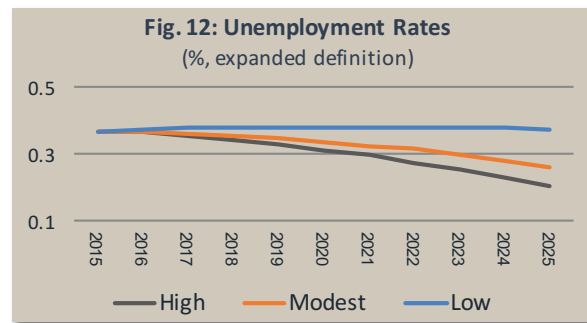
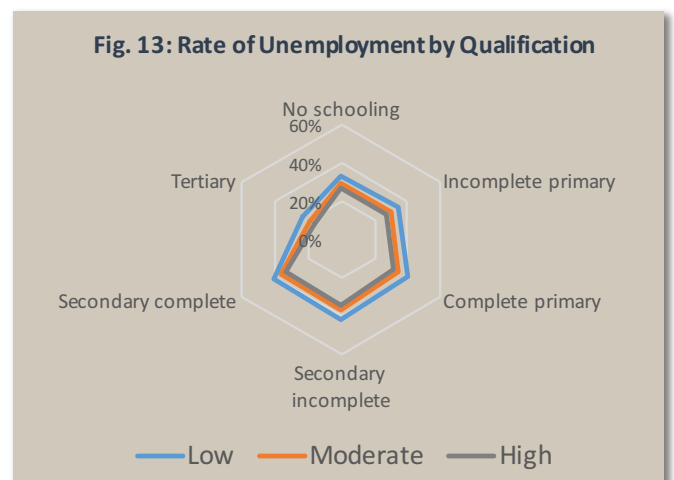


Figure 13 provides an overall view of the average rates of unemployment across scenarios for various qualification cohorts over the next 10 years. Across scenarios, the segment of the labour force with Tertiary education is expected to experience the lowest average unemployment rate, which is projected at 24% (Low), 19% (Moderate), and 16% (High). For all other qualification cohorts, the average unemployment rate is projected to be one and a half to two times higher than the relevant unemployment rate for the tertiary cohort, in each of the scenarios.



Conclusions

The results from the above three scenarios provide insight into the interactions between the economy and the education sector and foresight about the demand and supply of occupations and skills required by the economy. If over the next 10 years performance of the economy gravitates between the Low and High scenarios, key findings from the LM-EM include:

1 The labour force will gradually grow by about 4 million over the next 10 years.

2 The combined share of the bottom four qualifications will gradually decline by 7.4%, from 51% in 2015 to 43.6% in 2025.

3 The share of those in the labour force with Secondary Complete and above is expected to grow from 48.4% in 2015 to 55.8% in 2025.

4 Total employment will increase between 2.38 million and 7.24 million.

5 The current share of High skill workers will increase from one-fifth to more

than one-fourth of total employment by 2025.

6 The average unemployment rate will be the lowest within the combined Managers and Professional occupations.

7 If the economy follows a low job creation path similar to the Low scenario, only about one third of job openings will be due to the expansion of the economy, compared to more than 50% under a high job creation scenario.

8 If the economy generates levels of employment that are close to the Moderate or High scenarios, the size of job seekers will decline between 1 and 2.5 million over the next 10 years.

9 If the economy achieves the High scenario path, then for all except those with no schooling, the percentage of job openings relative to job seekers will double to triple over the next 10 years.

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APPLIED DEVELOPMENT RESEARCH SOLUTIONS is an independent economic consultancy organization with extensive experience in economic model building, capacity building, policy research, and advisory services in Africa. Our innovative web-based interface gives users the power to design policies and test their impact prior to embarking on implementation.

THE BRIDGE is an ADRS policy brief designed to present the main findings of policy simulations on key development challenges. With each issue we present the quantification of policy options in order to support evidence-based policy decision-making and to contribute to current economic policy analysis and debate.

ADRS MODELS OF THE SOUTH AFRICAN ECONOMY

BRIDGING RESEARCH AND DEVELOPMENT

Appplied Development Research Solutions (ADRS) has developed six economic models of South Africa that interested individuals and institutions can use for projections, policy design and impact analyses. The models include a highly disaggregated macroeconomic model, two tax and transfer microsimulation models of households, a linked macro-micro model, and two linked national-provincial models of South Africa. Following is a brief description of each model:

MACROECONOMETRIC MODEL OF SOUTH AFRICA (MEMSA)TM

This model captures the complex inter-linkages that exist between and within industrial sectors of the economy, macro-economic variables, policy variables, and income and expenditure of government, labour, and business. MEMSA is a bottom up disaggregated model with 7 estimated variables for 41 sectors of the economy. It is most suitable for forecasting and simulating the impact of domestic and international shocks, macroeconomic and industrial policy changes, major public expenditure projects, as well as policies that affect private businesses, government and household income and expenditure. MEMSA is hosted at the ADRS website and is accessible through its user-friendly platform.

SOUTH AFRICAN TAX AND TRANSFER SIMULATION MODEL (SATTSIM)TM

ADRS has built this microsimulation model of South Africa for the projection of costs and benefits of current and future tax and transfer policies. Users of the model can design simple or complex tax and transfer policies for the next 15 years and assess their budgetary, poverty and income distribution effects. Model results are presented in aggregate and disaggregated forms, i.e., by gender, family type, quintile, province, and locality. In addition to a direct and an indirect tax modules, the model includes modules for current social security programmes (i.e., old age grant, child support, disability grant, and care dependency grant), and five additional grant programmes (i.e., care giver support, the basic income grant, youth grant, unemployment grant and adult grant) that are not currently part of the social security system in South Africa but can be used to develop 'what if' scenarios. SATTSIM is hosted at the ADRS website and is accessible through its user-friendly platform.

ADRS MODELS

- **MEMSATM: Macroeconomic Model of South Africa**
- **SATTSIMTM: South African Tax and Transfer Simulation Model**
- **SATTSIM-PlusTM: Augmented South African Tax and Transfer Simulation Model**
- **DIMMSIM-SATM: Dynamically Integrated Macro and Micro Simulation Models of South Africa**
- **LNP-MacroTM: Linked National-Provincial Macroeconomic Model of South Africa**
- **LNP-MMTM: Linked National-Provincial Macro-Micro Model of South Africa**

MEMSA

SATTSIM

AUGMENTED SOUTH AFRICAN TAX AND TRANSFER SIMULATION MODEL (SATTSIM-Plus)TM

This model is an extension of SATTSIM. It allows users to produce projections of the tax revenue, social security beneficiaries and cost, and poverty and income distribution under alternative scenarios for the performance of macroeconomic indicators (e.g., growth, employment, inflation, and wage rate) over the next 15 years. Or, for a given scenario for the future performance of the South African economy (e.g., low or high economic growth during next three years), users can make changes to the social security and tax system and simulate their impact on the rate of poverty and income inequality. SATTSIM-Plus is hosted at the ADRS website and is accessible through its user-friendly platform.

DYNAMICALLY INTEGRATED MACRO AND MICRO SIMULATION MODELS OF SOUTH AFRICA (DIMMSIM-SA)TM

This model integrates the ADRS macroeconomic model (MEMSA) with its household microsimulation model (SATTSIM) to capture the dynamic interactions between the macroeconomic performance and the poverty and income distribution at household level. The model is most suitable for the analysis of poverty and inequality and for the impact analyses of alternative macro and micro policies for growth and development. It includes two-way interactions between its macro and micro components such that (a) changes in macroeconomic variables (e.g., prices, employment, wage rates, benefits, transfers, etc.) influence the welfare of individuals and families, and (b) changes in household level economic conditions (e.g., poverty, inequality, consumption, taxes, eligibility for social grant, etc.) influence macroeconomic outcomes. DIMMSIM-SA is hosted at the ADRS website and is accessible through its user-friendly platform.

DIMMSIM-SA is most suitable for the impact analyses of alternative macro and micro policies for growth and development.

LINKED NATIONAL-PROVINCIAL MACROECONOMETRIC MODEL OF SOUTH AFRICA (LNP-MACRO)TM

The purpose of the ADRS provincial macroeconomic model is to produce projections of growth, investment, and employment for 27 sectors of each of the nine provinces in South Africa. The model captures the economic structure of nine provinces using econometric estimations of sectors of provincial investment, output and employment and nine linked national-provincial input-output tables. The latter captures sector linkages within provinces and between provinces and the rest of the South African economy. The model is most suitable for forecasting the impact of national level policies on provincial economies or the impact of provincial initiatives on the province and the rest of the country. A second version of the model, **LINKED NATIONAL-PROVINCIAL MACRO-MICRO MODEL OF SOUTH AFRICA (LNP-MM)TM**, allows additional assessments of the impact of policy scenarios on national and provincial poverty and income distribution.

For more information on ADRS models, visit the ADRS website or send your enquiries to adelzadeh@adrs-global.com.