Growth, Employment and Skills

The New Growth Path Revisited

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**LABOUR MARKET
INTELLIGENCE PARTNERSHIP**

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ABBREVIATIONS AND ACRONYMS

AsgiSA	Accelerated and Shared Growth Initiative for South Africa
CSPS	Community, Social and Personal Services
DPRU	Development Policy Research Unit
EDD	Economic Development Department
EPWP	Expanded Public Works Programme
FET	further education and training
GDP	gross domestic product
GEAR	Growth, Employment and Redistribution Strategy
ICT	information and communications technology
NGO	non-governmental organisation
NGP	New Growth Path
QES	Quarterly Employment Statistics
QLFS	Quarterly Labour Force Survey
RDP	Reconstruction and Development Programme
SSA	sub-Saharan Africa
StatsSA	Statistics South Africa

1 INTRODUCTION

One of the critical challenges facing the South African government is the country's extraordinarily high levels of unemployment. Since the transition to democratic rule in 1994, job creation has been one of the government's key policy objectives, articulated in successive policy documents such as the Reconstruction and Development Programme (RDP), the Growth, Employment and Redistribution Strategy (GEAR) and the Accelerated and Shared Growth Initiative for South Africa (AsgiSA). However, by the end of 2009, the combination of the labour market impact of the 2008 global economic recession and ineffective policies had resulted in further increases in unemployment, driven in part by the stagnation in employment creation.

In his inaugural State of the Nation Address in June 2009, President Zuma communicated a framework for a new economic programme, with job creation at the centre of the plan (EDD 2011). The New Growth Path (NGP) framework was released in late 2010 under the guidance of the newly created Economic Development Department (EDD). The main objective of the NGP is to address the persistently high levels of unemployment through the creation of *decent* jobs. Through the NGP, government has committed to creating five million jobs by 2020 and decreasing unemployment by ten percentage points over the same period.

In order to achieve the aggregate job creation target, five 'jobs drivers' have been identified which have the potential for creating jobs on a large scale. These jobs drivers are (EDD 2011):

- Infrastructure;
- Main economic sectors;
- New economies (including the green economy and knowledge-intensive sectors);
- Investing in social capital and public services; and
- Spatial development.

Numerical targets for job creation have been set for each of the five jobs drivers. As the NGP framework document highlights, two of the key variables affecting the achievability of those targets are the rate of economic growth and the rate of employment growth relative to the rate of economic growth (EDD 2011). More specifically, the rate of output growth required to reach the employment-creation target of five million jobs by 2020 depends on the relationship between employment growth and economic growth or, in other words, the employment-growth elasticity.

This report has two broad objectives. Firstly, the report hopes to use the rubric of employment intensity and growth outlined in the NGP (EDD 2011) to assess and understand the output-growth implications of the job-creation targets set in the NGP. Secondly, the report attempts to provide some indication of the skills implications of the employment targets in the jobs drivers.

With this in mind, the structure of the report is as follows. The next section will provide a discussion of the data and methodology. The methodology specifically deals with how the job-creation targets for each job driver are aligned to the different economic sectors. Section 3 starts with a brief explanation on how employment-output elasticities are derived and also provides regression and simple-method estimates of sectoral employment-output elasticities. Section 4 provides an empirical overview of employment shifts by sector since 2004Q2 until the initiation of the NGP in 2011Q3. Through the analysis of demand-side employment

estimates we aim to provide a historical context for the evaluation of the job-creation targets set in the NGP. In addition to assessing historical employment changes, we attempt to provide an analysis of the effectiveness of the NGP with regard to employment creation since 2011Q3. Although the NGP was announced in late 2010, we assume the start of the NGP to be only in 2011Q3.[1] The rationale behind this assumption is to take into account a possible six-month lag from announcement to implementation. In Section 5, an assessment of the job-creation targets in the NGP and forecasted employment figures are provided. More specifically, the output growth required to reach the NGP job-creation targets is assessed. Section 6 discusses the skills implications of the employment targets in the jobs drivers. Section 7 concludes the discussion.

2 DATA AND METHODOLOGY

2.1 Data sources

The main sources of data utilised are the official labour market surveys conducted by Statistics South Africa (StatsSA); specifically, the Quarterly Employment Statistics (QES) survey and the Quarterly Labour Force Survey (QLFS). The QLFS is a supply-side, household-level survey which collects labour market data from individuals in the household. The QES, on the other hand, is a survey of public and private enterprises in the formal non-agricultural sector and therefore provides data from the labour-demand perspective. The QES will be utilised for the majority of the analysis in the report. The rationale behind using the QES database is its ability to provide data from the firm or demand side, which represents a more accurate estimate of formal employment. This hypothesis is supported by recent research confirming that the QES provided more accurate employment estimates for the Mining sector when compared with the QLFS (DPRU 2013). Moreover, since the majority of the job drivers in the NGP target formal non-agricultural employment, the use of the QES can be seen as preferable to the QLFS. While using the QES provides several advantages, there are drawbacks. One key drawback to using the QES is its exclusion of the agricultural sector. We thus utilise the QLFS for estimates for agricultural employment where necessary. In addition, the QES excludes informal-sector employment. We do not feel that this will seriously hamper our analysis, as the NGP appears to focus on job creation in the formal sector.[2]

2.2 Methodology

Sectoral alignment of employment targets for each jobs driver

As noted above, the NGP set numerical targets for job creation for each of the five jobs drivers. Since the five jobs drivers do not correspond to a single main economic sector, our first task is to align the employment-creation targets in each area with one of the main economic sectors. We utilise the QLFS estimates for total formal-sector employment for the second quarter of 2011 (the 'base' year) and follow the approach first used by Bhorat and Van der Westhuizen (2012). We utilise formal-sector employment to ensure comparability with the QES estimates used in this report. In addition, the NGP does not explicitly mention job-creation targets for the informal sector.[3] The specific assumptions made to facilitate the alignment are discussed in more detail below. If jobs are to be created in a specific area which is associated with more than one sector, the target is distributed according to the share of each sector in the aggregated formal-sector employment, in all the relevant sectors in 2011Q2. For example, if the jobs in terms of one jobs driver are to be created in Mining, Manufacturing & Transport, the share of jobs to be created in the Mining sector is calculated according to the Mining sector's share in total formal employment.

Some of the NGP's targets are set as annual objectives, while others are to be reached by either 2015 or 2020. For the purposes of consistency, no acceleration or deceleration is assumed in the pace of job creation over the period. (The NGP documents also did not disaggregate these targets into annual targets.) In other words, if an aggregate target is set for 2015 or 2020, the total number of jobs to be created is divided by the number of years[4] required to achieve the goal. Arguably, the assumption of a linear distribution of jobs offers no disadvantage in terms of our analytical approach and final results.

Job driver 1: Infrastructure
The NGP proposes to create 250 000 jobs a year in energy, transport, water and communications

infrastructure, and housing by 2015. We thus assume that 250 000 formal-sector jobs will be created per annum in each of the four years between 2011 and 2015. The NGP states that the jobs will be in four activities, namely construction of new infrastructure, operation of the new facilities, expanded maintenance, and the manufacture of components for the infrastructure programme. The four sectors in which the jobs will be created are therefore Construction, Utilities, Manufacturing and Transport. The annual target of 250 000 is distributed proportionally according to each sector's share in the aggregate employment in the four sectors in 2011Q2. For example, in 2011Q2, the Manufacturing sector accounted for 57.6% of the combined formal employment in the Construction, Utilities, Manufacturing and Transport sectors. The total number of jobs related to driver 1 and to be created in the Manufacturing sector, is therefore 57.6% of 250 000 (or 144 095 jobs) per annum between 2011 and 2015. Similarly, 20.1% of the jobs to be created are in Construction, 18.5% in Transport and 3.8% in Utilities.

Job driver 2: Labour-absorbing activities in main economic sectors

The second jobs driver entails targeting labour-absorbing activities across main economic sectors, specifically Agriculture, Agro-processing, Mining, Manufacturing, and high-level services (specifically Tourism and Business Services). Targets in each sector are set for 2020, and the aggregate targets are divided by nine to derive annual job-creation targets for the nine-year period between 2011 and 2020.

The NGP proposes to create 'opportunities' for 300 000 households in agricultural smallholder schemes by 2020. For the purposes of aligning our job-creation targets, these opportunities are interpreted as 300 000 jobs to be created in the Agriculture sector. In addition, 145 000 jobs in Agro-processing and 140 000 jobs in Mining are targeted by 2020. The jobs in Agro-processing fall within the Manufacturing sector. The NGP also proposes to add an additional 350 000 jobs in Manufacturing in line with IPAP2. Finally, it is proposed that 225 000 jobs will be created in Tourism by 2015 and 50 000 jobs in Business

Services by 2020. Since Tourism is not formally classified as an economic sector, these jobs are distributed proportionally between Transport (which includes travel agencies and logistical services) and Wholesale & Retail Trade (which includes hotels and restaurants). The Transport sector accounts for 21.7% of the target, while 78.3% of the jobs to be created are allocated to the Trade sector. The NGP also identifies job opportunities in the cultural industries, but no targets are set.

Job driver 3: Seizing the potential of new economies

Driver 3 targets job creation specifically in the green economy and the knowledge economy. The NGP proposes to create a total of 300 000 jobs by 2020 in the green economy, with 220 000 of these in construction, operations and maintenance of new environmentally-friendly infrastructure, and the remaining 80 000 in manufacturing. In addition, it is proposed that 100 000 new jobs will be created by 2020 in the knowledge-intensive sectors of ICT, higher education, healthcare, mining-related technologies, pharmaceuticals and biotechnology. The sectoral alignment of the last target is challenging. It was decided to distribute the target between Financial and Business Services and Community, Social and Personal Services (CSPS), again proportionally to their shares in total formal-sector employment in these two sectors in 2011Q2. This means that 36.2% of the target is allocated to Financial and Business Services and 63.8% of the target is allocated to CSPS. The Financial and Business Services sector includes all computer and related activities, as well as research and development (including technical activities), while CSPS includes education and healthcare.

Job driver 4: Investing in social capital and public services

This driver aims to promote growth in the social economy, including co-ops, non-governmental organisations (NGOs) and stokvels, with a target of 260 000 new employment opportunities by 2020. It is also anticipated that the public service can generate 100 000 jobs by 2020 in health, education and policing. These jobs all fall within the CSPS sector.

Job driver 5: Spatial development

Driver 5 focuses on the job-creation potential of rural development and regional integration. While 'substantial new employment from increased construction and public employment' is mentioned, only targets for the export of manufactured goods and services are set. These are again allocated proportionally according to current employment levels to Manufacturing and Financial & Business Services. As a result, the two sectors account for approximately 50% each of the job-creation target. A target of 60 000 jobs by 2015 and 150 000 by 2020 has been set. The first 60 000 jobs are allocated to the 2011 to 2015 period, while the remaining 90 000 are allocated to the 2016 to 2020 period.

Table 1 below provides a summary of the annual targets by job driver and main economic sector. If a target within a jobs driver or a specific area within a jobs driver is distributed between two or more

sectors, the share of each sector in the aggregate target is given in brackets.

It is very clear from the table that, with the exception of job driver 4 (Investing in social capital and public services), the jobs to be created within each jobs driver are spread over a range of sectors. In fact, according to our alignment of employment targets with economic sectors, jobs will have to be created in each of the nine main sectors of the economy to ensure that the aggregate employment-creation target is met by 2020.

Table 3 below provides a summary of the aggregate employment targets by economic sector for each year and also for the 2011–2020 period as a whole. The table therefore presents the number of jobs to be created in each main economic sector in each year, if the targets set in the jobs drivers in the NGP are to be met.

Table 1: Summary of annual NGP employment targets by jobs driver and economic sector

Jobs driver	Sector	Annual target	Aggregate	Year for achievement (assuming 2011 as base year)
(1) Infrastructure (energy, transport, water & communications infrastructure, and housing)	Construction (20.1%)	50 312	201 246	2015
	Utilities (3.8%)	9 420	37 680	2015
	Manufacturing (57.6%)	144 095	576 381	2015
	Transport (18.5%)	46 173	184 692	2015
(2) Main economic sectors	Transport (21.7% of Tourism job target)	12 195	48 781	2015
	Trade (78.3% of Tourism target)	44 055	176 219	2015
	Agriculture	33 333	300 000	2020
	Mining	15 556	140 000	2020
	Manufacturing	55 000	495 000	2020
	Financial & Business Services	5 556	50 000	2020
(3) Seizing the potential of new economies	Construction	24 444	220 000	2020
	Manufacturing	8 889	80 000	2020
	Financial & Business Services (36.2% of Knowledge-intensive sectors)	4 020	36 180	2020
	CSPS (63.8% of Knowledge-intensive sectors)	7 091	63 820	2020
(4) Investing in social capital and public services	CSPS	40 000	360 000	2020
(5) Spatial development	Manufacturing (50.2%)	7 533	30 132	2015
	Financial & Business Services (49.8%)	7 467	29 868	2015
	Manufacturing (50.2%)	9 040	45 200	2020
	Financial & Business Services (49.8%)	8 960	44 800	2020

Source: EDD (2011) & Statistics South Africa, 2011Q2; own calculations

If the jobs-creation targets are aggregated, the NGP has an overall *sectoral* job-creation target of 3.12 million between 2011 and 2020.[5] The figures presented in the table above suggest that, over the first four years of the lifespan of the NGP (namely 2011 to 2015), the various sectoral targets for each of the jobs drivers total more than half a million new jobs per annum.[6] From 2016 to 2020, this annual aggregate target declines to just more than 200 000 per annum. This decline in the annual target is driven by the fact that, for a number of drivers, the target year for achieving the aggregate job-creation target is 2015.

For the period as a whole, the Manufacturing sector is the largest contributor relative to the total number of new jobs to be created. In fact, over the nine-year period, this sector is expected to contribute 1.2 million jobs, or almost 40% of the total number of jobs to be created as set out in the NGP. The second-largest contribution comes from the Construction and CSPS sectors respectively, with each sector accounting for almost 14% of the aggregate target or just more than 400 000 jobs.

The smallest estimated contribution comes from the Utilities sector, with a share of just more than 1% in the total number of jobs to be created. Mining accounts for 4.5% of the aggregate target, while the Trade and Financial & Business Services sectors are estimated to contribute 5.6 and 5.2% to the total number of jobs to be created.

Furthermore, in assessing employment shares as a percentage of total employment, Table 2 shows a suggestion of a potential structural transformation through the implementation of the NGP. By the end of 2012, employment in the tertiary sector occupied almost 75% of total employment compared with only 19% in the secondary sector. In terms of industries, the largest employers all fall within the tertiary sector: namely the CSPS, Financial & Business Services and Wholesale & Retail Trade. However, if the

employment targets set by the NGP are met, the employment share in 2020 will be vastly different to that prevailing in 2012. While the largest employer remains the tertiary sector, its share of total employment in terms of the NGP projections should decrease by almost 10% – the same percentage distribution transfer towards the secondary sector. The structural change via increasing secondary employment, suggested in Table 2, is therefore represented by the substantial increase in manufacturing employment from roughly 1.2 million in 2012 to the 2.4 million expected in 2020 (an increase of over 100%). This change, applied by the NGP, will see the manufacturing industry become the second-largest employer in South Africa with 21% of total employment, only 4% less than the CSPS.

Table 2: Sectoral and industry employment share of total employment, 2012 and 2020

	2012		2020	
	'000	Share	'000	Share
Primary	**519**	**6.1%**	**659**	**5.8%**
Mining	519	6.1%	659	5.8%
Secondary	**1 645**	**19.4%**	**3 331**	**29.5%**
Manufacturing	1 154	13.6%	2 381	21.1%
Utilities	62	0.7%	100	0.9%
Construction	429	5.1%	850	7.5%
Tertiary	**6 297**	**74.4%**	**7 291**	**64.6%**
Whole & retail trade	1 709	20.2%	1 885	16.7%
Transport	383	4.5%	616	5.5%
Finance	1 841	21.8%	2 002	17.7%
CSPS	2 364	27.9%	2 788	24.7%
Total	**8 461**	**100.0%**	**11 281**	**100.0%**

Source: Statistics South Africa, Quarterly Employment Statistics 2004Q4–2012Q4; own calculations

Ultimately, then, the core approach of the NGP is that of pursuing a structural transformation of the domestic economy. This structural transformation is mainly featured in the attempt to shift job generation away from the tertiary sector and towards manufacturing. This is essentially a policy framework for the growth of South Africa's domestic manufacturing industry.

Table 3: Annual employment creation targets by sector

	2012	2013	2014	2015	2016	2017	2018	2019	2020	Total	Share in total
Agriculture	33 333	33 333	33 333	33 333	33 333	33 333	33 333	33 333	33 333	300 000	9.6%
Mining	15 556	15 556	15 556	15 556	15 556	15 556	15 556	15 556	15 556	140 000	4.5%
Manufacturing	215 517	215 517	215 517	215 517	72 929	72 929	72 929	72 929	72 929	1 226 712	39.3%
Utilities	9 420	9 420	9 420	9 420	-	-	-	-	-	37 680	1.2%
Construction	74 756	74 756	74 756	74 756	24 444	24 444	24 444	24 444	24 444	421 248	13.5%
Trade	44 055	44 055	44 055	44 055	-	-	-	-	-	176 220	5.6%
Transport	58 368	58 368	58 368	58 368	-	-	-	-	-	233 472	7.5%
Financial & Business Services	17 043	17 043	17 043	17 043	18 536	18 536	18 536	18 536	18 536	160 848	5.2%
CSPS	47 091	47 091	47 091	47 091	47 091	47 091	47 091	47 091	47 091	423 819	13.6%
Total	515 139	515 139	515 139	515 139	211 889	211 889	211 889	211 889	211 889	3 119 999	100.0%

Source: EDD (2011) & Statistics South Africa, 2011Q2; own calculations

3 DERIVATION AND ESTIMATION OF EMPLOYMENT-OUTPUT ELASTICITIES

The second component of the study assesses the employment-creation targets within the NGP in terms of the output growth required to achieve these targets. This is done by utilising employment-output elasticities. The employment-output elasticity is usually defined as log E/log Q, where E is the number of employees and Q is the gross domestic product. We utilise two methods of estimating the employment-output elasticity. The first is a 'simple' method calculating the elasticity for a given time period without any alignment to any theoretical model involving the firm or capital stock. The second method is based on explicit theoretical assumptions about economic behaviour.

As shown in equation (1) below, the most common example of the first method is the calculation of the percentage changes in E and Q at two points in time, and the elasticity is obtained by the ratio of these two percentage changes. The elasticities can be calculated at the aggregate level as well as by sector or subsector and thus serve as proxies for the labour-absorption rate of economic growth, either at the aggregate or by economic sector.

$$\varepsilon = \frac{\Delta \text{Employment}}{\Delta \text{Real GDP}} \qquad (1)$$

This convenient method of estimating the elasticity has been popular due to unreliable time-series data on E and Q in many developing countries. The weaknesses inherent in simple two-point calculations, however, call into question the usefulness of the elasticity obtained for forecasting purposes. In the presence of an abnormal base or terminal years in the point estimates, the elasticity obtained may not reflect the average relationship between E and Q for a sector or industry (Lim 1976).

This is especially an area of concern due to the recent economic crisis.

As a result, an alternative method, based on a regression analysis, is often preferred, since it presents a better indication of the relationship between employment and output over time. Since the aim is to find the most accurate estimate of elasticity in a theoretical vacuum, the choice of a functional form becomes vital. The only concern with using regression-based analysis is often the limited quantity of time-series data on employment (E) and output (Q). The theoretical framework used in this report borrows from the Kyock-Nerlove adjustment model[7] through a Cobb-Douglas production function and is presented as the following estimation equation:

$$\log E_t = \alpha_0 + \beta_0 \log Q_t + \gamma_0 \log E_{t-1} + \delta_0 T$$

where α_0, β_0 and δ_0 are the coefficients of the constant, gross domestic product, employment of the previous period and the time-trend respectively. The time-trend reflects changes in technology. The coefficient (β) of concern will be that of Q_t. The value of β falls generally within a range between -1 and 2. A negative value of β represents a negative employment-output elasticity while a positive number provides evidence of a positive relationship. For example, if β for the Manufacturing sector is estimated to be 0.63, we can infer that for a 1% increase in economic growth, employment in manufacturing will increase by 0.6%.

While the estimated coefficient (β) represents either a positive or negative employment-output elasticity, there are actually four possible employment-output relationships, two for a positive elasticity and two for a negative elasticity. For instance, a negative

employment-output elasticity is indicative of either a negative output growth and positive employment growth, or positive output growth and negative employment growth. The latter of the two scenarios represents the commonly used phrase of jobless growth, where economic growth is not associated with an increase in employment levels. Similarly, a positive elasticity represents either positive output and employment growth, or negative output and employment growth. Put differently, in this case, economic growth is associated with an increase in employment, or a decline in output is associated with job losses.

This method of analysis has been widely used internationally by the likes of Lim (1976) to estimate the employment-output elasticity for Malaysian manufacturing, and by Islam and Nazara (2000) to estimate the employment elasticity for Indonesia and Kapsos (2005) and to assess global and regional employment-output elasticities. Locally, research into the employment-output elasticity was most recently done by Oosthuizen (2006) who estimated the employment-output relationship in the post-apartheid labour market.

In analysing South Africa's employment-output elasticity we have to take account of the impact of the global economic crisis in 2008 on its labour market. In South Africa, the economic recession was accompanied by a massive shedding of aggregate employment.

According to the QES, over 360 000 formal non-agricultural jobs were lost between the fourth quarter of 2008 (when formal non-agricultural employment peaked at 8.5 million) and the third quarter of 2009. A further 60 000 formal non-agricultural jobs were lost over the following two quarters and formal employment has essentially been stagnant since then, totalling approximately 8.5 million in the fourth quarter of 2012.

When we consider the change in employment between the fourth quarter of 2008 and the fourth quarter of 2012, the average of the annual employment growth rate is 0%. Over the same time period, the average of the annual real GDP growth rates is 1.9%. These results suggest that the South

African economy, since the recession, has experienced slow growth in output accompanied by jobless growth, since employment figures did not change over the period.

As mentioned earlier, 'abnormal' years (in terms of the relationship between economic growth and employment) can have a distorting impact on derived simple employment-output elasticities. And the 'jobless growth' years in the post-recession period can be considered 'abnormal'. In order to correct for this, the decision was taken to estimate the employment-output elasticities using both the simple and regression method. Furthermore, in providing an in-depth analysis of sectoral employment-output elasticities, we provide estimates for the entire period (2004Q4[8] to 2012Q4), the pre-NGP period (2004Q4 to 2011Q2), the current-NGP period (2011Q3 to 2012Q4) and the pre-recessionary period (2004Q4 to 2008Q3). In doing so we hope to fully understand the dynamics of the employment growth relationship over different time periods, and also particularly whether economic recessions have an impact on this relationship. In calculating the employment-output elasticities – due to data limitations – we utilise the regression method and the simple method for the entire period,[9] and only the simple method for the other periods.

The employment-output elasticity required by a country is often dependent on several variables such as: rate of economic growth; quantity of surplus labour; labour force growth rate; unemployment and labour force participation rates; labour productivity; and poverty rates. As a general consensus, countries such as South Africa, which have relatively low economic growth rates and high labour force growth rates, require relatively higher employment-output elasticities than more developed countries.

While there is no optimal figure for South Africa's employment-output elasticity, a comparison with world and regional averages provides a guideline for the preferred elasticities. Although the general rule of thumb identifies the preferred elasticities to be between 0.3 and 0.5, an elasticity of 0.3 or less (the world average between 1992 and 2008) for South Africa can be considered too low. This can be due to the degree of employment intensity required by a

country, which often depends on several variables, including economic growth, the amount of labour surplus, the labour force growth rate, the unemployment and labour force participation rates, the level and growth rate of labour productivity, and the poverty rate. On the other hand, a high employment-output elasticity (an elasticity of greater than one – the average of the Middle East between 1992 and 2000) is also not ideal, as it can be indicative of volatility within the economy. As a general guide for South Africa, we see that, in the period 1992 to 2008, the employment-output elasticity for sub-Saharan Africa (SSA) was between 0.5 and 0.7 (third highest behind North Africa and the Middle East), and, since South Africa can be considered the most developed country in SSA, any employment elasticity between these figures could be considered reasonable and acceptable. One must keep in mind that these figures fall within the 'preferred' 0.3 to 1.0 employment-output elasticity.

The results from simple point estimates (Table 4, Column 3) suggest an employment elasticity of growth of 0.79 at the aggregate for the period 2004Q4 to 2012Q4. All sectors, except the Mining &

Quarrying and Manufacturing sectors, displayed positive elasticities, meaning that output growth in the sector was accompanied by positive employment growth over the same period. For example, between the fourth quarter of 2004 and the same quarter of 2012, a 1% increase in the output of the Transport, Storage and Communications sector was accompanied by an average increase of 0.7% in employment in that sector. Interestingly, the Manufacturing sector – over the eight-year period – experienced jobless or even worse, job-shedding growth, since the positive growth in value added was accompanied by a decline in employment. Moreover, the negative elasticity in the Mining sector was due to a combination of positive employment growth and negative real GDP growth. This is an intriguing and counter-intuitive finding, since the estimates imply an increase in employment for the sector despite the drop in output.[10]

Using the logarithmic regression method (Table 4, Column 4), we see that the results confirm those of the point analysis, with three important exceptions: the Mining & Quarrying, Manufacturing and

Table 4: Derived employment elasticity of GDP growth for 2004Q4–2012Q4

	Average of annual growth rates: 2004Q4-2012Q4		Simple employment output elasticity	Employment output elasticity
	Employment	Real GDP (value-added)	$\frac{\Delta Employment}{\Delta Real\ GDP}$	Regression coefficient
Mining & quarrying	2.26%	-1.31%	-1.73	0.38*
Manufacturing	-0.22%	2.44%	-0.09	0.34***
Utilities	5.05%	0.84%	6.02	0.12
Construction	1.19%	6.68%	0.18	-0.40*
Wholesale & retail trade	3.19%	3.41%	0.94	0.11
Transport, storage & communication	2.45%	3.49%	0.70	0.46*
Finance, real estate & business services	2.99%	5.06%	0.59	1.52***
Community, social & personal services (CSPS)	3.84%	3.35%	1.14	0.99**
Aggregate	2.56%	3.25%	0.79	1.49***

Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Notes:

1. The averages of the annual growth rates have been calculated as the average of the eight growth rates for both employment and real GDP over the eight year period.

2. The real GDP growth rates have been derived from the seasonally adjusted and annualised quarterly GDP by industry at constant 2005 prices (R million) for the fourth quarter in each year from 2004 to 2012.

3. Private households (mostly domestic workers) are combined into CSPS. While employment is recorded separately for domestic workers, output (or value added) is not recorded separately for domestic workers and they are included in CSPS.

*4. Column 4 shows the coefficient of the log of GDP (β) where the significance levels are represented as *** p<0.01, ** p<0.05, * p<0.1.*

5. Aggregate GDP is taken as the sum of all formal non-agricultural value added output.

Construction sectors. While the simple point estimates showed Mining & Quarrying and Manufacturing industries having negative employment-output elasticities, our regression analysis conveys a different result. Both the Mining & Quarrying and Manufacturing industries yield positive employment-output elasticities. Interestingly, the opposite result is seen for the Construction industry, where the point estimates suggest a negative relationship and the regression estimates suggest a positive relationship.

Although the results are generally similar for the other sectors, the sizes of the employment-output elasticities differ. The regression method estimates higher employment-output elasticities for the Mining & Quarrying, Manufacturing and Financial Services industries, while, for the CSP services, Utilities, Construction, Wholesale & Retail Trade, and Transport industries, the point estimates produce larger employment output coefficients. For example, for the CSP services industry, the point estimate method predicts that a 1% increase in output in that sector will result in a 1.14% increase in employment. Using the regression method, it is estimated that a 1% increase in CSP services output will result in a proportional increase in employment.[11] While the regression analysis is generally preferred, given the South African context whereby employment and

GDP are highly volatile (high standard errors) and the time-series is relatively short, one should not read too much into the regression results. It is with this in mind that we turn to point estimate analysis in the following section.

Relating the estimated employment-output elasticities to an 'optimal' elasticity suggested for South Africa, we see that, using the regression method, only four of the eight sectors (Mining & Quarrying, Manufacturing, Transport and Communications, and CSPS) fell within the 0.3 to 1.0 bound. Three sectors, Utilities, Construction, and Wholesale & Retail Trade fell below the 'preferred' elasticity of 0.3, while the employment-output elasticity for Financial & Business Services is estimated to be above the 'preferred' 1.0 bound. On aggregate, we see that employment-output elasticity for formal South African employment is estimated to be 1.49, a figure substantially higher than the average SSA estimate or the 'optimal' South African figure. The comparison with 'preferred' employment-output elasticities suggests that, for the period 2004Q4 to 2012Q4, South Africa can be seen as a volatile economy which often overreacts to both internal and external shocks to the economy. This result is unsurprising, since the South African rand has been identified as one of the most volatile emerging-market currencies and this could be

Figure 1: Derived employment-output elasticity: 2004Q4–2012Q4
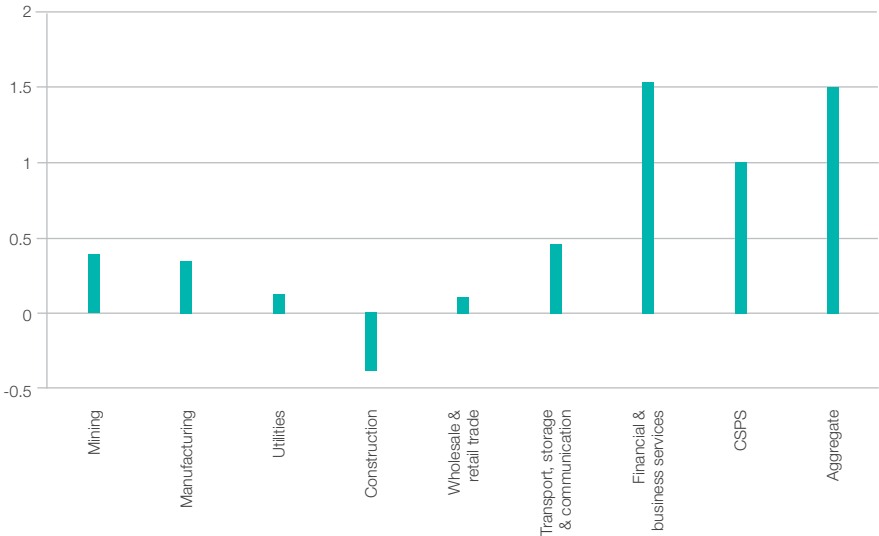
Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

indicative of the type of economy South Africa is currently facing (Hassan & Smith 2011).

In trying to better understand the changes in the employment-output relationship over time, we have identified key periods for consideration and calculated employment-output elasticities for each of these periods. Table 5 presents the employment-output elasticity for the pre-recessionary period (2004Q4 to 2008Q3) and post-recessionary period (2009Q3 to 2012Q4). As noted earlier, while the regression method for calculating employment-output elasticities is preferred, it does require longer time-series data. We therefore only use the simple point estimates to derive the employment-output elasticities for these two time periods.

Table 5 provides employment-output elasticities for the two periods: 2004Q4 to 2008Q3 and 2009Q3 to 2012Q4. The 2004Q4 to 2008Q3 period is seen as the 'pre-recession' period, characterised by continuous economic growth. The estimates below suggest that, at the aggregate and for all sectors except Mining & Quarrying, this positive growth in output was associated with an increase in employment. The elasticities are generally higher than those derived for the overall 2004Q4 to 2012Q4 time period. This result is unsurprising, as the full period not only includes the 2008 global financial crisis, but also the aftermath of the crisis, which has been characterised by very low or no employment growth, despite a tepid recovery in economic growth.

The results for the post-recessionary period, namely 2009Q3 to 2012Q4, are characterised mostly by low economic growth and job creation. For the post-recessionary period, Table 5 shows that, in all instances, the elasticities are lower compared with the pre-recessionary period. Four of the eight industries experienced negative employment-output elasticities, while, on aggregate, the employment-output elasticity of 0.06 is indicative of no employment response in the light of an economic recovery. Table A2 in the appendix shows that, for the post-recessionary period, although the real values added for all the sectors were positive, Manufacturing, Construction, Wholesale & Retail Trade, and Financial & Business Services all

experienced declines in employment. While the result for Manufacturing, Construction and Wholesale & Retail Trade is not surprising – the impact of the global recession and its aftermath on employment in these sectors has been well documented – it is a surprising find for the Financial & Business Services sector, a sector that has been the second-largest creator in absolute terms.

A comparison of the elasticities between the pre- and post-recessionary periods shows a stark contrast in the employment-output elasticities. While the former was one of consistent economic and employment growth, the latter was one of employment stagnation and decline, with below-trend economic growth. The main employment story for the post-recession period is one of employment loss and retention rather than employment recovery and growth. Moreover, it seems that the recession has had a relatively larger negative impact on manufacturing employment as compared with the other industries. Estimates from Table 5 suggest that, during the pre-recessionary period, employment-output elasticity for Manufacturing was quite large at 1.57, signifying that a 1% increase in output was associated by an approximately 1.5% increase in employment. However, for the period after the recession, the employment-output elasticity for manufacturing is negative. The negative elasticity of -1.13 can be seen as substantial, with the estimates representing a decline in employment by -2.47% despite an increase in output of over 2%, a clear presence of jobless or job-shedding growth in the Manufacturing sector.

Furthermore, estimates in Table 5 suggest that employment-output elasticities are higher in the primary and secondary sector when compared with the tertiary sector. As noted above, a low employment-output elasticity is generally a characteristic of slow-responding industries where employment responds slowly to output changes. This is clearly seen in the post-recessionary period, with the overall employment-output elasticity estimated to be only 0.06.

Some industries such as Utilities, Transport, Storage & Communications, and CSPS have relatively more stable employment-output elasticities. These

industries are shown to have experienced increases in employment from increases in output despite the negative impacts of the recession. While this result is interesting, closer inspection reveals that the Utilities, Transport, Storage & Communications, and CSPS sectors are mostly public sector or government owned and constitute a relatively more stable source of employment when compared with the other industries. Moreover, these sectors, can be considered non-tradable sectors which would be relatively more stable than tradable sectors, such as Mining or Manufacturing. Overall, the estimates in Table 5 suggest that the recent global recession has had a lingering impact on both GDP growth and employment creation, with the elasticity in the post-recession period substantially lower than the pre-recession period.

Given the above estimates, we retain the regression method, and thus the derived elasticities in Section 4, to estimate the level of real growth by sector needed to reach the employment targets of the NGP.

Table 5: Derived employment output elasticity for pre and post-recessionary period

	Employment output elasticity 2004Q4–2008Q3	Employment output elasticity 2009Q3–2012Q4
Mining & quarrying	-2.84	0.03
Manufacturing	1.57	-1.13
Utilities	4.51	3.12
Construction	0.45	-0.77
Wholesale & retail trade	1.79	-0.05
Transport, storage & communication	0.92	0.47
Finance, real estate & business services	1.01	-0.24
Community, social & personal services (CSPS)	1.28	0.93
Aggregate	1.20	0.06

Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Note: The employment-output elasticities shown for the three periods are calculated on average annual growth rates.

4   EMPIRICAL OVERVIEW OF SECTORAL DISTRIBUTION OF EMPLOYMENT SINCE 2004Q4

This section discusses the trends in employment by sector for three separate time periods, namely the full period of analysis, from 2004Q4 to 2012Q4, the pre-recession period and the period since the inception of the NGP. Firstly, Table 6 presents the sectoral distribution of employment change for the full period of analysis.

It must be noted that by using the QES dataset we narrow our analysis to only the formal labour market, omitting the agriculture and informal sectors. The discussions in this section therefore focus on changes in formal-sector employment, and thus a reference to total employment, here meaning total employment in the formal non-agricultural sector.

While almost 1.4 million jobs were added over the period 2004Q4 to 2012Q4, it is clear that employment growth has been unevenly distributed across the various industries and sectors of the economy. The tertiary sector accounted for 90% of the increase in employment over the period; approximately 1.2 million formal jobs were created in

the sector. As a result, the share of the tertiary sector employed in aggregate employment increased from 71% in 2004Q4 to 74% in 2012Q4. Over the same period, employment in the primary (Mining & Quarrying only) and secondary sectors increased marginally by 4.6 and 3.8% respectively. The result of this marginal increase and the strong labour market performance in the tertiary sector have meant a decrease in the share of primary and secondary employment in aggregate formal non-agricultural employment.

Employment growth in the tertiary sector was driven by the Wholesale & Retail Trade, Financial & Business Services, and Community, Social & Personal Services (CSPS). These three industries accounted for 85% of net new jobs created between 2004Q4 and 2012Q4, with the CSPS industry accounting for more than 40% of the aggregate employment growth. As a result of the 580 000 net new jobs in the industry, the share of CSPS employment in total employment increased from 25 to 28%. Table 6 also shows that Wholesale & Retail

Table 6: Sectoral distribution of employment change, 2004Q4–2012Q4

	2004Q4		2012Q4		Change		
	'000	Share	'000	Share	'000	Share	AAG
Primary	**456**	**6.4%**	**519**	**6.1%**	**63**	**4.6%**	**1.63%**
Mining	456	6.4%	519	6.1%	63	4.6%	1.63%
Secondary	**1 593**	**22.5%**	**1 645**	**19.4%**	**52**	**3.8%**	**0.40%**
Manufacturing	1 178	16.6%	1 154	13.6%	-24	-1.7%	-0.26%
Utilities	42	0.6%	62	0.7%	20	1.4%	4.99%
Construction	373	5.3%	429	5.1%	56	4.1%	1.76%
Tertiary	**5 048**	**71.3%**	**6 297**	**74.4%**	**1 249**	**90.4%**	**2.80%**
Wholesale & retail trade	1 388	19.6%	1 709	20.2%	321	23.2%	2.63%
Transport	313	4.4%	383	4.5%	70	5.1%	2.55%
Finance	1 565	22.1%	1 841	21.8%	276	20.0%	2.05%
CSPS	1 782	25.2%	2 364	27.9%	582	42.1%	3.60%
Total	7 079	100.0%	8 461	100.0%	1 382	100.0%	2.25%

Source: Statistics South Africa, Quarterly Employment Statistics 2004Q4-2012Q4; own calculations

Trade and Financial & Business Services added approximately 321 000 and 276 000 jobs respectively. Interestingly, a recent article by Bhorat, Goga and Stanwix (2013) found that a substantial amount of the increase in Financial & Business Service sector employment was due to workers being employed through labour brokers. These jobs range from helpers and cleaners to protective-service workers to farmhands and labourers. Employment in the Manufacturing sector declined at an average annual rate of 0.26% and approximately 25 000 fewer people were employed in this sector in 2012 than in 2004.

One key result from Table 6 is that, in the eight years between 2004Q4 and 2012Q4, only 1.38 million formal jobs were created, translating into an annual average increase of just more than 170 000 jobs. The annual and sectoral breakdown of the job-creation targets in the NGP shows a target of more than 515 000 new jobs per year in the period 2012 to 2015 and an annual target of approximately 210 000 new jobs between 2016 and 2020. The number of jobs created annually between 2004 and 2012 was therefore less than even the lower target for the latter years of the NGP. If we assume that 170 000 new jobs will be created in 2013, according to the NGP targets, there will be a shortfall of 345 000 jobs. If the assumption of 170 000 new jobs per year is to hold – from the implementation of the NGP to 2020 – then, over the nine-year period, employment is expected to increase by an estimated

1.5 million. However, this remains 1.7 million jobs short of satisfying the NGP target of 3.2 million formal jobs.

It can be argued that the estimates presented in Table 6 include the global recession, therefore generating a downward bias in the number of jobs created per annum. The evidence in Table 7, which shows the pre-recessionary period, does seem to support this argument. In this pre-recession period, despite only having four years of economic growth, employment increased by more than the 'full period', with the average annual growth rate being over 4.5%. However, even with such an impressive growth in employment, total formal-sector employment growth did not reach the average annual target proposed by the NGP for the 2012 to 2015 period. The 1.4 million jobs created over the four-year period translates into approximately 350 000 new jobs a year. This is still more than 150 000 fewer jobs than the NGP's 2012 to 2015 target.

Interestingly, while the two largest contributors to the NGP job-creation targets are the Manufacturing & Construction sectors, the evidence from Table 7 suggests that the bulk of employment growth – during a period of relatively strong employment growth – took place within the tertiary sector: namely Wholesale & Retail Trade, Financial & Business Services, and Community, Social & Personal Services. Between 2004Q4 and 2008Q3 the

Table 7: Sectoral distribution of employment change, 2004Q4–2008Q3

	2004Q4		2008Q3		Change		
	'000	Share	'000	Share	'000	Share	AAG
Primary	**456**	**6.4%**	**532**	**6.3%**	**76**	**5.4%**	**3.93%**
Mining	456	6.4%	532	6.3%	76	5.4%	3.93%
Secondary	**1 593**	**22.5%**	**1 826**	**21.5%**	**233**	**16.5%**	**3.47%**
Manufacturing	1 178	16.6%	1 300	15.3%	122	8.6%	2.49%
Utilities	42	0.6%	59	0.7%	17	1.2%	8.87%
Construction	373	5.3%	467	5.5%	94	6.7%	5.78%
Tertiary	**5 048**	**71.3%**	**6 132**	**72.2%**	**1 084**	**76.8%**	**4.98%**
Whole & retail trade	1 388	19.6%	1 709	20.1%	321	22.7%	5.34%
Transport	313	4.4%	366	4.3%	53	3.8%	3.99%
Finance	1 565	22.1%	1 924	22.7%	359	25.4%	5.30%
CSPS	1 782	25.2%	2 133	25.1%	351	24.9%	4.60%
Total	7 079	100.0%	8 490	100.0%	1 411	100.0%	4.65%

Source: Statistics South Africa, Quarterly Employment Statistics 2011Q3-2012Q4; own calculations

Manufacturing and Construction sectors only added 216 000 jobs (15.4% of total employment growth), in comparison with the Wholesale & Retail Trade, Financial & Business Services and Community, Social & Personal Services, which added a total of 1.03 million jobs or 73.1% of total employment growth.

The figures in Tables 6 and 7 suggest that an important structural transformation needs to take place in South Africa in order for the NGP targets to be met. While the historical trend has been one of impressive growth within the tertiary sector, a shift towards employment creation in the secondary sector (Manufacturing and Construction sectors) may prove to be the key challenge for the NGP. In essence, the NGP targets imply a move away from non-tradable employment and towards tradable employment. This structural transformation of the economy can be viewed as potentially crucial to South Africa's long-run employment generation strategy built, as with most emerging markets, around a dynamic fast-growing light manufacturing sector.

The analysis of the NGP period – more specifically the period 2011Q3 to 2012Q4 – enables us to assess the immediate impact of the NGP on job creation. As explained, the 2011Q3 to 2012Q4 period corresponds to the first 18 months of the NGP. Since, at the time of writing, we were unable to find credible reports or reviews regarding the progress of the NGP, this analysis provides an opportunity to compare employment growth in that period with the targets set in the NGP.

As stated earlier, we have taken six quarters, from the end of 2011Q2 to the end of 2012Q4, as the first year of NGP analysis. Table 8 shows that, of the targeted 481 805 jobs[12] required by the NGP in 2012, only approximately one-third (161 000 jobs) were created. Only two sectors, namely Wholesale and Retail Trade and CSPS, came within reach of their targets. In the Wholesale and Retail Trade sector, 50 000 jobs were created, 6 000 more than the targeted 44 000, while the CSPS sector reached 90% of its targeted 47 000 new jobs. In total, these two sectors accounted for almost 60% of new jobs created over the period. More importantly though,

the largest contributor to the NGP target for 2012, namely Manufacturing, experienced almost no change in employment levels, with a negligible increase of 6 000 workers. This constitutes a shortfall of almost 210 000 jobs. In the Construction sector, the target was the creation of almost 75 000 new jobs. However, in the 18-month period under review, this sector only managed to increase employment by 10 000 workers.

As shown in Table 8, the inability of the South African economy to effectively create jobs has resulted in a failure to reach the NGP's target in its first year of implementation. However, this inability should be mainly attributed to the lack of policies aimed at the above identified structural transformation in the economy. Since the announcement of the NGP in 2009, there has been limited discussion on the implementation of the programme and no direct mention made of the structural transformation of the economy implicit in the strategy.

The estimates presented in Tables 6 and 7 further suggest that, based on historical trends and no structural change, the employment growth required to reach the NGP targets may not be realistic. Between 2004 and 2012, an eight-year period, a total of 1.38 million jobs were created. While this is a 20% increase in employment over the eight-year period, the average annual growth rate is a meagre 2.25% or 172 000 jobs per year. In comparison with the NGP targets shown in Table 2, we see that the average annual increase of 172 000 jobs constitutes only one-third of the proposed annual 2012 to 2015 NGP target. Furthermore, the average annual increase in employment is also lower than the 212 000 annual job-creation target set for the periods 2016 and 2020.[13]

Findings from the above three tables indicate that, based on current and historical data, employment growth has yet to reach a level that would meet the NGP targets. Even during the periods where economic and employment growth was at its relatively highest, total annual employment creation was over 150 000 less than the proposed NGP target. Moreover, while the NGP targeted the Manufacturing and Construction sectors as the largest job drivers, the Wholesale & Retail Trade,

Table 8: Sectoral distribution of employment change, 2011Q2–2012Q4

	2011Q2		2012Q4		Change		
	'000	Share	'000	Share	'000	Share	%Δ
Primary	**517**	**6.2%**	**519**	**6.1%**	**2**	**1.2%**	**0.39%**
Mining	517	6.2%	519	6.1%	2	1.2%	0.39%
Secondary	**1 627**	**19.6%**	**1 645**	**19.4%**	**18**	**11.2%**	**1.11%**
Manufacturing	1 148	13.8%	1 154	13.6%	6	3.7%	0.52%
Utilities	60	0.7%	62	0.7%	2	1.2%	3.33%
Construction	419	5.0%	429	5.1%	10	6.2%	2.39%
Tertiary	**6 156**	**74.2%**	**6 297**	**74.4%**	**141**	**87.6%**	**2.29%**
Wholesale & retail trade	1 659	20.0%	1 709	20.2%	50	31.1%	3.01%
Transport	357	4.3%	383	4.5%	26	16.1%	7.28%
Finance	1 818	21.9%	1 841	21.8%	23	14.3%	1.27%
CSPS	2 322	28.0%	2 364	27.9%	42	26.1%	1.81%
Total	8 300	100.0%	8 461	100.0%	161	100.0%	1.94%

Source: Statistics South Africa, Quarterly Employment Statistics 2011Q3-2012Q4; own calculations

Note: The use of 2011Q2 as the base year provides an analysis of six quarters of employment change (i.e. employment growth from 2011Q2 to 2011Q3 and 2011Q3 to 2011Q4).

Financial & Business Services, and Community, Social & Personal Services sectors were the biggest contributors to job creation. Overall, the results suggest that the failure to meet the 2012 employment-creation target set by the NGP is not only due to slow economic growth or low employment-output elasticity, but a combination of very ambitious targets being pursued by the NGP and non-specific structural policies aimed at transforming the economy from a largely tertiary sector-based economy to a more secondary sector-focused economy.

5 ASSESSMENT OF NGP JOB-CREATION TARGETS AND FORECASTS TILL 2020

5.1 Assessing the NGP job creation targets

In Section 3, simple and regression employment elasticities, based on the historical relationship between output growth (or gross value added) and growth in formal employment, have been derived for each economic sector. These elasticities are now utilised to calculate the required annual sectoral growth rates to produce the employment-creation targets set in the NGP.

Since the employment-output elasticities are calculated as the ratio of employment growth to real GDP growth, the absolute additional numbers of jobs to be created in each sector in each year between 2012 and 2020 have to be expressed as an annual growth rate in employment. Put differently, we have to estimate the annual growth rate associated with the absolute increase in employment in each sector for every year. These estimates (and the annual absolute increases in employment) can be found in Table A3 in the appendix. The annual growth rates in employment, together with the derived employment-output elasticities, are then used to estimate the sectoral growth rates required to reach the job-creation targets in the NGP. However, due to the negative elasticity derived for the Construction sector when the regression method was utilised, the elasticity used for the Construction sector will be the one derived from the simple method. The negative elasticity derived using the regression method suggests that either an increase in output in the Construction sector will be associated with a decline in employment, or that a decline in output will be associated with an increase in employment. The first scenario is undesirable and indicative of jobless growth in the sector, while the second is difficult to explain, but could be a function

of labour intensity or a secular labour market response to output changes.

Table 9 below presents a summary of the annual employment and sectoral GDP growth rates required to reach the NGP job-creation targets. The annual employment growth rates refer to the annual growth in employment required to reach the NGP job-creation target for that specific year. The annual GDP growth rates are estimated using the above calculated employment-output elasticities and refer to the annual growth in sectoral GDP required to support the employment growth needed to reach the NGP job-creation targets. It should also be noted that we only evaluate the future target growth rates. Put differently, we do not show by how much the output in each sector should have grown in 2012 to reach the 2012 job-creation targets. We show the target employment and output growth rates from 2013 onwards.

The first key result in here is that, due to the high employment-creation targets and the relatively low derived employment-output elasticities, the GDP growth rates required to match the NGP targets are extremely high for all sectors, except for the Financial & Business Services and CSPS sectors. For example, in order for the Utilities sector to achieve the targeted employment growth of 13.8% or 9 420 jobs for the year 2013, sectoral output will have to increase by 115%. This result should, however, be treated with caution, as Utilities only account for less than 1% of total formal-sector employment, and even moderate absolute changes in both employment or output in this sector will result in very large growth rates. Despite slightly larger employment-output elasticities for sectors such as Manufacturing and Transport, the high employment growth rates required to reach NGP targets means that GDP growth rates in excess of

30% per annum are required to reach the job-creation targets in 2013. While the required real GDP growth rates do decline slightly over the period as a whole, it is estimated that, by 2020, manufacturing output still has to grow by 9.4% to reach the job-creation target in that sector. For the Construction industry, the required increase in output is more than 80% in 2013, before declining over the period. By 2020, however, value-added in Construction still has to increase by as much as 16% to reach the job-creation target in that year. An assessment of historical data from 2004 shows that the required growth in both output and employment does not appear feasible. Between 2004Q4 and 2012Q4, output in Manufacturing and Construction increased by 2.4 and 6.7% respectively, significantly below the required NGP targets.

It is projected that output in the Mining sector will have to grow by 7.6% to achieve the 2.9% employment growth target for 2013. Again, the estimated required growth in output is forecasted to decline over the period between 2012 and 2020. However, the required growth rate is still as high as 6.3% by 2020. Growth in output in excess of 20% per annum is required for the Wholesale & Retail Trade sector to reach its job-creation targets for the years 2013 to 2015. Again, this is far higher than the growth trend for

the past decade. The remaining sectors, namely Financial & Business Services and Community, Social & Personal Services, are required to increase output at relatively tepid rates, with the projected required growth rates actually below their averages for the last eight years. This is an encouraging result, particularly in the case of CSPS, which accounts for almost 14% of aggregate job-creation target in the NGP.

Overall, our analysis – as shown in Figure 2 – suggests that extraordinarily high increases in employment in most sectors are required to reach the job-creation targets in the NGP. Based on historical trends, Trade, Storage & Communications, Financial & Business Services, and CSPS are the only three sectors which could potentially reach their NGP targets by 2020.

5.2 Employment Forecasts 2013 to 2020

Having assessed the output and growth rates required to successfully meet the NGP targets, we now present an estimated forecast of output and formal employment for all formal sectors between 2013 and 2020. This will allow us to compare more realistic forecasts of employment growth with the targets required by the NGP.

Figure 2: Average employment growth and required NGP targets
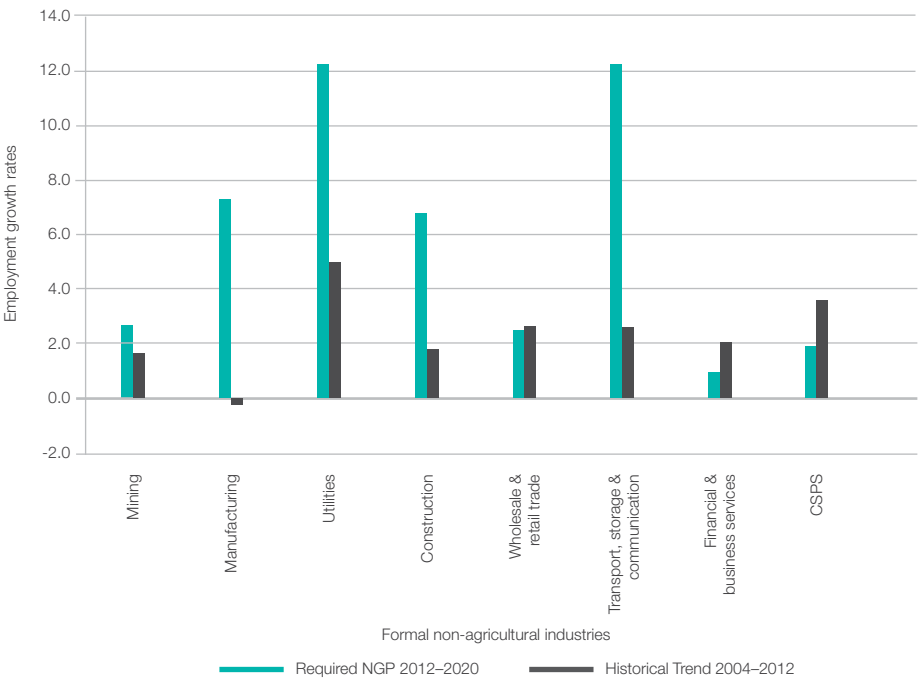
Required NGP 2012–2020   Historical Trend 2004–2012

Table 9: Estimated real sectoral GDP growth required to reach NGP job-creation targets and forecasted employment growth results

	2012 Q4 GDP in constant 2005 prices (R million)	Elasticity	2013 GDP growth	2013 Empl growth	2014 GDP growth	2014 Empl growth	2015 GDP growth	2015 Empl growth	2016 GDP growth	2016 Empl growth	2017 GDP growth	2017 Empl growth	2018 GDP growth	2018 Empl growth	2019 GDP growth	2019 Empl growth	2020 GDP growth	2020 Empl growth
Mining	23 746	0.38	7.6	2.9	7.4	2.8	7.4	2.8	7.1	2.7	6.8	2.6	6.6	2.5	6.6	2.5	6.3	2.4
Manufacturing	78 362	0.34	46.5	15.8	40.0	13.6	35.3	12.0	10.6	3.6	10.3	3.5	10.0	3.4	9.7	3.3	9.4	3.2
Utilities	8 709	0.12	115.0	13.8	100.8	12.1	90.0	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Construction	15 408	0.18	81.7	14.7	71.1	12.8	63.3	11.4	18.3	3.3	17.8	3.2	17.2	3.1	16.7	3.0	16.1	2.9
Trade	69 851	0.11	23.6	2.6	22.7	2.5	21.8	2.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Transport	45 699	0.46	30.0	13.8	26.3	12.1	23.5	10.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Financial & business services	105 654	1.52	0.59	0.9	0.59	0.9	0.59	0.9	0.7	1.0	0.7	1.0	0.7	1.0	0.6	0.9	0.6	0.9
CSPS	93 930	0.99	2.0	2.0	1.9	1.9	1.9	1.9	1.9	1.9	1.8	1.8	1.8	1.8	1.8	1.8	1.7	1.7

Source: EDD (2011) Statistics South Africa: Various QES 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP),4th Quarter 2012 (downloads: tables in Excel format); own calculations

Note: The derived employment output elasticity for Construction was negative. For the purpose of our analysis, we assigned the elasticity calculated from the simple point estimate method, namely 0.18.

Table 10: Forecasted sectoral employment based on employment-output elasticity, 2012–2015

	Employment '000 2012	Employment '000 2015	% Δ 2012–15	Δ '000 2012–15	NGP gap '000 Δ 2012–15	% of NGP gap Δ 2012–15
Mining	519	529	2.0%	10	-37	4.5%
Manufacturing	1 154	1 184	2.6%	30	-617	74.9%
Utilities*	62	62	0.3%	0	-28	3.4%
Construction	429	438	2.1%	9	-215	26.1%
Wholesale and retail trade*	1 709	1 728	1.1%	19	-113	13.7%
Transport*	383	398	4.0%	15	-160	19.4%
Finance	1 841	2 180	18.4%	339	288	-35.0%
CSPS	2 364	2 563	8.4%	199	58	-7.0%
Total*	2 154	2 189	1.6%	35	-301	36.5%
Total	8 461	9 082	7.3%	621	-824	100.0%

Source: EDD, 2011; Statistics South Africa: Various QES 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Notes:

*1. * Represents sectors that have NGP targets ending in 2015.*

2. Figures for 2012 represent the employment figures for the period 2012Q4 and thus forecasts are for three years, 2012 to 2013, 2013 to 2014 and 2014 to 2015.

The method used for forecasting is called exponential smoothing and is drawn from Bowerman and O'Connell (1979). This method is popular owing to its ability to effectively forecast when one has a limited number of observations on which to base forecasts. Unlike forecasts based on formal regression models, forecasts from exponential smoothing methods adjust for past forecast errors. Another advantage of exponential smoothing is its ability to identify and account for seasonal factors that affect our quarterly data. The final forecasted figures therefore account for historical trends, past forecast errors and seasonality.

For robustness, two methods are used to forecast employment. First, using the exponential smoothing method, sectoral output is forecast until either 2015 or 2020 (depending on the final aggregate job-creation target) and the previously derived elasticities are then utilised to project employment. The results are presented in Tables 10 and 11. The second method directly forecasts employment using historical data and the exponential smoothing, and the results are shown in Tables 12 and 13.

Table 10 shows the results when the output forecasting and derived elasticities are utilised to forecast growth in employment for the years 2013 to 2015[14] (the base year here is 2012). When the first method is utilised, only the Financial & Business Services and CSPS sectors are expected to reach and exceed their respective NGP targets by 2015. According to the forecasts of sector GDP growth combined with the derived employment-output elasticities, employment in the Financial & Business Services sector is expected to grow by 339 000, which is 288 000 jobs more than the NGP target of approximately 52 000. The CSPS sector is also expected to perform well, creating almost 200 000 jobs by 2015 and thus exceeding the required 141 000 jobs set by the NGP.

The other sectors, however, are forecasted to perform poorly in terms of job creation. Mining & Quarrying is only expected to increase employment by 10 000 workers, while Manufacturing and Construction are forecasted to increase employment by a mere 30 000 and 9 000 respectively.

The Utilities, Wholesale & Retail Trade, and Transport sectors that have 2015 as the target year for achieving their aggregate job-creation target, are all expected to fail to reach these proposed NGP targets. Forecasts in Table 10 suggest that employment in the Utilities sector is to remain stagnant until 2015, while employment in Wholesale & Retail Trade and in the Transport sectors will increase by 19 000 and 15 000 respectively. The forecasted employment increases show that the Utilities sector is expected to experience a shortfall of roughly 28 000 jobs relative to the NGP target, while the Wholesale & Retail Trade and Transport sectors will experience shortfalls of 113 000 and 160 000 jobs respectively.

Overall, according to its employment-creation targets, the NGP is expected to create a total of 1.54 million jobs in the three years 2013, 2014 and 2015. However, the results in Table 10 show that, when sectoral output is predicted using an exponential smoothing method and employment is then predicted using the sectoral output forecasts and the employment-output elasticities, employment is expected to increase by only 40% of the aggregate NGP target, consisting of some 621 000 jobs. In addition, the Finance & Business Services and the CSPS sectors are predicted to account for 87% of the increase in aggregate employment. Both these sectors, as shown in Figure 3, are expected to create jobs in excess of their NGP targets, while job creation in all other sectors is predicted to fall short of the NGP targets. According to the job drivers in the NGP, the Manufacturing sector should account for almost half of the jobs created up to 2015. The forecasts presented here, however, suggest that only 30 000 new jobs are expected to be created in this sector, which will be a shortfall of more than 600 000 jobs.

Table 10 further emphasises the above identified structure changes required in order to reach the NGP targets. The final column in Table 10 shows the employment gap in percentage shares. We see that, together, the Manufacturing and Construction industries account for the entire shortfall of targeted NGP jobs between 2012 and 2015. It is clear from

Table 11: Forecasted sectoral employment based on employment-output elasticity, 2012–2020

	Employment 000's		% Δ	AAG	Δ 000's	NGP gap 000's	% of NGP gap
	2012	2020	2012–20	2012–20	Δ 2012–20	Δ 2012–20	Δ 2012–20
Mining	519	545	4.9%	0.6%	26	-240	42.7%
Manufacturing	1 154	1 213	5.1%	0.6%	59	-952	169.4%
Construction	429	450	4.8%	0.6%	21	-325	57.8%
Finance	1 841	2 832	53.8%	6.7%	991	847	-150.7%
CSPS	2 364	2 849	20.5%	2.6%	485	108	-19.2%
Total	6 307	7 888	25.1%	3.1%	1581	-562	100.0%

Source: EDD (2011) Statistics South Africa: Various QES 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP),4ⁿᵈ Quarter 2012 (downloads: tables in Excel format); own calculations

Note: Figures for 2012 represent the employment figures for the period 2012Q4 and thus forecasts are for eight years, 2012 to 2013, 2013 to 2014 and 2014 to 2015, etc.

Table 10 that, in order for the NGP targets to be met, the emphasis must be on structural transformation that focuses on job creation in the secondary sector (Manufacturing and Construction industries).

Table 11 follows the same format as Table 10, but provides employment forecasts for the 2012 to 2020 period for the sectors which have 2020 as the target year for achieving their aggregate job-creation targets. On aggregate, over the next eight years, 1.58 million jobs are forecasted to be created by the Mining & Quarrying, Manufacturing, Construction, Financial & Business Services, and CSPS sectors. While the forecasts suggest a substantial number of new jobs will be created, the total number of new jobs is almost 800 000 less than the NGP target over the same period.

Figure 3: Employment gap relative to the NGP target: 2012–2015
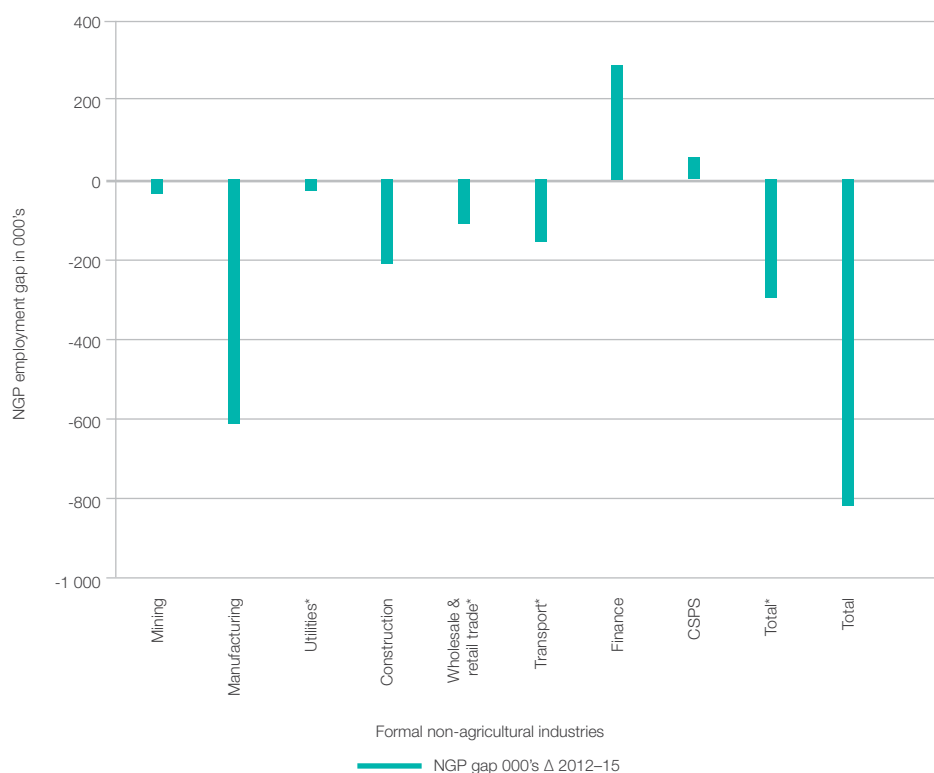
Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4ⁿᵈ Quarter 2012 (downloads: tables in Excel format); own calculations

*Note: * represents sectors that have NGP targets ending in 2015.*

More importantly, the estimates in Table 11 below show that the majority of jobs are predicted to be created in sectors which do not account for the relatively largest share in the NGP job-creation targets. The Financial & Business Services and CSPS sectors are expected to account for the majority (93.4% or 955 000 jobs) of total job creation. Employment creation in the Mining, Manufacturing and Construction sectors is forecasted to remain largely stationary over the eight-year period. Of the five sectors, only the Financial & Business Services and CSPS sectors are expected to reach the NGP targets. In fact, the Financial & Business Services sector is expected to exceed the NGP target by roughly 850 000 jobs.

According to the NGP targets, the Manufacturing sector is expected to create more than a million jobs between 2012 and 2020. But, as presented above, this sector is predicted to only create approximately 60 000 jobs over that period, a shortfall of over 950 000 jobs. To reach its NGP target, the Construction sector is expected to create around 350 000 jobs. Again, the forecast above suggests a large shortfall of more than 325 000 jobs in this sector.

Overall, the forecasts presented in the two tables above suggest that, based on historical evidence and the output-employment relationship, only two sectors, namely Financial & Business Services and CSPS, can reasonably be expected to reach their NGP job-creation targets. Moreover, although the government has identified Manufacturing and Construction as the main contributors to job creation in the NGP, forecasts based on historical trends do not provide any evidence of such job-creation capacity in these two sectors. The results presented in Table 11 and Figure 4 firmly show that, in South Africa, unless a structural transformation takes place within the economy, the main job-creation industries have been, and are expected to continue to be, the Financial & Business Services and CSPS sectors.

Having shown employment forecasts using the output forecast and elasticity method, we now compare those results with employment forecasts based purely on historical employment data. The forecasts shown here have therefore been calculated based on historical employment trends using the exponential smoothing method. We again

Figure 4: Employment gap relative to the NGP target: 2012–2020
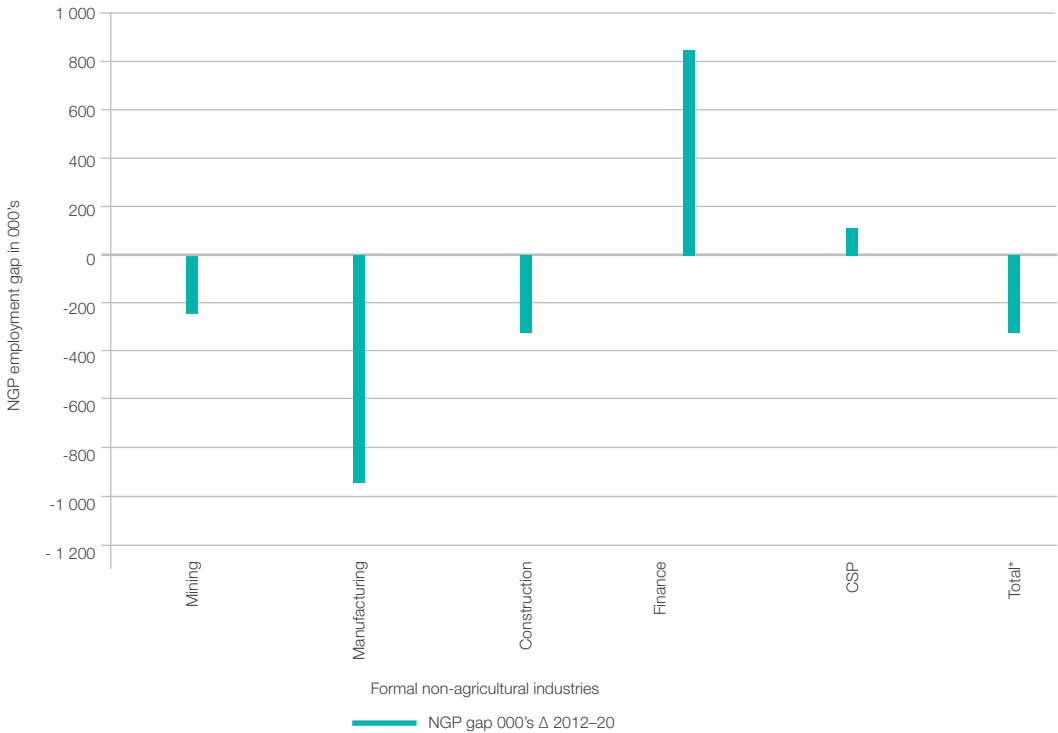
Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4nd Quarter 2012 (downloads: tables in Excel format); own calculations

present the forecasts until 2015 and until 2020 separately.

The forecasts presented in Table 12 are similar to those presented in Table 10, with a few notable exceptions. Again, all three sectors with aggregate job-creation targets for 2015 are predicted to fail to reach their targets. In contrast to the estimates presented in Table 10, the Wholesale & Retail Trade sector is expected to almost reach its target, with a shortfall of only 20 000 jobs. Manufacturing is not only predicted to not reach the job-creation target, but, based on historical employment trends, is also expected to shed jobs between 2012 and 2015. While fewer jobs are expected to be created in Financial & Business Services, based on this method, both it and the CSPS sector are again expected not only to meet but also exceed their NGP job-creation targets. Moreover, analogous to Tables 10, the Manufacturing and Construction industries account for nearly the entire NGP employment shortfall.

Using the employment forecast method, total employment creation is predicted to be slightly lower than when the output forecast method is used in combination with employment-output elasticities. The implication here is that, based on historical employment trends only, it becomes even less likely that sufficient jobs will be created to meet the NGP targets.

Table 13 presents forecasted job creation, based on historical employment trends, for the 2012 to 2020 period. Similar to the results presented in Table 12, the most notable forecast is the decline in manufacturing employment until 2020. As expected, employment forecasts for the Financial & Business Services and CSPS sectors are above the NGP targets of 2020. The comparison between Tables 11 and 13 shows that, while Financial & Business Services and overall employment forecasts are less when using the historical trend method, it does predict higher potential jobs being created in the CSPS, Mining and Construction sectors.

Despite the differences in the two forecasting methods utilised above, the overarching conclusion drawn from the estimates presented in Tables 10 to 13 is the inability of the South African economy to generate sufficient jobs to meet the NGP targets. Only two of the eight sectors were predicted to reach their proposed targets, while the remaining six were seen to largely remain stagnant. Therefore, based on both historical economic growth trends and historical employment growth trends, it appears highly unlikely that the NGP job-creation targets will be reached by 2020.

Table 12: Forecasted sectoral employment based on historical trend, 2012–2015

	Employment '000				% Δ	Δ '000	NGP gap '000	% of NGP gap
	2012	2013	2014	2015	Δ 2012–15	Δ 2012–15	Δ 2012–15	Δ 2012–15
Mining	519	529	539	550	6.0%	31	-16	1.7%
Manufacturing	1 154	1 158	1 154	1 150	-0.4%	-4	-650	70.2%
Utilities*	62	64	66	69	11.2%	7	-31	3.3%
Construction	429	433	436	440	2.6%	11	-210	22.7%
Wholesale & retail trade*	1 709	1 730	1 775	1 820	6.5%	111	-21	2.3%
Transport*	383	400	408	416	8.6%	33	-140	15.1%
Finance	1 841	1 867	1 914	1 961	6.5%	120	69	-7.5%
CSPS	2 364	2 422	2 500	2 578	9.1%	214	73	-7.9%
Total*	2 154	2 194	2 250	2 305	7.0%	151	-192	20.7%
Total	8 461	8 602	8793	8 984	6.2%	523	-926	100.0%

Source: EDD, 2011; Statistics South Africa: Various QES 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP),4th Quarter 2012 (downloads: tables in Excel format); own calculations

Notes:

1.* represents sectors that have NGP targets ending in 2015

2. Figures for 2012 represent the employment figures at for the period 2012Q4 and thus forecasts are for three years, 2012–2013, 2013–2014 and 2014–2015

Table 13: Forecasted sectoral employment based on historical trend, 2012–2020

	Employment '000		% Δ	AAG	Δ '000	NGP gap '000	% of NGP gap
	2012	2020	2012–20	2012–20	Δ 2012–20	Δ 2012–20	Δ 2012–20
Mining	519	604	16.31%	2.04%	85	-40	4.2%
Manufacturing	1 154	1 129	-2.16%	-0.27%	-25	-1036	108.6%
Construction	429	459	7.05%	0.88%	30	-317	33.2%
Finance	1 841	2 196	19.28%	2.41%	355	211	-22.1%
CSPS	2 364	2 969	25.59%	3.20%	605	228	-23.9%
Total	6 307	7 357	16.65%	2.08%	1050	-954	100.0%

Source: EDD, 2011; Statistics South Africa: Various QES 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Note: Figures for 2012 represent the employment figures for the period 2012Q4 and thus forecasts are for eight years, 2012–2020.

6 SKILLS IMPLICATIONS OF THE NGP JOB-CREATION TARGETS: SOME THOUGHTS

In Section 5 we provided a breakdown of the employment targets of the NGP according to main economic sector and employment forecasts for the relevant sectors. These estimates, however, simply provide an indication of the estimated total number of jobs to be created in each sector without any discussion of the *type* of jobs to be created. Put differently, no information or targets are provided in terms of the type of skills involved, or what the occupations of these new jobs look like. In addition, the potential employment targets discussed in the NGP document provide no guidance on the skill levels associated with the job targets. The demand for skills is determined by many factors, including: technological change; macroeconomic dynamics; trading partners; government policies; the level of capital investment; and so on. The challenges inherent in skills forecasting also include the depth and width of labour market information required to conduct this forecasting. The objective here is not to provide or predict the skills needs based on the job targets of the NGP, but rather to provide a very basic overview of the current skills composition of the main economic sectors in order to provide some idea of the possible skills implications of the jobs drivers in the NGP.

We utilise the skills composition of employment from the Quarterly Labour Force Survey (QLFS) in each economic sector in 2012Q4 (See Table 14) to determine the skills breakdown of the sectoral job-creation targets. While the use of the QES is obviously preferred owing to comparability with the previous sections, the QES does not provide data on occupation categories. For our purposes here, the occupation categories in the QLFS are categorised into highly skilled, skilled and unskilled categories. 'Highly skilled' refers to managers, professionals and technicians. 'Skilled' refers to

clerks, services and sales workers, craft and trade workers as well as operators and assemblers. Finally, 'unskilled' refers to elementary occupations.

We allocate the total number of jobs to be created by 2020 in each sector to the three skill categories calculated, according to the skills breakdown in 2012Q4. Put differently, the share of each skills category in 2012Q4 acts as weights to determine the skills composition of the sectoral employment targets presented in the NGP.

Table 14: Skill composition of sectoral employment, percentage share: 2012Q4

	Highly skilled	Skilled	Unskilled
Mining	6.6	75.4	18.0
Manufacturing	11.2	66.5	22.4
Utilities	24.3	69.7	5.9
Construction	12.0	57.7	30.3
Whole & retail trade	16.5	68.2	15.3
Transport	16.9	67.3	15.7
Finance	28.2	56.6	15.2
CSPS	18.1	68.5	13.4
Total	**17.5**	**65.4**	**17.1**

Source: Statistics South Africa, Quarterly Labour Force Survey 2012Q4; own calculations

In 2012Q4, the most skills-intensive sector is Financial & Business Services with 28.2% of workers in this sector employed as managers, professionals or technicians. If we take the skills composition in 2012Q4 as proxy for the skills composition of the net growth employment in this sector over the next nine years, this means that approximately 28% of the jobs to be created in Financial & Business Services will be skilled. Put differently, based on our sectoral alignment of the employment-creation targets in the NGP, our estimates suggest that, in order to reach the NGP target for this sector, just more than 45 000

additional managers, professionals and technicians will have to be employed in Financial & Business Services.

Furthermore, in 2012Q4, 56.6% of those working in Financial & Business Services are considered skilled. This means that, if the skills composition remains unchanged, by 2020 just more than 91 000 additional clerks, services and sales workers, craft and trade workers or operators and assemblers will be required to reach the NGP target. Finally, only 15.2% of those employed in the sector in 2012Q4 are considered unskilled, which means that only 15% of the aggregate employment target in the sector will be unskilled. This share corresponds to approximately 24 000 workers.

The estimates above therefore provide an indication of the various skills required to meet the NGP job-creation targets. For a relatively skills-intensive sector such as Financial & Business Services, the majority (approximately 85%) of the employment to be created will be for highly skilled or skilled workers and the job-creation target in the NGP aligned to this sector is therefore relatively skills-intensive. Table 15 below provides a summary of skills needed by the relevant sector if the NGP targets are to be reached.

Table 15: Breakdown of NGP employment targets based on skills composition: 2012Q4.

	Highly Skilled	Skilled	Unskilled	Total
Mining	9 202	105 622	25 176	140 000
Manufacturing	137 165	815 293	274 254	1 226 712
Utilities	9 166	26 274	2 240	37 680
Construction	50 696	243 022	127 530	421 248
Whole & retail trade	29 007	120 206	27 007	176 220
Transport	39 483	157 229	36 761	233 472
Finance	45 433	91 036	24 379	160 848
CSPS	76 581	290 292	56 946	423 819
Total	396 733	1 848 974	574 292	2 820 000

Source: EDD (2011) Statistics South Africa: Various LFSs & QLFS 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

As Table 14 shows, all formal non-agricultural sectors in South Africa employ mainly skilled workers, with between 55 and 75% of those employed in the various sectors in 2012Q4 classified as skilled. This

then implies that the majority of the jobs to be created in these sectors according to the targets in the NGP, will have to be filled by skilled workers. In fact, manufacturing accounts for the largest share of jobs to be created according to the NGP targets, and, based on the skills composition of this sector in 2012Q4, over 810 000 skilled positions in this sector will have to be filled between 2012 and 2020 if the NGP targets are to be achieved.

The overall implication of the estimates in Table 15 is that two-thirds of the aggregate formal non-agricultural employment target of 2.82 million jobs consists of skilled occupations. This means that in order to reach the job-creation targets in the NGP, the South African FET system will have to provide 1.85 million individuals with the skills required to reach the NGP target. The scenario above also implies that almost 600 000 unskilled individuals would find employment if the NGP job-creation targets are realised. Furthermore, our estimates suggest that approximately 400 000 highly skilled individuals (managers, professionals and technicians) are needed to reach the job-creation targets of the NGP.

In combining NGP employment targets with our estimated forecasts, Figure 5 provides an illustration of the potential skills gap in 2020 if South Africa continues on its current growth trajectory. It can be seen that, while there will be a surplus of skills in the Financial & Business Services and CSPS industries, the remaining six industries will all record skill deficits of highly skilled, skilled and unskilled workers. Overall, by 2020, there will be a skills shortage of 1.2 million jobs, with roughly 860 000 skilled workers, 330 000 unskilled workers and 13 000 highly skilled workers needed. This shortage is almost entirely accounted for by the Manufacturing industry alone.

Thus, the amalgamation of the above tables and figures suggests that, unless the above-discussed structural transformation from a tertiary to secondary sector-focused economy is realised, not only will the NGP targets not be reached, but severe skill shortages in the economy will also remain and will most certainly be exacerbated.

Figure 5: Skill gap in 2020 according to NGP forecasts
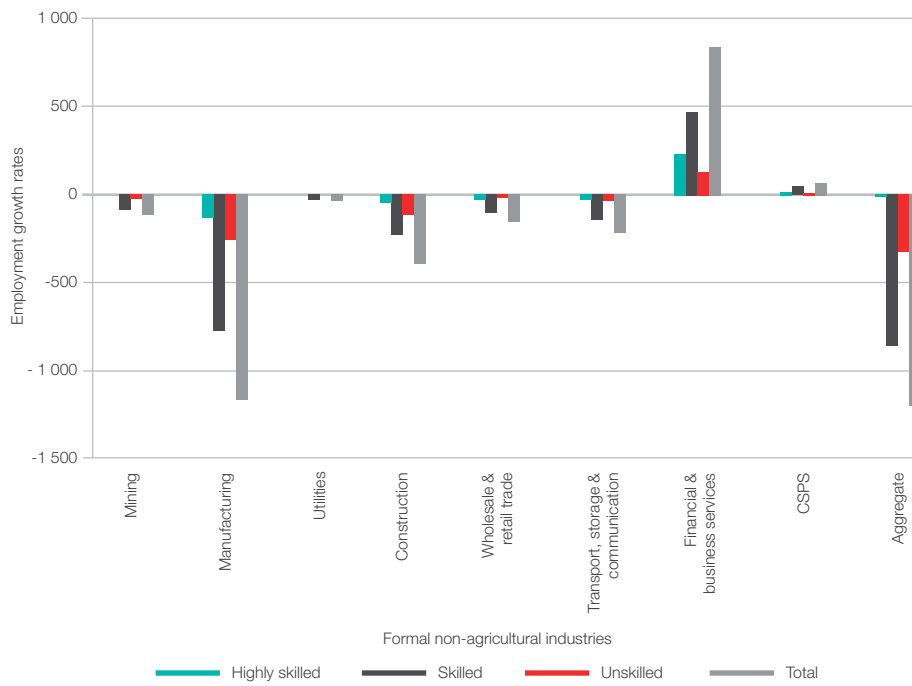
Source: Statistics South Africa, Quarterly Labour Force Survey 2012Q4; EDD (2011) Statistics South Africa: Various QES 2012Q4; own calculations

7   CONCLUSIONS

In this report we have analysed the current structure of South Africa's labour market and its output growth implications (based on the employment-output elasticities) for the job-creation targets set in the NGP and have given an indication of the skills implications of the employment targets in the jobs drivers. This is one of the only reports focusing on an issue that can be considered both important and relevant in a post-recession South African economy.

Our first challenge with this report was to correctly identify the sectors or industries that the NGP was targeting. In so doing, we were able to attach precise numerical figures to each sector or industry for the entire NGP period of 2012 to 2020. Through the use of weighted averages based on current industry and sectoral employment share we were able to disaggregate the overall 3.12 million jobs targeted by the NGP into industry-specific annual targets. The calculations point to the NGP targeting the Manufacturing, Construction, and Community, Social & Personal Services industries as the three largest contributors to employment creation. Together, these three industries account for almost 2.08 million jobs or 66% of aggregate employment creation. While the aggregate NGP employment targets are set to terminate in 2020, not all the industries' specific employment targets stretch until then. Only five of the eight formal non-agricultural industries have target years ending in 2020; the others, namely Utilities, Wholesale & Retail Trade, and Transport are set to have their target years end in 2015.

Following on from defining and measuring the employment targets set by the NGP, the next step was to assess the current employment situation in South Africa via the use of employment-output elasticities. By using an empirical approach, the results suggest an economy that performed reasonably well in the periods under consideration (2004Q4 to 2012Q4). An aggregate employment-output elasticity over the full period of 1.49 can be considered an impressive statistic. And, while this figure was largely due to notable employment and output growths in the Financial & Business Services and Community, Social & Personal Services industries, it is no doubt indicative of the potential growth outcomes the South African economy is capable of.

Yet, an aggregate investigation hides considerable heterogeneity across time, especially since the full period contained the recent global recession. Once we disaggregate the full period into pre- and post-recession periods, there were some stark contrasts in the results. While only the Mining & Quarrying industry recorded a negative employment-output elasticity during the pre-recession period, and aggregate employment-output elasticity was calculated to be 1.2, in the post-recessionary period four industries (Manufacturing, Construction, Wholesale & Retail Trade, and Financial & Business Services) recorded negative elasticities, and the aggregate employment-output elasticity fell to a meagre 0.06. Moreover, all four industries recorded positive GDP growth rates but negative employment growth rates, a clear indication of jobless growth. The industries that showed consistent and stable employment-output elasticities between different periods were Utilities, Transport and CSPS. This was an interesting result, since all three industries can be considered mostly public sector or government owned and thus constitute a relatively more stable source of employment when compared with the other industries.

The main result from the disaggregation of employment-output elasticity into different time periods was the lingering impact on both GDP

growth and employment creation, with the post-recession employment-output elasticity substantially lower than that of the pre-recession period.

Having estimated the employment-output elasticities, we used these estimates – in conjunction with the forecasting method of exponential smoothing – to forecast sectoral- and industry-specific employment figures until 2015 and 2020. These figures were then directly compared with the NGP employment targets to show that, for the eight industries under examination, only the Financial & Business Services and CSPS industries reached or exceeded the proposed NGP targets. Two of the three largest employment contributors (the Manufacturing and Construction industries) recorded marginal increases in employment over the period. It is forecasted that, together, the two industries will create an employment shortfall in excess of 1.25 million jobs. Overall, the forecasts suggest that, of the 2.82 million jobs required by the NGP in 2020, only 1.6 million will be created, a shortfall of over 1.2 million jobs.

Clearly, the first implication resulting from this finding is the inability of the South African economy to generate sufficient jobs to meet the NGP targets. With historical and forecasted employment growth firmly set within the tertiary sectors, Financial & Business Services and CSPS industries, moving the majority of employment creation to the Manufacturing and Construction industries points towards the pursuit of a structural transformation of the domestic economy. The attempt is then a shift of job creation away from the tertiary sector towards the secondary sector. This is essentially a policy framework to support the growth of a domestic manufacturing industry, a goal similar to that of most emerging markets. However, while the results suggest a failure to meet the employment-creation goals set by the NGP, we stress that this is not due to slow economic growth, poor economic performances post-recession or the low employment-output elasticity. It is rather a combination of the above-mentioned issues along with ambitious employment targets pursued by the NGP, and non-specific and non-implementation of the implicit structural policy that was aimed at transforming employment and GDP creation from a

largely tertiary-based to a more secondary-focused economy.

Finally, the estimation of total number of jobs created within an industry, sector or economy is incomplete without any discussion of the type of jobs created. To do this, a brief overview of the skills implications resulting from the job-creation targets set in the NGP was required. Through the use of current skills compositions of the eight formal non-agricultural industries, we find that, in order to satisfy the NGP targets of 2.8 million jobs, a split of 1.84 million skilled, 570 000 unskilled and almost 400 000 highly skilled jobs is required to be generated within the economy. The contribution of employment by skills follows from our above estimates, whereby the Manufacturing, CSPS and Construction industries are expected to create the most highly skilled, skilled and unskilled jobs. However, as mentioned above, by 2020, our forecasts expect a shortfall in employment of 1.2 million jobs, which can be divided into skills shortages of 860 000 skilled workers, 330 000 unskilled workers and 13 000 highly skilled workers. The implications of this result are that the Manufacturing sector is estimated to account for the entire skills shortage, while the low number of highly skilled workers needed within the economy is a direct result of the Financial & Business Services industry being forecasted to exceed the NGP job-creation target. Since the Financial & Business Services industry has the highest proportion of skilled workers (28.2%), the strong growth in the Financial & Business Services industry has helped cover the expected skills shortages within the highly skilled workforce.

In the light of the recent NGP policy, our report provides an in-depth analysis of the current employment situation within the South Africa economy. It provides an assessment of historical, current and future employment characteristics as well as of the feasibility and implications of the NGP targets. Ultimately, our results suggest an improbability that the NGP will succeed as a policy due to a combination of issues such as slow economic growth, poor economic performances post-recession, low employment-output elasticity, ambitious employment targets, and non-specific and

non-implementation of the implicit structural policy that was aimed at transforming the employment and GDP creation from a largely tertiary-based to a more secondary-focused economy. While it is still too early to call the NGP a failure, we believe that this policy framework needs a considerable revamp to take into account the above-mentioned issues, but also the implicit structural transformation identified within this report. Whether or not the South African government has recognised the shortcomings of the NGP, perhaps it is only fitting that, following the announcement of the NGP in 2009, the government recently shifted its economic policy towards the more recent New Development Plan of 2012. The success or failure of this new plan is most certainly a crucial avenue of future research.

APPENDIX

Table A1: Derived employment output elasticity of GDP growth for pre-recessionary period

	Average of annual growth rates: 2004Q4-2008Q3		Employment-output elasticity
	Employment	Real GDP (value added)	
Mining and quarrying	4.91%	-1.73%	-2.84
Manufacturing	5.68%	3.63%	1.57
Utilities	9.97%	2.21%	4.51
Construction	5.36%	11.93%	0.45
Wholesale & retail trade	8.55%	4.76%	1.79
Transport, storage & communication	4.89%	5.33%	0.92
Finance, real estate & business services	8.23%	8.18%	1.01
Community, social and personal services (CSPS)	5.25%	4.10%	1.28
Aggregate	6.22%	5.19%	1.20

Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Notes:

1. The averages of the annual growth rates have been calculated as the average of the eight growth rates for both employment and real GDP over the eight-year period.

2. The Real GDP growth rates have been derived from the seasonally adjusted and annualised quarterly gross domestic product by industry at constant 2005 prices (R million) for the fourth quarter in each year from 2004 to 2012.

3. Private Households (mostly domestic workers) are combined into CSPS. While employment is recorded separately for domestic workers, output (or value added) is not recorded separately for domestic workers and they are included in CSPS.

Table A2: Derived employment output elasticity of GDP growth for post-recessionary period

	Average of annual growth rates: 2009Q3-2012Q4		Employment-output elasticity
	Employment	Real GDP (value added)	
Mining and quarrying	0.02%	0.80%	0.03
Manufacturing	-2.47%	2.19%	-1.13
Utilities	1.28%	0.41%	3.12
Construction	-1.60%	2.08%	-0.77
Wholesale & retail trade	-0.16%	3.26%	-0.05
Transport, storage & communication	1.02%	2.18%	0.47
Finance, real estate & business services	-0.63%	2.66%	-0.24
Community, social and personal services (CSPS)	2.58%	2.78%	0.93
Aggregate	0.15%	2.36%	0.06

Source: Statistics South Africa: Various QESs P0277; Statistics South Africa: Gross Domestic Product (GDP), 4th Quarter 2012 (downloads: tables in Excel format); own calculations

Notes:

1. The averages of the annual growth rates have been calculated as the average of the eight growth rates for both employment and real GDP over the eight year period.

2. The real GDP growth rates have been derived from the seasonally adjusted and annualised quarterly gross domestic product by industry at constant 2005 prices (R million) for the fourth quarter in each year from 2004 to 2012.

3. Private households (mostly domestic workers) are combined into CSPS. While employment is recorded separately for domestic workers, output (or value added) is not recorded separately for domestic workers and they are included in CSPS.

Appendix A4: Absolute increase and percentage growth required per annum to reach NPG targets

		2012			2013			2014		
	2011Q3	Increase	Total	Rate (%)	Increase	Total	Rate (%)	Increase	Total	Rate (%)
Agriculture										
Mining	519 000	15 556	534 556	3.0%	15 556	550 112	2.9%	15 556	565 668	2.8%
Manufacturing	1 150 000	215 517	13 65 517	18.7%	215 517	15 81 034	15.8%	215 517	1 796 551	13.6%
Utilities	59 000	9 420	68 420	16.0%	9 420	77 840	13.8%	9 420	87 260	12.1%
Construction	434 000	74 756	508 756	17.2%	74 756	583 512	14.7%	74 756	658 268	12.8%
Trade	1 669 000	44 055	1 713 055	2.6%	44 055	1 757 110	2.6%	44 055	1 801 165	2.5%
Transport	365 000	58 368	423 368	16.0%	58 368	481 736	13.8%	58 368	540 104	12.1%
Financial & business services	18 34 000	17 043	1 851 043	0.9%	17 043	1 868 086	0.9%	17 043	1 885 129	0.9%
CSPS	2 328 000	47 091	2 375 091	2.0%	47 091	2 422 182	2.0%	47 091	2 469 273	1.9%
Total	8 358 000	515 139	8 839 806	5.8%	515 139	9354945	5.8%	515 139	9 870 084	5.5%

	2015			2016			2017		
	Increase	Total	Rate (%)	Increase	Total	Rate (%)	Increase	Total	Rate (%)
Agriculture									
Mining	15 556	581 224	2.8%	15 556	596 780	2.7%	15 556	612 336	2.6%
Manufacturing	215 517	2 012 068	12.0%	72 929	2 084 997	3.6%	72 929	2 157 926	3.5%
Utilities	9 420	96 680	10.8%						
Construction	74 756	733 024	11.4%	24 444	757 468	3.3%	24 444	781 912	3.2%
Trade	44 055	1 845 220	2.4%						
Transport	58 368	598 472	10.8%						
Financial & business services	17 043	1 902 172	0.9%	18 536	1 920 708	1.0%	18 536	1 939 244	1.0%
CSPS	47 091	2 516 364	1.9%	47 091	2 563 455	1.9%	47 091	2 610 546	1.8%
Total	515 139	10385223	5.2%	211 889	10 597 112	2.0%	211 889	10809001	2.0%

	2018			2019			2020		
	Increase	Total	Rate (%)	Increase	Total	Rate (%)	Increase	Total	Rate (%)
Agriculture									
Mining	15 556	627 892	2.5%	15 556	643 448	2.5%	15 556	659 004	2.4%
Manufacturing	72 929	2 230 855	3.4%	72 929	2 303 784	3.3%	72 929	2 376 713	3.2%
Utilities									
Construction	24 444	806 356	3.1%	24 444	830 800	3.0%	24 444	855 244	2.9%
Trade									
Transport									
Financial & business services	18 536	1 957 780	1.0%	18 536	1 976 316	0.9%	18 536	1 994 852	0.9%
CSPS	47 091	2 657 637	1.8%	47 091	2 704 728	1.8%	47 091	2 751 819	1.7%
Total	211 889	1 020 890	2.0%	211 889	11 232 779	1.9%	211 889	11 444 668	1.9%

Source: EDD (2011) Statistics South Africa: Various LFSs & QLFS 2012Q4; Statistics South Africa: P0441 – Gross Domestic Product (GDP),4th Quarter of 2012 (downloads: tables in Excel format); own calculations

ENDNOTES

1. This means that 2011Q2 serves as the 'base' and the first quarter in which the impact of the NGP can be measured is 2011Q3.
2. In fact, no specific mention is made of the informal sector in the New Growth Path.
3. We do note that some of the employment creation might take place in the informal sector, particularly for jobs drivers 2 and 4.
4. The number of years between 2011 and 2015 or 2020 respectively with the 1st targeted year to be 2012. This means that the first year for reaching the NGP target is actually equivalent to 18 months or six quarters.
5. It should be noted that the NGP has an overall job-creation target of five million jobs by 2020 (EDD 2011: 14). This figure, however, includes targets for the Expanded Public Works Programme (EPWP) under jobs driver 4 (investing in social capital), but no numerical values are specified for these targets in the NGP. The objective of the EPWP Phase II is to create 2 million full-time equivalent jobs by 2014 (http://www.epwp.gov.za/). We therefore assume that the aggregate target of five million new jobs comprises the 3.12 million jobs according to the sectoral targets and the EPWP target.
6. It should be reiterated here that the job-creation targets for each driver were distributed equally between relevant years to derive the annual targets, and no acceleration or deceleration of job creation was assumed.
7. The Koyck-Nerlove model can be written as where the adjustment coefficient, is assumed to lie between 0 and 1. See Lim (1976) for a full explanation of the theoretical model.
8. We take 2004Q4 as the starting date, since it is the first time period of the QES database.
9. Too few data points are available to utilise the regression method for the shorter time periods.
10. A more detailed discussion of this result falls outside the scope of this study, but the authors acknowledge that it requires more detailed analysis.
11. Owing to the limited degrees of freedom in our regression we set our acceptable significance level at 10%. With this in mind we see from Column 4, Table 2a, that only two of the nine coefficients are insignificant; namely, the Utilities and Wholesale & Retail sectors.
12. The original target was 515 000 jobs, but for the discussion here the target for Agriculture (33 000 jobs) was excluded.
13. The decreased number of jobs to be created per annum is driven by the fact that job drivers for the Utilities, Wholesale and Retail Trade, and Transport sectors are targeted to be completed by 2015.
14. In the NGP, the aggregate jobs targets are set for 2015 or 2020, and employment is therefore forecasted separately here for the two periods.

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LABOUR MARKET INTELLIGENCE PARTNERSHIP

Growth, Employment and Skills: The New Growth Path Revisited

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