# Teacher Supply in South Africa:
## A Focus on Initial Teacher Education Graduate Production[1]

HENDRIK VAN BROEKHUIZEN

Stellenbosch Economic Working Papers: WP07/15

KEYWORDS: TEACHERS, ITE, HIGHER EDUCATION

JEL: I23, I28

HENDRIK VAN BROEKHUIZEN
DEPARTMENT OF ECONOMICS
UNIVERSITY OF STELLENBOSCH
PRIVATE BAG X1, 7602
MATIELAND, SOUTH AFRICA
E-MAIL: HENDRIKVANB@SUN.AC.ZA

UNIVERSITEIT
STELLENBOSCH
UNIVERSITY


A WORKING PAPER OF THE DEPARTMENT OF ECONOMICS AND THE
BUREAU FOR ECONOMIC RESEARCH AT THE UNIVERSITY OF STELLENBOSCH

[1] This paper was written with the financial support of the Programme to Support Pro-Poor Policy Development (PSPPD), a partnership between the Presidency, The Republic of South Africa and the European Union. Additional funding came from the Zenex Foundation.

## *Acknowledgements*

*The author would like to acknowledge and thank the Programme to Support Pro-Poor Policy Development (PSPPD), a partnership between the Presidency, The Republic of South Africa and the European Union, who provided funding for this research as well as the Zenex Foundation for additional funding received. The views expressed in this paper are those of the author and do not necessarily reflect the views of these organisations.*

*Further information regarding PSPPD and the Zenex foundation can respectively be found at www.psppd.org.za and www.zenexfoundation.org.za*


planning, monitoring and evaluation

Department:
Planning, Monitoring and Evaluation
REPUBLIC OF SOUTH AFRICA

PSPPD
PROGRAMME TO SUPPORT PRO-POOR POLICY DEVELOPMENT

ZENEX FOUNDATION

# Teacher Supply in South Africa:

## A Focus on Initial Teacher Education Graduate Production

Hendrik van Broekhuizen[1]

**Abstract**

It is commonly recognized that South Africa has a severe shortage of adequately qualified and competent teachers, owing in part to the insufficient production of qualified new teachers by the higher education system. This study uses aggregate data from the Higher Education Management Information System (HEMIS) to analyse the trends and underlying correlates of first-time enrolments and graduations in initial teacher education (ITE) programmes in the public higher education system between 2004 and 2013.

The paper investigates six research questions: (1) What are the trends in initial teacher education programme first-time enrolments and graduations? (2) Are enough individuals enrolling in initial teacher education qualification programmes? (3) Are enough qualified potential new teachers being produced to satisfy current and projected levels of teacher demand? (4) What does the demographic composition and geographic distribution of new ITE programme students and graduates look like, and how has it changed over time? (5) What are the relative roles of first-time enrolments and ITE programme throughput in explaining observed levels of teacher graduate production? (6) Which groups of ITE students have the highest/lowest completion rates and how do completion rates at distance institutions (Unisa) compare with those at contact institutions?

The findings show that first-time enrolments in ITE programmes have grown rapidly since 2006, followed also by a moderate rise in ITE programme graduations from 2008 onwards. However, while both enrolments in, and graduations from, ITE programmes appear to be on an upward trend, growth in the former has largely been restricted to Unisa, South Africa's foremost distance learning institution, which now accounts for roughly half of all first time enrolment in initial teacher education programmes. This is potentially problematic for teacher graduate production since ITE programme throughput, while low overall in South Africa, is far lower still at Unisa than at contact institutions. It is therefore doubtful that the current rise in ITE programme enrolments will result in commensurate increases in ITE programme graduations.

Despite current growth trends in ITE programme enrolments and graduations, South Africa is currently not producing sufficient numbers of teacher graduates. Projections indicate that the system could begin to produce sufficient numbers of graduates to satisfy projected teacher demand within the next decade, but only if current enrolment growth can be sustained without any drop in programme throughput rates. Yet, even if the country manages to produce sufficient numbers of ITE programme graduates in the next 10 years, it remains unlikely that the types of teacher graduates that are produced will be the same as the types of teachers that are most needed in the schooling system. This would be exacerbated by the fact that an ever-smaller percentage of new teacher graduates appear to enter the teaching profession in the public school system after graduating. To address South Africa's teacher supply shortfall, greater emphasis is needed on ensuring that ITE students complete their programmes, specialise in high-demand subject areas and phases, and transition into the teaching profession with minimal delay.

[1] The author would like to thank Professor Servaas van der Berg, Doctor Nicholas Spaull, and the Research on Socio-economic Policy (ReSEP) team at Stellenbosch for their feedback and suggestions.

# Contents



[2] Unless explicitly stated otherwise, all estimates, tables, and figures presented in the analysis that follows are the author's own calculations and are based on aggregate HEMIS data.

[3] See http://41.72.139.116/Valpac_Help/Ded_001_010.htm#E009

[4] See Gujarati (2003, pp. 178 - 181)

# List of Figures

# List of Tables

**Acronyms and Abbreviations**

| | |
|---|---|
| ACE | Advanced Certificate in Education |
| BEd | Bachelor of Education |
| BEd Hons | Bachelor of Education Honours |
| BTech | Bachelor of Technology |
| CCR | Cumulative completion rate |
| CESM | Classification of Educational Subject Matter |
| CESM1 | First-order CESM |
| CESM2 | Second-order CESM |
| CESM3 | Third-order CESM |
| CHET | Centre for Higher Education Transformation |
| CPTD | Continuing Professional Teacher Development |
| CPUT | Cape Peninsula University of Technology |
| CR | Completion rate |
| CUT | Central University of Technology |

| | |
|---|---|
| DE | Diploma in Education |
| DET | Department of Education and Training |
| DHET | Department of Higher Education and Training |
| DoE | Department of Education |
| FET | Further Education and Training band |
| FLBP | Funza Lushaka Bursary Programme |
| FTE | Full-Time Equivalent |
| FTEN | First-time Enrolment(s)/First-time Enrolling |
| GET | General Education and Training band |
| HAI | Historically Advantaged Institution |
| HDI | Historically Disadvantaged Institution |
| HDE | Higher Diploma in Education |
| HE | Higher Education |
| HEDA | Higher Education Data Analyzer |
| HEI | Higher Education Institution |
| HEMIS | Higher Education Management Information System |
| HEQF | Higher Education Qualification Framework |
| HSRC | Human Sciences Research Council |
| ITE | Initial Teacher Education |
| MCR | Marginal completion rate |
| MEd | Master of Education |
| MTech | Master of Technology |
| NDE | National Diploma in Education |
| NHDE | National Higher Diploma in Education |
| NPDE | National Professional Diploma in Education |
| NTEQ | Non-Teacher Education Qualification |
| NQF | National Qualifications Framework |
| NSFAS | National Students Financial Aid Scheme |

| | |
|---|---|
| PGCE | Postgraduate Certificate in Education |
| PGDHE | Postgraduate Diploma in Higher Education |
| SAQA | South African Qualifications Authority |
| TEQ | Teacher Education Qualification |

# 1 Introduction

In recognition of the central role that teachers play in the schooling system, much of the National Development Plan's chapter on *"improving education, training and innovation"* is devoted to underlining the importance of developing a competent, highly qualified, and highly motivated body of teachers in South Africa (NPC, 2011, pp. 261 - 294). Presently, however, the country is faced both with an absolute shortage of teachers and a relative shortage of adequately qualified and competent teachers, particularly in key areas like mathematics and the physical sciences (DBE and DHET, 2011, p. 11). These shortages not only threaten to undermine the educational objectives set out in the NDP, but, more fundamentally, serve as a constraints to improving educational outcomes in South Africa.

While several studies on the issue of teacher supply and demand in South Africa have been conducted, there remains a need to improve our understanding of the underlying dimensions and pervasiveness of the country's teacher shortages, the reasons why such shortages persists, and the most appropriate policy interventions through which those shortages may be redressed (Arends, 2010; CDE, 2011). In particular, there is a need to better understand the extent to which current trends in the production of initial teacher education graduates by the higher education system either undermines or strengthens the supply of qualified teachers to the schooling system and how it is likely to influence teacher supply in the foreseeable future. Such an understanding not only necessitates an evaluation of the numbers and types of individuals that are drawn into initial teacher training, but also comprehensive analysis of the size and composition of annual teacher education graduate flows from South Africa's higher education system.

Given that the public university sector is the primary provider of new, technically qualified teachers to the schooling system, this paper uses aggregate data from the Higher Education Management Information System (HEMIS) (the repository for all administrative information relating to public higher education in South Africa), to analyse teacher education graduate production in the country between 2004 and 2013. Improving teacher supply is not simply about getting sufficient numbers of technically qualified educators into schools, but rather about getting sufficient numbers of adequately prepared, appropriately trained, competent and motivated teachers into the right schools. However, because of several limitations imposed by the nature of the aggregate HEMIS data, this paper is forced to assume a narrow perspective on teacher supply, focussing primarily on the numbers and demographic composition of individuals who enter and graduate from initial teacher education (ITE) programmes in the public higher education system. Despite this restricted focus, the objective throughout is to identify the major constraints to increasing the supply of qualified teachers in South Africa in terms of teacher graduate production.

The paper seeks to answer six main research questions: (1) What are the dominant trends in first-time enrolments and graduations in ITE programmes at public universities and what are the potential factors that might explain those trends? (2) What does the demographic composition and geographic distribution of new ITE programme students and graduates look like, and how has it changed over time? (3) Given South Africa's current and projected future demand for teachers, are enough individuals entering ITE programmes? (4) Are enough qualified potential new teachers being produced by the

higher education system? (5) If the numbers of ITE graduates being produced is not sufficient to satisfy demand, is it because too few individuals are entering ITE programmes or because higher education institutions are failing to convert student enrolments into graduations to a sufficient extent? (6) How does the timing and extent of programme completion and throughput vary between cohorts of ITE programme students and how do completion rates in ITE programmes at distance institutions (Unisa) compare with those at contact institutions?

The findings from the analysis presented below show that first-time enrolments in ITE programmes at public universities have risen substantially since 2006, not just in absolute terms, but also when compared to first-time enrolments in other comparable university programmes. However, while the trends in ITE programme enrolments and, more recently, also in graduations are arguably encouraging, current levels of ITE graduate production are not.

The higher education system is still not producing sufficient numbers of ITE graduates to meet the annual demand for qualified new teachers. This is partly due to the fact that the rise in the number of individuals entering ITE programmes is only a fairly recent phenomenon, but also because this rise has coincided with changes in the underlying composition of ITE programme students which may have have served to temper graduations to some extent. In particular, it is evident that Unisa now accounts for a far larger share of all ITE students in the public higher education system than it did in 2004 and this share only appears to be increasing over time. This has important implications for current and future levels of ITE graduate production as ITE students at Unisa not only have far lower completion rates than those at contact universities, on average, but also tend to take far longer to complete their qualifications.

Despite the compositional changes between 2004 and 2014, projections of ITE graduations indicate that, conditional on the higher education system's ability to sustain the current rise in the number of individuals entering ITE programmes without experiencing a decline in throughput rates, the system as a whole may be expected to start producing sufficient numbers of ITE graduates to satisfy projected levels of annual qualified teacher demand within the next decade. However, the data also suggests that while the numbers of ITE graduates that are likely to produced in the near future may be high enough, it remains unlikely that the system will be producing the types of ITE graduates that are most needed in South African schools.

The paper proceeds as follows:[5] Section 2 describes the HEMIS data used in the analysis, explains the rationale for focussing on the 2004 - 2013 period, and provides a comprehensive overview of the limitations imposed by the nature of the HEMIS data and the methodology underlying the identification of ITE programme students.

Section 3 investigates the major trends in first-time enrolments and graduations in both undergraduate and postgraduate ITE programmes, highlights the increasing centrality of Unisa in the teacher graduate production landscape, discusses the respective roles that the status of the teaching profession in South Africa and the availability of financial support play in explaining the rise in the numbers of students

[5] This paper does not present a self-contained literature review. Instead, findings from existing research are integrated throughout the report.

entering ITE programmes, explains the distinction between new ITE graduate production and new qualified teacher supply, and evaluates current and projected levels of ITE graduated production in the context of estimated and projected teacher demand.

Section 4 focusses on the demographic composition and geographic distribution of ITE students and graduates in South Africa, how this composition has changed since 2004, how it is likely to change in the future, and what the potential implications of these changes are for numbers and types of ITE graduates that the higher education system produces. Specifically, the section disaggregates the trends in first-time enrolment and graduations in ITE programmes by gender, race, home language, geographical location, and age.

Section 5 assesses the extent to which the public higher education system successfully converts first-time enrolments in ITE programmes into ITE graduations by considering throughput rates among cohorts of ITE students. In addition to explaining why completion rates are preferable to simple graduation rates as measures of student throughput, outlining the methodology employed to estimate completion rates using the HEMIS data, and describing the general structure, timing, and nature of throughput in ITE programmes in the public higher education system, the section investigates the extent of completion rate differentials between cohorts of ITE programme students and identifies the major demographic and institutional dimensions along which those differentials are delineated.

Lastly, Section 5 synthesises and contextualises the paper's main findings within a conceptual framework of teacher supply which argues that, in order to increase the supply of qualified teachers in South Africa, targeted interventions are required in each of the four phases of the teacher supply chain, namely (1) the recruitment of new ITE programme students, (2) the conversion of ITE programme entrants into ITE graduates, (3) the absorption of qualified potential teachers into the schooling system, and (4) the retention of employed teachers within the schooling system.

# 2 Data and Methodology

## 2.1 The Higher Education Management Information System (HEMIS)

The data used in the analysis below comes from the Department of Higher Education and Training's (DHET) Higher Education Management Information System (HEMIS) which is the national repository for management information on all South African public HEIs (Paterson and Arends, 2009, p. 21). Each HEI submits administrative information from its own institutional management information system to national HEMIS on an annual basis, under the agreement that DHET may not release any personal or sensitive institutional information to third parties.[6]

In its original form, the national HEMIS database contains comprehensive detailed student and institutional unit-record information for every individual who enrolled at a public HEI in South Africa since

[6] In addition to its administrative and internal monitoring roles, HEMIS's also informs institutional planning at HEIs and determines the allocation of financial support from DHET (Paterson and Arends, 2009, p. 21).

2000. However, because of the aforementioned agreement between DHET and the respective HEIs, this database cannot be accessed directly.[7]

Publicly available versions of the HEMIS data contain only limited information and, for the most part, simply report the annual numbers of student enrolments and graduations for each HEI, disaggregated over a small subset of institutional and student characteristics. Although these data are derived from the HEMIS student unit-records, they contain such a restricted subset of the original HEMIS variable fields and are aggregated in such a way that it is no longer possible to identify individual student records. While this ensures that one cannot access sensitive personal or institutional information from the data, it also severely restricts the depth of the analysis that the data can be used for.

Some aggregate HEMIS data can be accessed via the DHET's own annually published *HEMIS indicator tables*[8] or via the Centre for Higher Education Transformation's (CHET) *South African Higher Education Open Data Portal*.[9] The aggregated HEMIS data used in the this paper, however, comes from IDSC's Higher Education Data Analyser (HEDA).[10] For the sake of brevity, the HEDA version of HEMIS is hereafter simply referred to as *HEMIS* or *aggregate HEMIS* whilst the full unit-record original HEMIS databse is referred to as *original HEMIS*.

As mentioned above, the structure of the aggregate HEMIS data imposes several limitations on the types of research questions that its analysis can potentially address. For example, it is not possible to use the data to track the performance of individual students, nor is it possible to conduct the kind of nuanced, disaggregated analysis of trends and student or institutional performance correlates (which are essential for informing policy) that would be possible with richer unit-record data. Nonetheless, the data can be used to answer basic questions regarding broad trends and patterns in the numbers of enrolments and graduations from South Africa public HEIs.

## 2.2 Period of analysis

The primary analysis presented below covers the period 2004 - 2013. There are at least three good reasons for focussing on this particular period.

First, the period represents the most recent decade of available audited HEMIS data and the data series is therefore both long enough in a longitudinal sense to uncover long-term trends and also up-to-date enough to shed light on recent short-term patterns and changes.

Second, South Africa's 36 public technikons and universities were amalgamated into 23 HEIs comprising 11 traditional universities, 6 comprehensive universities, and 6 universities of technology in 2004. As such, 2004 presents a natural "breaking point" in the HE data with the data for the period following the amalgamation being significantly less fragmented and institutionally heterogenous than the data for the period which preceded it.

[7] Only four director-level staff members within the DHET have access to the full HEMIS database (van Schalkwyk, 2013).
[8] See http://www.dhet.gov.za/SitePages/Org_Universities.aspx
[9] See http://www.chet.org.za/data/sahe-open-data
[10] The HEDA (2014) data can be accessed via the IDSC homepage at http://www.idsc.co.za/

Third, while public HE data is available for the period before 2004, the available pre-2000 data is not nearly as rich as the data for the post-2004 period. More importantly, Paterson and Arends (2009) already provide a comprehensive and nuanced review of teacher graduate production from public HEIs in South Africa between 1995 and 2004 based on the available public HE data for the period.[11] The present paper does not seek to replicate their analysis. Instead, what follows is intended to update and extend Paterson and Arends (2009)'s research by offering new insights based on more contemporary and, in some ways, more detailed data.

## 2.3 Methodology

The objective of the empirical analysis is to use the available information on both student inputs (enrolments) and student outputs (graduations) in the HEMIS data to estimate, describe, and evaluate the trends in, and the institutional and socio-demographic dimensions of, teacher education qualification production in South Africa. This firstly requires identification of teacher education qualifications in the data.

### 2.3.1 Teacher education qualifications

The National Qualifications Framework Act 67 of 2008 describes the minimum requirements for teacher education qualifications in South Africa and clearly identifies which diplomas, certificates, and/or degrees qualify or used to qualify individuals to work as teachers in South African schools and the conditions under which they do so (DHET, 2011*a*). Teacher education programmes offered at HEIs can broadly be separated into Initial Teacher Education (ITE) programmes and Continuing Professional Teacher Development (CPTD) programmes.

While ITE qualifications are meant to qualify unqualified individuals as beginner teachers in specific phases and/or subjects, CPTD qualifications are meant to qualify underqualified or unqualified existing teachers as qualified teachers or to further enhance and refine the teaching capacity of qualified teachers (DHET, 2011*a*, p. 15). The respective approved teacher education qualifications and their classifications into ITE or CPTD are presented in Table 2.1. The focus throughout this paper falls on ITE, rather than CPTD qualifications.

In theory, one could identify teaching qualifications in the original HEMIS data based on the approved names or designators given to those qualifications by the respective HEIs. Although the choice of appropriate qualification names/designators is discretionary and there is no standard naming convention applied across institutions or even over time, most qualification names captured in HEMIS should be sufficiently descriptive to allow one to distinguish not only between teacher education programmes and non-teacher programmes, but also between ITE and CPTD qualifications (Paterson and Arends, 2009, p. 85). Even if a particular qualification name/designator is too vague to allow for immediate identification as either a teaching or non-teaching qualification, it would be possible to query that

[11] The aggregate HEMIS data used in this study, while superficially different from the HEMIS data used by Paterson and Arends (2009) in a number of ways, produces the same results for the period 2000 - 2004.

**Table 2.1:** Current and former HE teacher education qualifications in South Africa

| Qualification | Acronym/Abbreviation | Type | NQF Level |
|---|---|---|---|
| *Current Qualifications*[1] | | | |
| Bachelor of Education degree | BEd | ITE | 7 |
| Post Graduate Certificate in Education *or* Advanced Diploma in Teaching | PGCE<br>Adv Dip (Teaching) | ITE | 7 |
| Advanced Certificate in Education *or* Advanced Certificate in Teaching | ACE<br>Adv Cert (Teaching) | CPTD | 6 |
| Advanced Diploma in Education | Adv Dip (Ed) | CPTD | 7 |
| Postgraduate Diploma in Education | PG Dip (Ed) | CPTD | 8 |
| Bachelor of Education Honours degree | BEd Hons | CPTD | 8 |
| Master of Education Degree | MEd | CPTD | 9 |
| Doctor of Education Degree | DEd | CPTD | 10 |
| Diploma in Grade R Teaching | Dip (Grade R Teaching) | Grade R | 6 |
| *Other/Former Qualifications*[2] | | | |
| National Professional Diploma in Education | NPDE | CPTD | 6 |
| National Diploma in Education | NDE | ITE | 6 |
| National Higher Diploma in Education | NHDE | CPTD | 7 |
| Further Diploma in Education | FDE | CPTD | 7 |

NOTES: [1]Qualifications and programmes for ITE and CPTD as set out in (DHET, 2011*a*). [2]Qualifications that are still offered at some HEIs and are listed as approved current of former teaching qualifications by SAQA.

qualification on the South African Qualifications Authority (SAQA) qualification database in order to determine its precise nature.[12] In the absence of any other information, the qualification name would thus provide the definitive basis for accurately identifying teacher education qualifications. Unfortunately, although qualification names/designators are captured by the *QUALNAME* variable when HEIs report to HEMIS[13], this variable field is not available in the aggregate HEMIS data that can be accessed via HEDA.[14]

In the absence of any descriptive qualification name or designator field(s), the only variables that are available in the aggregate HEMIS data with which one can attempt to identify teaching qualifications are the qualification type (*QUALTYPE*) and Classification of Educational Subject Matter (*CESM*) fields. The nature of these variables and the potential biases they may introduced when used to classify qualifications as teacher education programmes or non-teacher education programmes is discussed below.

### 2.3.2 HEMIS *qualification type*

The *qualification type* field (*QUALTYPE*) in HEMIS is a standardised scheme with which HEIs indicate the highest most relevant qualification for which an individual is enrolled when they report to HEMIS. Importantly, the *QUALTYPE* field only describes the level of the programme for which a student is enrolled and conveys no information about the associated field(s) of study or focus area(s). The HEMIS

[12] The SAQA database contains detialed information on all current and historic approved, formal study programmes at South African public HEIs.

[13] See http://41.72.139.116/Valpac_Help/Ded_001_010.htm

[14] To the author's knowledge, the *QUALNAME* field is not available in any publicly accessible nationally representative version of HEMIS.

qualification type scheme was changed in 2005 following the amalgamation of South Africa's traditional universities and Technikons and again in 2009 in order to accommodate further changes in the HE system and homogenise the new qualification types being offered at HEIs. The HEMIS qualification type schemes corresponding to the three different periods are shown in Tables B.2 - B.4 in B.

Inspection of the tables should make it clear that, even ideal circumstances where all HEIs consistently classify their qualifications under the HEMIS qualification type scheme in exactly the same manner, the *QUALTYPE* field simply is not detailed enough to allow one to distinguish between certain qualification types. For example, it is conceivable that a HEI offering both the Post Graduate Certificate in Education (PGCE) and the National Professional Diploma in Education (NPDE) could jointly classify them under the HEMIS qualification type of *"Post-graduate Diploma or Certificate"* despite the fact that the former is an ITE qualification and the latter is a CPTD qualification. Moreover, while the HEMIS *QUALTYPE* scheme is supposed to guide institutions in how they should classify their qualifications, it is ultimately up to them to choose how they do so. This not only means that different HEIs may classify what is effectively the same teaching qualification under different HEMIS qualification types, but also that institutions may classify the same qualification differently over time or even across individuals. Table B.5 in B gives an indication of the various ways in which different approved teacher education qualifications may be classified under the HEMIS qualification type scheme.

The implications of likely inter- and intra-institutional "inconsistencies" in classifying qualifications under the HEMIS qualification type scheme is simple: While in theory the HEMIS *QUALTYPE* field could be used to broadly identify the qualification level/type for which an individual is enrolled, it is not a definitive indicator and using it as such when conducting analysis on aggregate HEMIS data is likely to bias results in significant and ambiguous ways.

### 2.3.3 Classification of Educational Subject Matter (CESM)

All formal qualifications in HEMIS are arranged according to Classification of Educational Subject Matter (CESM) codes (DOE, 2008). These codes are part of a standardised classification scheme and are used to describe the focus and/or specialisation areas of academic qualifications in a way that ensures comparability between HEIs. The CESM scheme is hierarchically structured comprising three nested descriptor levels, each of which describes the focus area of an academic module or course in further detail. First-order CESM codes (CESM1) are the top-level descriptors and separate fields of study and specialisation areas into broad categories.[15] These categories are then subdivided into second-order CESM codes (CESM2) which are themselves subdivided into third-order CESM codes (CESM3), providing more nuanced classifications of the knowledge content associated with the major subject matter (DHET *et al.*, 2008, p. 5).[16] Tables B.6 and B.7 provide a full breakdown of the CESM2 and CESM3 codes

[15] First-order CESM codes (CESM1) can, for example, tell you whether the content of a course or module broadly falls more within the ambit of "Education" (CESM1 = 07) than "Engineering" (CESM1 = 08).

[16] CESM2 could, for example, tell you if an "Education" module focusses on "Educational/Instructional Media Design" (CESM2 = 07.04) or on "Teacher Education and Professional Development" (CESM2 = 07.12). CESM3, in turn, adds even more depth and, in the case where a course is designated to deal with "Teacher Education and Professional Development", for example, may tell you whether the specific focus is "Mathematics - ECD and GET" (CESM3 = 07.11 12) or "FET: History" (CESM3 = 07.12 16).

that fall under the broad CESM1 category of "Education".[17]

Critically, CESM codes are used as descriptors at the course level rather than at the qualification level. In other words, they are used as standardised designators to describe the focus areas of specific subjects and/or modules that individuals complete as part of their academic programmes. In addition, HEIs exercise discretion when classifying their own programmes/course into CESM categories (Paterson and Arends, 2009, p. 108). This implies that there is not necessarily a one-to-one correspondence between a specific academic qualification offered at a HEI and a specific CESM category or code. Up to four CESM codes may be used to describe the focus areas of courses/modules taken as part of a qualification. In such cases, students' academic qualifications are fractionally partitioned across the various CESM codes under which they are classified when reporting to HEMIS (Paterson and Arends, 2009, p. 110).

All of the information on student enrolments and graduations in the aggregate HEMIS data is based on the *fractional counts* that result from institutions classifying their academic programmes under the CESM scheme. This has important implications for identifying teacher education programmes in the data.

For individuals who are enrolled in non-teacher education programmes, but take some education-related modules as electives, it is likely that part of those programmes will be apportioned under the CESM1 category of "Education". Similarly, for students who are enrolled in teacher education programmes, but take non-education modules as electives, it is likely that part of those programmes will be apportioned under other CESM1 categories. This means that one cannot fully distinguish between teacher education programmes and non-teacher programmes on the basis of CESM codes alone. In other words, the totals of the fractional counts for student headcount enrolments and graduates under the CESM1 "Education" category in the aggregate HEMIS data are likely only to approximate the total number of enrolments in and graduations from teacher education programmes in the HE system. A hypothetical illustration of this is given in Section B.3 in B.

### 2.3.4 Identifying initial teacher education (ITE) programmes in aggregate HEMIS

Given the constraints imposed by the structure of aggregate HEMIS, the only way of identifying teacher-education programmes in the data is to use information on *qualification type* and *CESM categories* in conjunction. This approach is similar to that used by Paterson and Arends (2009) who effectively classify all programmes that are apportioned under the CESM1 category of "Education" as teacher education qualifications. This approach, while simple, is likely to result in large numbers of non-teacher education qualifications erroneously being classified as teacher education qualifications. For example, none of the *General (3-year) Academic First Bachelor's Degrees* offered at South African HEIs qualify individuals as teachers.[18] Furthermore, with the exception of the Post Graduate Certificate in Education (PGCE), none of the post-graduate CPTD qualifications listed in Table 2.1 qualify individuals as teachers for the first time. In order to enrol for a *BEd Hons*, *MEd*, or *DEd* degree, for example, it is necessary

[17] While CESM3 codes have existed since 2000, they the were not used for reporting to HEMIS until 2010. For the period 2000 - 2009, it is only CESM1 and CESM2 codes that are available in HEMIS.

[18] The only undergraduate degree offered at South African HEIs that can qualify individuals as teachers is the BEd degree which is offered either as a *4-year Bachelor's degree*, a *post-graduate Bachelor's degree*, or a *Baccalaureus Technologiae degree*.

to already be qualified to teach in South African schools by virtue of having successfully completed at least a BEd degree.

Since the primary objective is to estimate how many newly qualified potential teachers are being produced by the public HE system and how many individuals enrol in programmes for the first-time with the aim of becoming newly qualified potential teachers, the approached employed here is slightly more nuanced than that employed by Paterson and Arends (2009). Specifically, the focus will be on identifying undergraduate and postgraduate ITE programmes/qualifications as accurately as possible, given the data constraints.

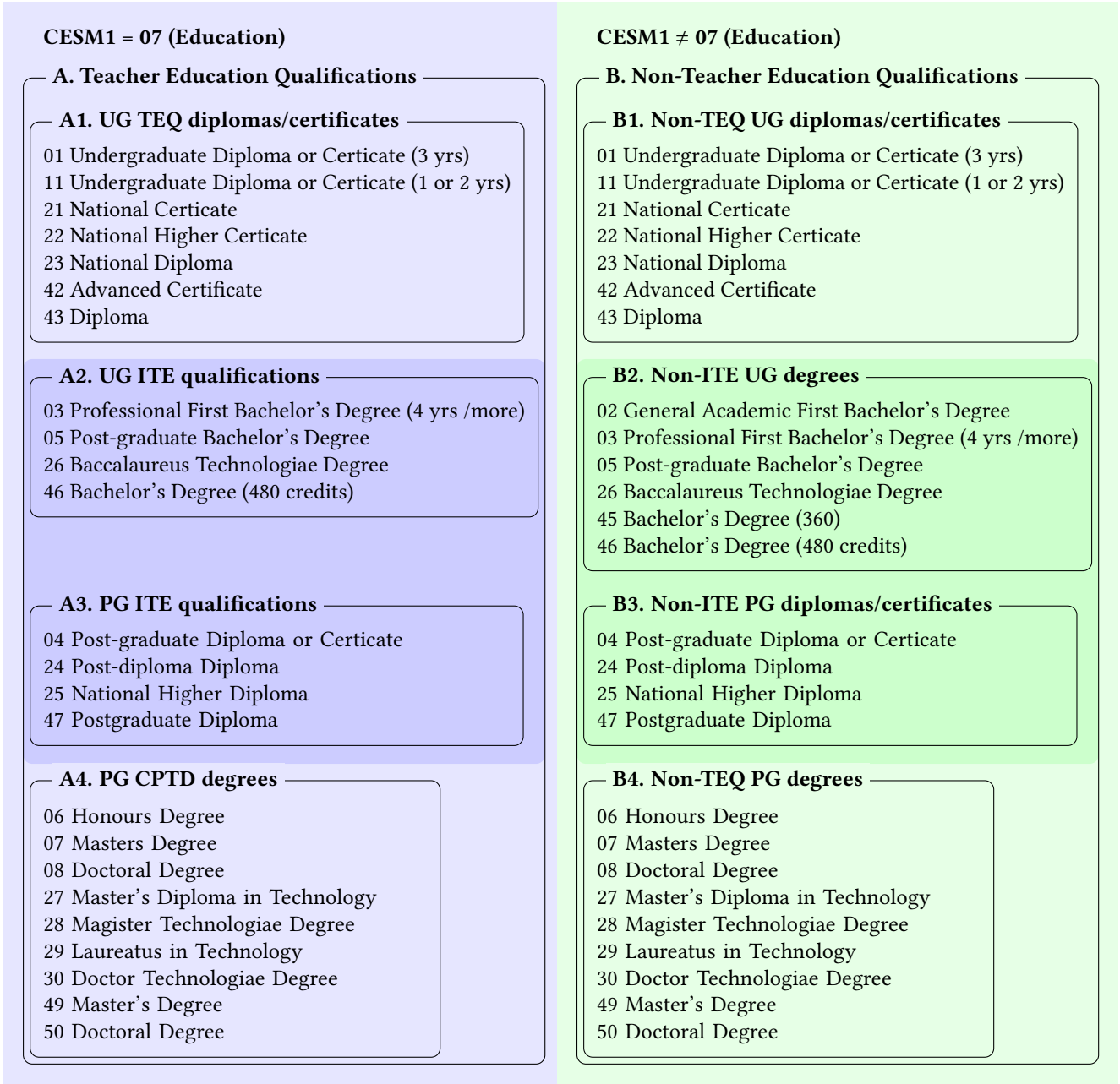
Broadly speaking, teacher education qualifications in this paper are defined as (a) all programmes that are apportioned under the HEMIS CESM1 category of "Education" and (b) are classified as one of the *HEMIS qualification types* listed in block A of Figure 2.1. Such qualifications thus include undergraduate diplomas and certificates (some of which may be CPTD qualifications), undergraduate and postgraduate ITE programmes, and postgraduate CPTD degrees. By contrast, all programmes that are not apportioned under the CESM1 "Education" category are defined as non-teacher education qualifications (block B of Figure 2.1).

Blocks A2 and A3 respectively list the types of teacher education qualification in HEMIS that are classified as undergraduate and postgraduate ITE qualifications. The focus throughout this paper falls primarily on these two sets of qualifications. For the purposes of comparative analysis, however, blocks B2 and B3 also list the sets of qualification types that are hereafter respectively referred to as *non-ITE undergraduate degrees* and *non-ITE postgraduate diplomas/certificates* (collectively, *non-ITE programmes* or *qualifications*). These qualification types represent the most comparable programme alternatives for individuals who, while they may qualify to enter ITE programmes, choose not to do so.

In addition to the potential biases introduced due to differential qualification type and CESM classifications applied at HEIs, as explained above, it is important to note that ITE programmes as defined here will, in some instances, also include CPTD qualifications. In other words, the group of students enrolled in ITE programmes is likely to include existing underqualified teachers who are endeavouring to upgrade their qualifications via, for example, an Advanced Certificate in Education (ACE) or similar upgrading qualification. This cannot be avoided since the data simply is not sufficiently detailed to fully distinguish between ITE and CPTD qualifications at the postgraduate level that may or may not be classified within the same HEMIS qualifcation type. As such, analysis of the trends in ITE graduations in this paper is unlikely to provide a perfect description of the number of new potential teachers being produced by the public HE system, but more so of the number of newly qualified potential teachers that are being produced. It is this group that is the focus of the analysis.

Lastly, because of the way in which HEIs classify programme levels and fields of study when reporting to HEMIS, calculations of summary measures such as totals and averages are likely to be biased in unknown ways, and to varying extents. All of the results from the analysis that follows are therefore only estimates and should be viewed as indicative rather than definitive.

**Figure 2.1:** Classification of ITE and non-ITE programmes using the *type-field methodology* in aggregate HEMIS




NOTES: UG: undergraduate; PG: postgraduate; TEQ: teacher education qualifications; ITE: initial teacher education; CPTD: continuing professional teacher development. Qualification types and codes are as per the official HEMIS qualification type classification shown in Tables B.2 - B.4.

## 2.4 Metrics and measures of interest[19]

### 2.4.1 Numbers of FTEN and graduations in ITE programmes

As stated above, the primary focus of this paper relates to the supply of newly qualified potential teachers in South Africa. Specifically, the aim is to evaluate the trends in and examine the demographic composition of new ITE graduates who graduated from public HEIs over the period 2004 - 2013. These trends and compositions are in themselves functions of the numbers and types of individuals who enrolled in ITE programmes over the period and the completion rates among them. The analysis that follows thus not only considers annual numbers of ITE graduations, but also the initial enrolments and extent of programme completion that ultimately lead to those graduation numbers.

The number of individuals who graduate with ITE qualifications is fundamentally constrained by the number of individuals who enrol in ITE programmes. Understanding enrolments in ITE programmes is thus critical for understanding the production of ITE graduates and the supply of newly qualified teachers. Most studies on teacher production in South Africa recognise this fact and incorporate in their analyses evaluations of either annual total headcount enrolments or full-time equivalent (FTE) enrolments in ITE programmes. However, the changes in these quantities are inherently dependent on changes in HE success, retention, drop-out, and completion rates. If, for example, the number of total headcount enrolments in ITE programmes increases from one year to the next, it is not clear to what extent this is because of low levels of drop-out, low levels of programme completion, high levels of repetition and retention, or high levels on new entry into ITE programmes. As such, neither total headcount enrolments nor FTE enrolments offer pure indications of the extent to which individuals intend to complete ITE programmes and/or become teachers. Instead, they also partially reflect information about factors that relate to the progression of ITE students through the HE system.

In appreciation of the shortcomings of total headcount enrolments and FTE enrolments, this paper instead focuses on the annual numbers of first-time enrolments (FTEN) in ITE programmes as a measure of collective intent to graduate with ITE qualifications and/or qualify to teach in South African schools. The way in which FTEN is defined in this paper is discussed in greater detail in Section B.1.1 of AppendixB.

### 2.4.2 Growth in FTEN and graduations in ITE programmes

The importance of having accurate aggregate and disaggregated estimates of the annual numbers of FTEN and graduations in ITE programmes is clear from a policy perspective. However, what is arguably of even greater importance is the need to understand how and why ITE FTEN and graduation numbers have changed over time and how they are likely to continue to do so in the future. The analysis below thus also focuses on the estimated growth rates in ITE FTEN and graduations between 2004 and 2013.

[19] Unless explicitly stated otherwise, all estimates, tables, and figures presented in the analysis that follows are the author's own calculations and are based on aggregate HEMIS data.

While other studies on teacher graduate production in South Africa may present estimates of the growth in enrolments and graduations in ITE programmes, the majority of these studies focus only on the overall extent of change in these quantities over what is usually a relatively short period of time (often only 1 or two years). That is, they calculate growth rates by selecting the data point at the beginning of a certain period and the data point at the end of the period and then expressing the difference between the two points as a percentage of the first. Growth figures that are estimated in this way may be criticised on at least two grounds. First, they are highly sensitive to the specific start and end data points that are used. This means that they tend not to be robust to minor changes in the chosen start or end points of the data series under consideration and can be highly misleading if either the start or end point is an outlier in the data. Second, such growth rates completely disregard any intermittent changes that occur between the chosen start and end points.

Given the aforementioned shortcomings, it is problematic when growth rates that are calculated as described above are used to draw inferences about trends in data that do not change monotonically or smoothly over time, but instead exhibit some volatility. Unfortunately, this is all too often precisely what is done. Given the inherent volatility in ITE FTEN and graduations, particularly at disaggregated levels, the total change in these numbers between any two periods in time can often give a misleading impression of the true rate at which they are changing over time.

In the interest of mitigating any biases that may result from working with data that does not just change smoothly over time, this paper presents estimates of the *average annual growth* in FTEN and graduations over various periods between 2004 and 2013 as measures of the ways in which these quantities change over time. Throughout this paper, average annual growth rates are estimated via ordinary least-squares. This methodology is described in greater detail in Appendix C. The average annual growth rates presented in this paper are believed to provide more credible estimates of the extent to which FTEN and graduations are changing over time than what is suggested by many other studies.

In addition to estimating average annual growth rates in FTEN and graduations in ITE programmes, the analysis below also compares these growth rates, where applicable, to the average annual growth rates in comparable non-ITE FTEN and graduations. This is done in order to gauge the extent to which changes in enrolments and graduations in ITE programmes are a reflection of more general underlying changes in the HE system as a whole rather than unique factors that relate to specifically to ITE programmes.

### 2.4.3 Completion rates among cohorts of ITE programme students

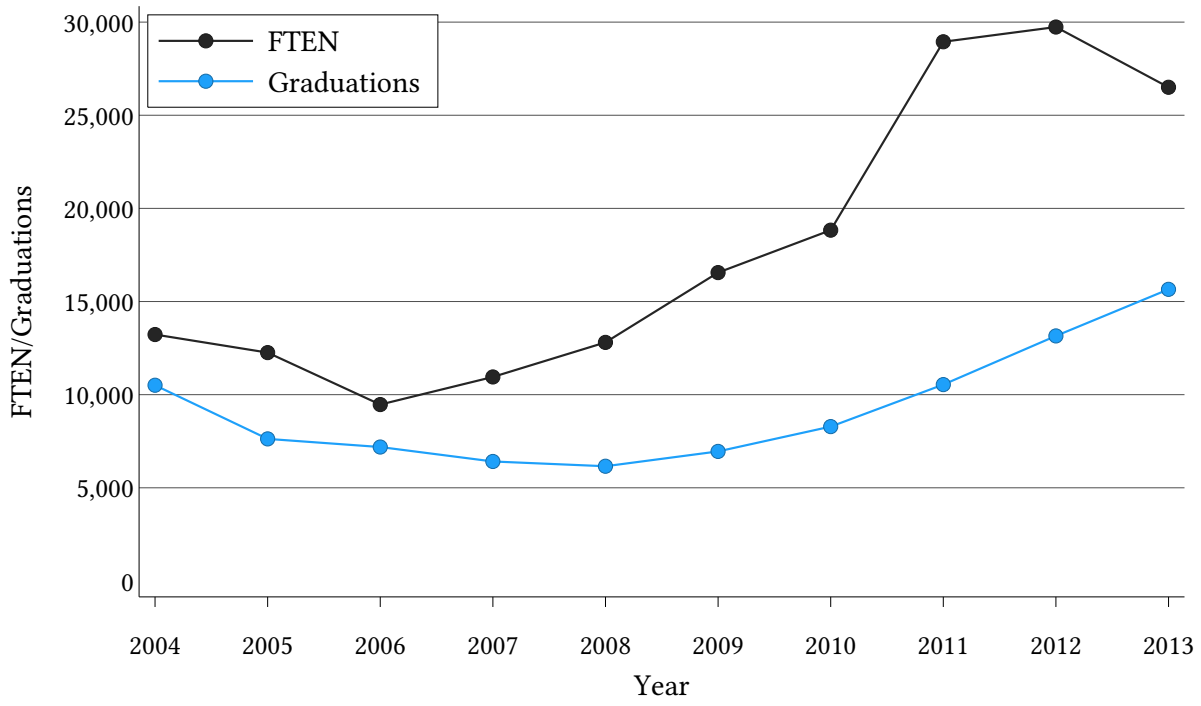
Lastly, as noted above, graduations in ITE programmes are not just a function of the number of individuals who enter such programmes, but also of the extent to which those individuals are able to successfully complete their academic studies. Chapter 5 therefore focusses on the extent of throughput among cohorts of ITE students over the 2004 - 2013 period by estimating completion rates and evaluating the time-invariant dimensions along which ITE programme completion rate differentials are delineated.

# 3 First-time enrolments (FTEN) and graduations in ITE programmes and teacher supply

## 3.1 General trends

Over the period 2004 to 2013, FTEN in ITE programmes doubled, rising from just over 13 200 in 2004 to 26 500 in 2013 (Figure 3.1 and Table A.1). At the same time, ITE graduations grew by a more modest 49% in total, from around 10 500 in 2004 to 15 650 in 2013. Not only did the total growth in ITE FTEN and graduations differ over period as a whole, but the two data series also appear to exhibit slightly different patterns of rise and decline over short-run periods between 2004 and 2013.

**Figure 3.1:** FTEN and graduations in ITE programmes (2004 - 2013)



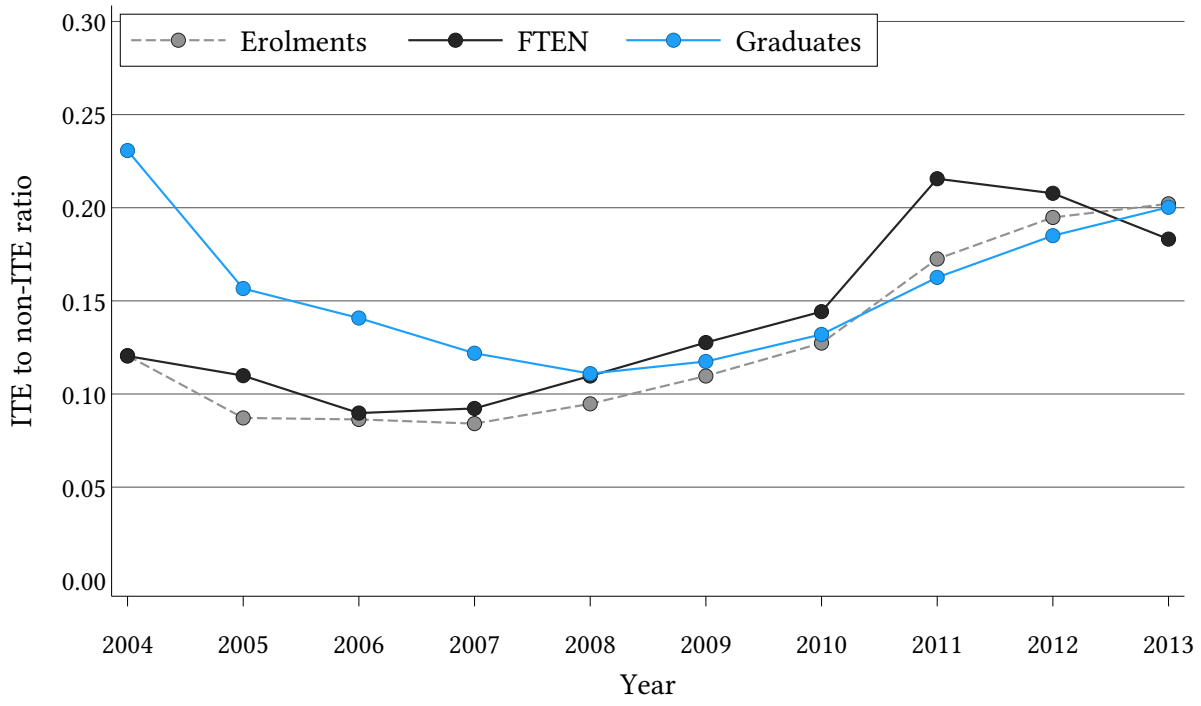

NOTES: Figures represent the estimated numbers of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes.

It is clear that movements in ITE FTEN are more volatile than movements in ITE graduations, with several large and sudden changes occurring during the period. The 54% rise in the number of FTEN in ITE programmes between 2010 and 2011 and the subsequent 11% fall between 2012 and 2013, in particular, reflect volatility in the number of FTEN in ITE programmes. The precise reasons for these and other changes in ITE FTEN are investigated further below, but it is worth noting that they were not driven purely by changes in overall FTEN in undergraduate degree and postgraduate diploma/certificate programmes at HEIs.

While ITE graduations increased in absolute terms over the period, the data shows that until 2008, there was a constant downward trend in ITE graduations relative to those in non-ITE programmes

(Figure 3.2). In fact, while the ratio of ITE to non-ITE graduations began to rise again after 2008 and has continued to do so ever since, the ratio in 2013 was still lower than it had been in 2004. For every 100 non-ITE graduates, the public HE system produced 23 ITE graduates in 2004. By comparison, it produced only 20 ITE graduates in 2013. This despite the fact that the number of FTEN in ITE programmes relative to those in non-ITE programmes increased over the period.[22] In other words, while comparatively more and more individuals are enrolling in ITE programmes, the HE system as a whole is producing comparatively fewer and fewer ITE graduates over time.

**Figure 3.2:** Ratio of headcount enrolments, FTEN, and graduations in ITE programmes to non-ITE programmes (2004 - 2013)




NOTES: Figures represent the respective ratios of total enrolments, FTEN, and graduations in undergraduate and postgraduate ITE programmes to non-ITE undergraduate degree and postgraduate diploma/certificate programmes.

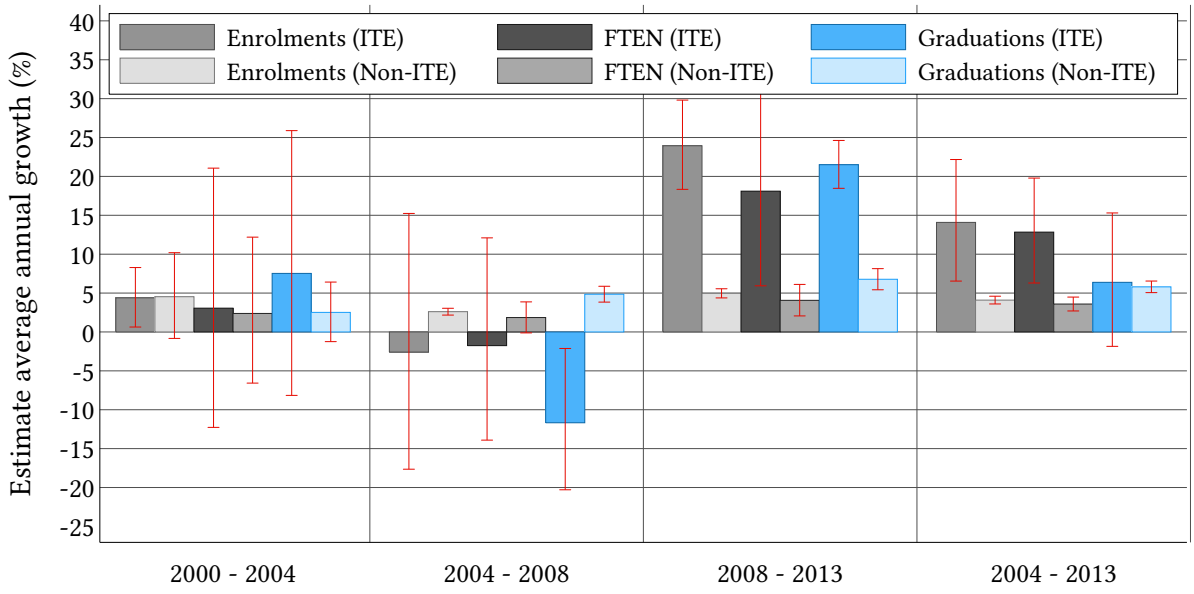
Figure 3.2 provides some preliminary evidence that, despite the increases in ITE FTEN and graduations over the past decade, the HE system has been performing below average in terms of converting ITE student inputs into graduate outputs. This is illustrated also in Table A.2 which shows the total growth and estimated average annual growth rates in enrolments, FTEN, and graduations for both ITE and non-ITE programmes over several periods between 2000 and 2013.

The estimates confirm that, with the exception of the 2004- 2008 period, total enrolments in ITE programmes grew at least as fast, if not significantly faster than total enrolments in non-ITE programmes. Similarly, with the exception of the 2004 - 2008 period, the average growth in FTEN in ITE programmes was significantly higher than the average annual growth in non-ITE FTEN. By contrast, the only period in which the rate of growth in ITE graduations was statistically significantly greater than the rate of growth in non-ITE graduations was between 2008 and 2013. The upshot of this is simple: while the ITE share of total enrolments and FTEN among HE progammes appears to have been increasing almost

[22] FTEN in ITE programmes grew by more than 118% between 2004 and 2011, but decreased by 8.5% between 2011 and 2013.

unambiguously over the past 10 years, the same is not true of the ITE share of graduations. It is only in more recent years that graduations in ITE programmes have begun to rise in relative terms. Moreover, the extent of this relative rise has not been sufficient to offset the relative decline between 2004 and 2008. As a result, the public HE system was producing fewer ITE graduates in relative terms in 2013 than it did in 2004. Insofar as this trend is accurately identified and persistent, it clearly has negative implications for the public HE system's ability to meet current and future demand for qualified teachers in South Africa.

**Figure 3.3:** Estimated average annual growth rates in headcount enrolments, FTEN, and graduations in ITE and non-ITE programmes (2004 - 2013)




NOTES: Bars represent the estimated average annual growth rates (%) in total enrolments, FTEN, and graduations for the respective dependent variables over the period and were estimated using the least-squares methodology described in C. Capped lines represent the 95% confidence intervals surrounding each point estimate.

## 3.2 Trends for undergraduate and postgraduate ITE programmes

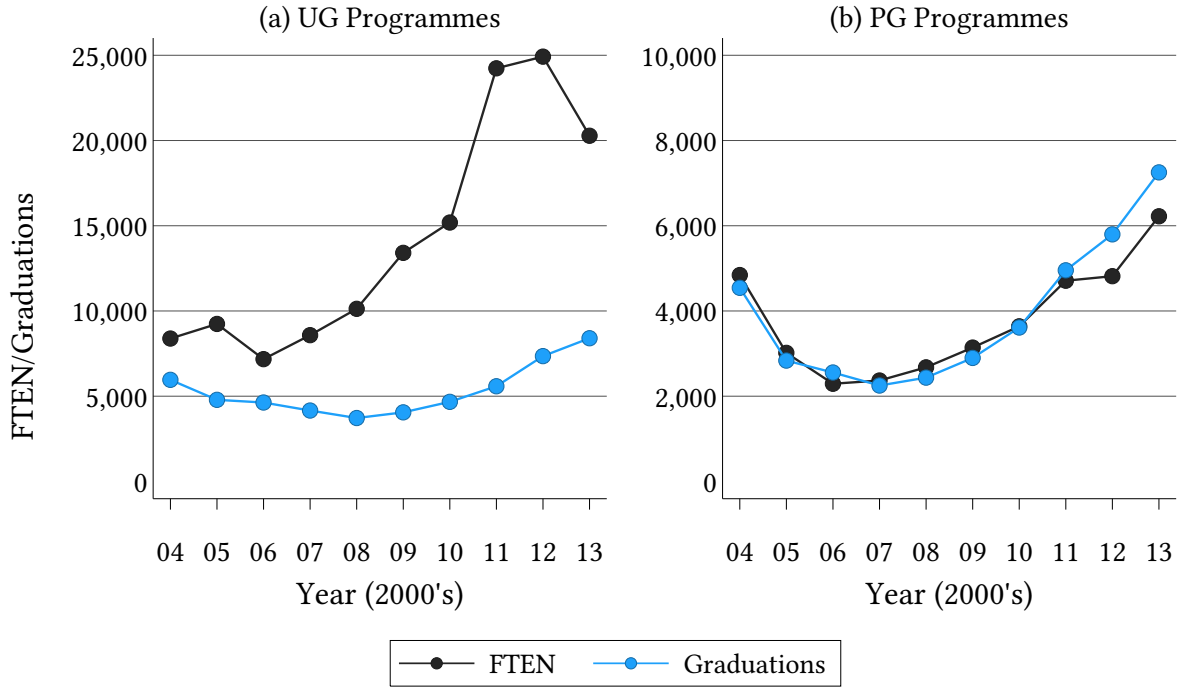
The aggregate trends in overall ITE FTEN and graduations mask substantial differences in the FTEN and graduation trends for undergraduate and postgraduate ITE programmes.

Figure 3.4 reveals that the growth in overall FTEN in ITE programmes between 2004 and 2013 was driven primarily by the significant growth in the number of FTEN in undergraduate degree programmes and to a lesser extent postgraduate diploma and certificate programmes. The number of FTEN in undergraduate ITE programmes increased by 238% between 2006 and 2011, far exceeding the 26% growth for FTEN in non-ITE undergraduate degree programmes (Figure 3.4 and Table A.3). Thus, where FTEN in undergraduate ITE programmes accounted for fewer than 7 in every 100 FTEN in undergraduate degree programmes in 2006, by 2011 this ratio had more than doubled to almost 16 in every 100. However, though the number of FTEN in non-ITE undergraduate degree programmes continued to grow between 2011 and 2013, the number of FTEN in undergraduate ITE programmes declined somewhat. Nonetheless, the estimated rate of average annual growth in undergraduate ITE FTEN over the period

(14.9%) was still significantly higher than the average rate of growth in non-ITE undergraduate degree FTEN (3.2%) (Table A.4).

The number of individuals graduating with undergraduate ITE qualifications more than doubled between 2008 and 2013, while the number of postgraduate ITE graduations almost tripled over the same period (Tables A.3 and A.4). The estimates indicate that by 2013, the public HE system was producing approximately 8 400 ITE graduates with undergraduate degrees and 7 250 ITE graduates with postgraduate diplomas/certificates per annum (Table A.4).

**Figure 3.4:** FTEN and graduations in undergraduate and postgraduate ITE programmes (2004 - 2013)

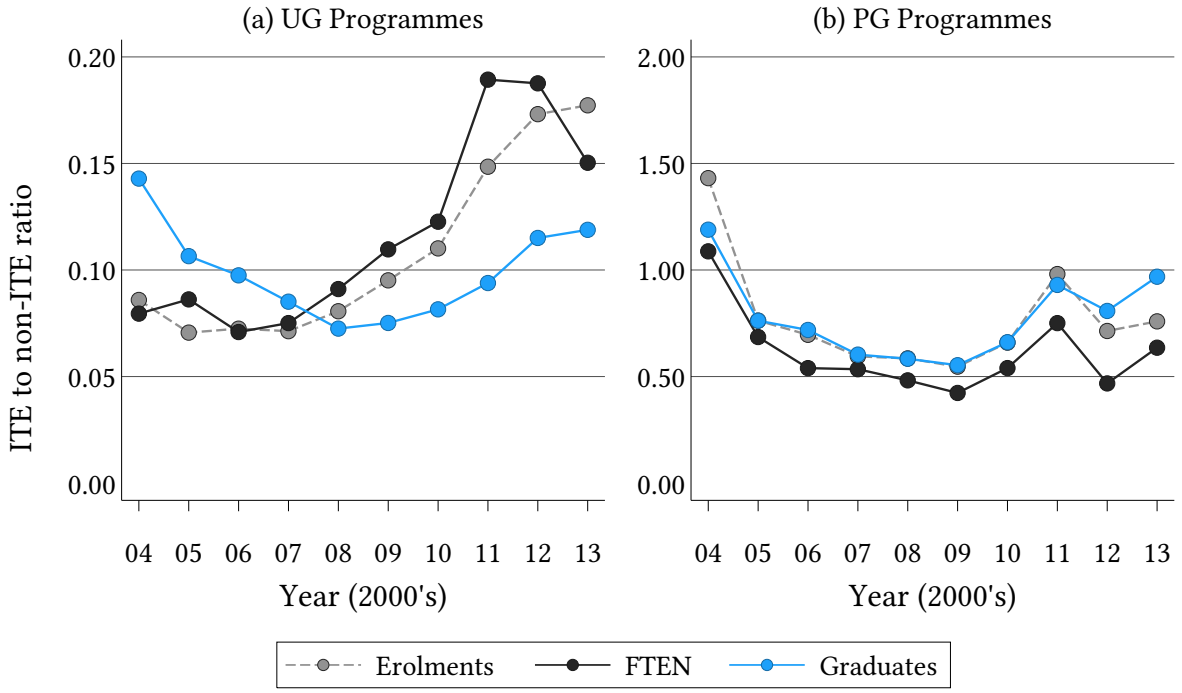



NOTES: Graphs are based on the numbers presented in Table A.3 as estimated from aggregate HEMIS. [1]Figures represent the estimated number of first-time enrolments (FTEN) and graduations in undergraduate certificate/diploma, 4-year Bachelor's degree, and postgraduate diploma TEQ programmes, respectively. [2]Figures show the respective ratios of the estimated number of enrolments, first-time enrolments (FTEN) and graduations TEQ programmes to their NTEQ equivalents, by broad qualification level.

As explained above, it is instructive to contextualise the trends in the absolute numbers of FTEN and graduations for different types of ITE programmes by viewing them relative to the trends in the equivalent metrics for different types of non-ITE programmes, as illustrated in Figure 3.5. For example, the rise in the absolute number of FTEN in undergraduate ITE programmes between 2004 and 2013 only represented a relative increase between 2004 and 2011. Between 2011 and 2012, growth in undergraduate ITE FTEN stagnated and by 2013, the number of FTEN in such programmes (20 281) had fallen to about 81% of the number of FTEN in 2012 (24 921). By contrast, FTEN in non-ITE undergraduate degree programmes continued to grow steadily between 2011 and 2013. The implication is that the ITE share of FTEN in undergraduate degree programmes declined marginally from a high of 15.9% in 2011 to around 13.1% in 2013 (Table A.3). Despite this short-run decline, however, FTEN in undergraduate ITE programmes in 2013 represented a far greater share of FTEN in overall undergraduate degree programmes than it did in 2004 (7.4%). In other words, the data suggests that FTEN in undergraduate ITE programmes not only increased in absolute terms between 2004 and 2013, but also that it increased

relative to FTEN in other undergraduate degree programmes.

**Figure 3.5:** Ratio of ITE to non-ITE enrolments, FTEN, and graduations for in undergraduate and postgraduate programmes (2004 - 2013)




NOTES: Figures represent the respective ratios of total enrolments, FTEN, and graduations for (a) undergraduate ITE vs non-ITE undergraduate degree programmes and (b) postgraduate ITE vs non-ITE postgraduate diploma/certificate programmes.

The precise reasons behind the marginal absolute and relative decline in FTEN in undergraduate ITE programmes between 2011 and 2013 are unclear, but are investigated further below. However, even if this short-run downward trend has subsequently been reversed, it is likely to have had a negative knock-on effect on the number of individuals who will be graduating with undergraduate ITE qualifiactions within the next 3 to 4 years. This is all the more worrisome when considered in light of the fact that, in relative terms, the public HE system was producing fewer graduates with either undergraduate or postgraduate ITE qualifications in 2013 than it did a decade before (Figure 3.5).

## 3.3 Understanding trends in FTEN in ITE programmes

Understanding the trends in ITE programme FTEN is fundamental to understanding the trends in teacher production in South Africa. Holding all other factors constant, the number of FTEN in ITE programmes places an upper limit on the number of ITE graduates that the HE system can ultimately produce. Interventions aimed at increasing the supply of qualified teachers by, for example, improving the throughput of ITE students can only be effective if large enough numbers of individuals are electing to enter teacher training in the first place.

As shown in the previous section, the trends in FTEN in ITE programmes in South Africa cannot be attributed purely to the general expansion of the HE system or to fluctuations in aggregate enrolments

at HEIs between 2004 and 2013. Rather, a host of complex and interrelated factors are likely to have influenced the levels of and changes in the number of individuals choosing to enrol in ITE programmes over the past decade. A comprehensive discussion of all of these factors is beyond the scope of this paper and some of the major issues are already dealt with in great depth in DOE (2005*b*), Armstrong (2009) Arends (2010), Steyn *et al.* (2014), and other studies. However, in order to better understand and contextualise the trends in FTEN in ITE programmes as presented in the previous section, it is necessary to highlight two major issues. The first is the role that the University of South Africa (Unisa) plays in the HE system and, more importantly, in the production of ITE graduates while the second is the roles that the status of the teaching profession, the attractiveness of teaching as a field of study, and the availability of financial support for ITE students in South Africa plays in incentivising or disincentivising enrolments in ITE programmes.

### 3.3.1 The central role of Unisa

Unisa, South Africa's only distance learning university, has long been the largest HEI in the country and its share of total enrolments and graduations in the HE system has continued to grown significantly over time. By 2013, it accounted for 36% of all enrolments, 30.5% of all FTEN, and 19.15% of all graduations in the public HE system each year. It is therefore to be expected that trends in South African HE enrolments and graduations will, to a large extent, be a reflection of the underlying trends in enrolments and graduations at Unisa. This is particularly true in the case of enrolments and graduations in ITE programmes.

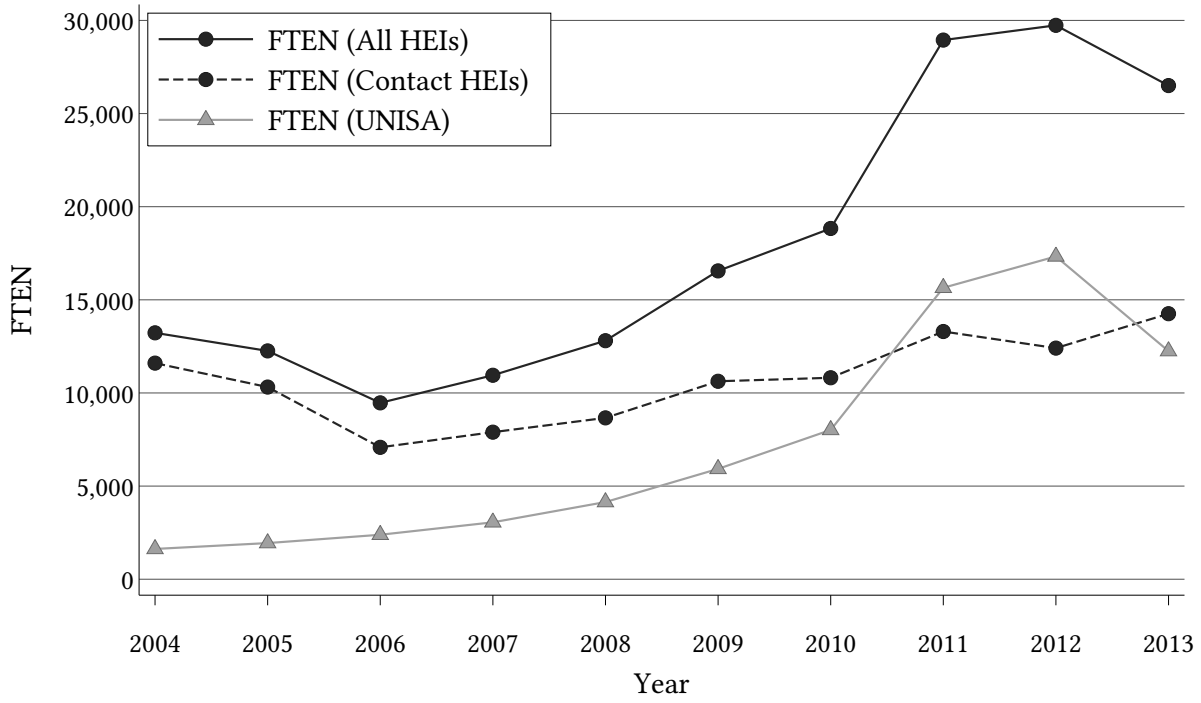
Unisa's College of Education (CEDU), which comprises the School of Educational Studies and the School of Teacher Education, is its second largest faculty in terms of headcount enrolments, and has been growing significantly in both absolute and relative terms since 2000 (Van Zyl and Barnes, 2012*b*, p. 6). The extent of this growth and of Unisa's contribution to FTEN in ITE programmes in the public HE system is illustrated in Figure 3.6.

Between 2008 and 2013, Unisa accounted for nearly 48% of all FTEN in ITE programmes in South Africa and in both 2011 and 2012 the number of students entering ITE programmes at Unisa exceeded the collective number of students entering such programmes at other (contact) public HEIs (Table A.5). However, it is not the fact that Unisa dominates new enrolments in ITE programmes that is of concern, but rather that the rise in ITE programme FTEN numbers in the HE system since 2006 appears to have been driven to such a great extent by the rise in FTEN at Unisa.

Table A.6 shows that FTEN in ITE programmes at Unisa grew by 32.3%, on average, per annum between 2004 and 2013 with the total number of ITE FTEN at the institution increasing more than sevenfold over the period. By contrast, the data shows that FTEN in ITE programmes at other HEIs grew by an estimated 4.6%, on average, per year over the period and that the number of individuals entering ITE programmes at contact HEIs in 2013 was only 23% higher than it had been in 2004 (Figure 3.7).

The comparatively subdued growth in FTEN in ITE programmes at contact HEIs is partly a reflection of a general lack of growth in FTEN in all academic programmes at South Africa's contact HEIs. Only 8 of

**Figure 3.6:** FTEN in ITE programmes including and excluding Unisa (2004 - 2013)




NOTES: Figures represent the estimated respective number of first-time enrolments (FTEN) in undergraduate and postgraduate ITE programmes in the entire public HE system, at contact HEIs, and at Unisa.

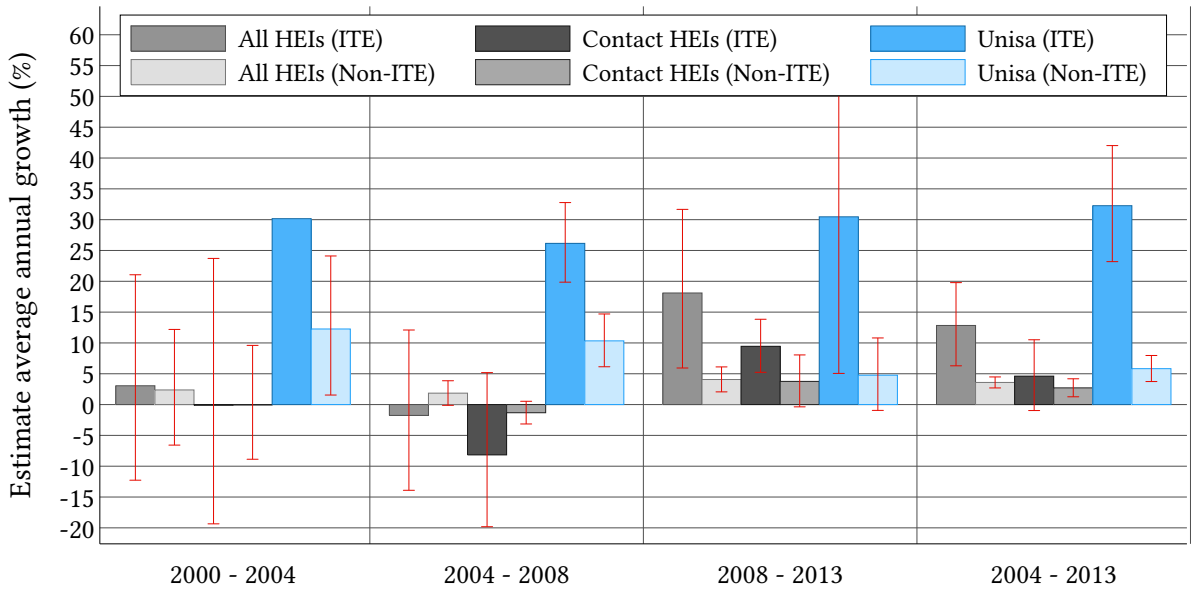
South Africa's 22 contact HEIs experienced statistically significant positive average annual growth in first-time academic program enrolments between 2004 and 2013.[23] However, FTEN at Unisa increased in general, with the numbers of students entering ITE programmes growing even faster than the numbers entering non-ITE programmes.[24]

On the basis of the aforementioned figures, it is tempting to conclude that the majority of South Africa's HEIs have been comparatively performing poorly with regard to increasing the number of individuals enrolling in ITE programmes. However, it is important to remember than Unisa is not subject to many of the physical infrastructural constraints that limit the rate at which contact HEIs can accommodate increasing numbers of students. Moreover, a somewhat different picture emerges when one disaggregates the trends in ITE programme FTEN at Unisa and other HEIs by programme level as done in Figure 3.8. This graph reveals that there was reasonably strong growth in FTEN in undergraduate ITE programmes at contact HEIs over the period. Since 2006, the same has also been true for FTEN in postgraduate ITE programmes at contact HEIs. However, the sharp decline in FTEN in postgraduate ITE programmes at contact HEIs between 2004 and 2006, coupled with a decline in FTEN in undergraduate ITE programmes at the such institutions over the same period has had the effect of partially confounding the estimated average annual growth rate in overall FTEN in ITE programes at contact HEIs between 2004 and 2013.

[23] Collectively, non-occasional FTEN at these institutions accounted for between 27% and 38% of all FTEN at contact institutions, growing by an estimated 3%, on average, per year between 2004 and 2013.

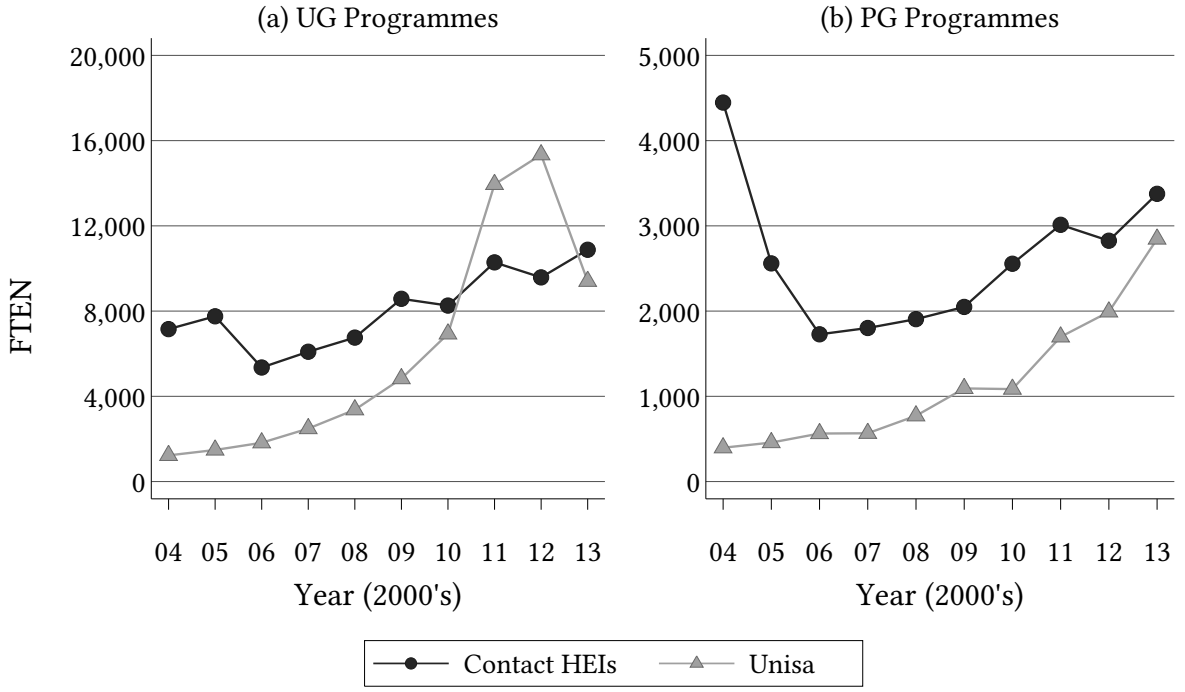
[24] These findings hold more generally. Overall FTEN at Unisa (excluding students enrolling for occasional studies) is estimated to have grown by 6.2%, on average, per annum between 2004 and 2013. By contrast, the estimated average annual growth in overall FTEN in the rest of the public HE system, while positive (0.47%) , was not statistically significant over the period.

**Figure 3.7:** Estimated average annual growth rates in FTEN in ITE and non-ITE programmes including and excluding Unisa (2004 - 2013)




NOTES: Bars represent the estimated average annual growth rates (%) in FTEN in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma/certificate programmes for the entire public HE system, contact HEIs, and Unisa over the indicated periods and were estimated using the least-squares methodology described in Appendix C. Capped lines represent the 95% confidence intervals surrounding the each point estimate.

**Figure 3.8:** FTEN in undergraduate and postgraduate ITE programmes at contact HEIs and Unisa (2004 - 2013)




NOTES: Figures represent the estimated number of first-time enrolments (FTEN) in (a) undergraduate ITE pogrammes and (b) postgraduate ITE programmes at contact HEIs and at Unisa.

Although the estimated average annual growth in undergraduate ITE FTEN at contact institutions between 2004 and 2013 was much lower than at Unisa (34%), it was still positive and statistically significant at 6% per annum (Table A.8). By 2013, 52% more students were entering undergraduate ITE programmes at these institutions than in 2004. When looking at postgraduate ITE programmes, the situation is slightly different. While FTEN in postgraduate ITE programmes at contact HEIs grew fairly rapidly between 2008 and 2013, the growth was insufficient to fully counteract the strong decline in FTEN in the years that preceded it. As a result, FTEN in postgraduate ITE programmes at contact institutions were still 24% lower in 2013 than in 2004.

The estimates of the average annual growth in ITE FTEN (Table A.8) between 2004 and 2013 may give a somewhat skewed account of the current growth trajectories for undergraduate and postgraduate ITE FTEN at contact HEIs. Figure 3.8 shows that while the number of FTEN in these programmes declined sharply between 2004 and 2006, they have been on a consistent upward trend ever since. If one considers only the post-2006 period, FTEN in undergraduate and postgraduate ITE programmes at contact institutions have respectively been growing at an estimated 10.6% and 10.7%, on average, per annum. While these growth rates are much lower than the comparable estimates for Unisa (35% and 26.8%), they are also noticeable higher than the estimated average annual growth rates in non-ITE undergraduate degree programmes (4%) and postgraduate diploma/certificate programmes (7.1%) at contact institutions between 2006 and 2013.

Collectively, the evidence presented here suggests that Unisa is likely to remain the foremost driver of FTEN in ITE programmes in South Africa for the foreseeable future. Not only does it represent the largest share of enrolments in ITE programmes, but its FTEN in such programmes have been growing much faster than comparable FTEN at contact HEIs over the past decade.[25] At the same time, the data shows that FTEN in ITE programmes at contact institutions have been increasing relatively rapidly since 2006, even if not quite to the same extent as at Unisa. Thus, while present levels of FTEN in such qualifications at contact institutions may not seem particularly encouraging when viewed relative to what they were in 2004, it is encouraging to know that they are on a strong upward trajectory.

It is important to appreciate the implications of the aforementioned points. Insofar as FTEN in ITE programmes ultimately translate into the production of qualified new potential teachers, they imply that any intervention aiming to materially raise the production of new teachers in South Africa must speak to the number of FTEN in ITE programmes and the quality of such programmes at Unisa. Similarly, if contact institutions are to continue to contribute meaningfully to the production of qualified teachers in South Africa, it is crucial for the recent upward trend in undergraduate and postgraduate ITE FTEN to persist.

### 3.3.2 The status of the teaching profession in South Africa

Having established that FTEN in ITE programmes have risen significantly in absolute terms since 2004 and that Unisa has been the primary contributor to this trend, it remains important to ask why FTEN

[25] Between 2004 and 2013, Unisa's share of all FTEN in undergraduate degree and postgraduate ITE programmes in South Africa grew by an estimated 4.8 percentage points (or 17.22%), on average, per annum, rising from just 12.3% in 2004 to a high of 58.3% in 2012.

in ITE programmes have also been growing rapidly in relative terms since 2006. Various push and pull factors have bearing on whether individuals ultimately decide to enrol in ITE programmes rather than alternative programmes at university. Many of these factors are discussed at length in DOE (2005*b*), DOE (2006), Cosser (2008), Cosser (2009), and SACE (2010). While those discussions will not be reproduced here, two of the most commonly cited factors affecting enrolments in ITE programmes are worth highlighting. The first is the status of the teaching profession in South Africa and the attractiveness of teaching as a career. The second, is the relative attractiveness of ITE programmes as fields of study and, closely linked to this, the availability of financial support for students who enrol in such programmes.

It is widely believed that the low status of the teaching profession in South Africa has had negative effects on teacher supply, not only in terms of increasing voluntary attrition among existing teachers, but also in terms of discouraging prospective students from enrolling in ITE programmes at universities (CDE, 2011). DOE (2005*b*, pp. 58, 68), for example, asserts that the low prestige associated with teaching relative to other occupations is one of the primary reasons why the rate at which existing teachers have been leaving the schooling system exceeds the rate at which newly qualified potential teachers are being produced by the public HE system.

The detrimental impact of low teacher esteem has also been exacerbated by a range of adverse factors that characterise the teaching profession in South Africa in general (OECD, 2008, p. 299). These include poor working conditions, low levels of job satisfaction, lack of career advancement opportunities, overcrowded classrooms, inadequate parental involvement and support, excessive administrative duties, and perhaps most importantly, comparatively low salaries (Deacon, 2010*a*, p. 40).

Armstrong (2009, p. 29) shows that South African teachers are at a distinct disadvantage relative to their non-teaching counterparts in terms of remuneration levels. Moreover, this disadvantage is found to be greatest for qualified teachers with university degrees or postgraduate qualifications. This relative socio-economic deprivation is often cited as one of the main reasons why many existing and newly qualified teachers choose to enter other, more lucrative and prestigious professions or emigrate to teach in other countries Manik (2014, p. 152).

All of the aforementioned factors arguably reduce the attractiveness of pursuing a career in teaching in South Africa (Chisholm, 2009, p. 23). However, insofar as these and other adverse considerations have indeed served to reduce FTEN in ITE programmes at universities, the HEMIS data suggest they have done so only to the extent of moderating the absolute and relative rise in ITE FTEN since 2006. This indicates that there are other, additional factors that affect the relative attractiveness of ITE programmes as fields of study which may not necessarily be linked to the attractiveness of teaching as a profession.

Cosser (2008, pp. 20 - 21) argues that not all individuals who enrol in ITE programmes do so because they find the teaching profession in South Africa particularly alluring or because they intend to pursue a career in teaching subsequent to graduating. Instead, for many, such considerations are secondary to issues pertaining to the differences in tuition fees, admission requirements, academic challenges, and availability of financial support for different fields of study.

In general, comparatively low entry requirements mean that enrolling in a ITE programme is one of the few viable options available to individuals who wish to study at university but fail to qualify for their

chosen academic programmes (JET, 2014, p. 8). Tracking a cohort of Matric learners, Cosser (2009), for example, finds that many learners who perform poorly in the Matric exams ultimately enrol in ITE programmes, even if they previously had no intention of doing so or indicated that they wished to pursue other fields of study. (Arends, 2010, p. 2)

### 3.3.3 The availability of financial support for ITE programme students

For some individuals, perhaps the most crucial factor underpinning their enrolment decisions at university is the availability of financial resources. Given the relatively high cost of university attendance in South Africa, generally low levels of household income and inadequate access to finances serve as major constraints to HE participation (Cosser, 2008). For many, the ability to enrol in university is entirely dependent on the ability to secure funding in the form of bursaries or loans (OECD, 2013, p. 38). Gurgand *et al.* (2011, p. 41), for example, find that the ability to secure a loan may increases the probability of enrolling in university in South Africa by as much as 50%. However, differences in tuition fees and the availability of bursaries and loans for various academic programs mean that financial constraints often also restrict the programme choices available to some students (Branson *et al.*, 2009, pp. 1 - 3). As such, the relative attractiveness of different university programmes may in certain instances be heavily influenced by the availability of financial support for students who choose to enrol in those programmes.

#### The Funza Lushaka Bursary Programme (FLBP)

In recognition of the central role that financial constraints play in shaping students' enrolment and academic programme choices, the Department of Education (DOE) has introduced various initiatives that aim to increase the number of qualified teachers being produced by the HE system (Onwu and Sehoole, 2011, p. 132). Chief among these is the Funza Lushaka Bursary Programme (FLBP).

Introduced in 2007, Funza Lushaka is a multi-year, service-linked bursary scheme designed to raise the number of newly qualified teachers entering South African public schools, particularly in poor and rural areas, by offering full-cost bursaries to eligible students who enrol in specific ITE programmes. In order to be eligible for an award, students must either be enrolled for a 4-year Bachelor of Education degree (BEd) or 1-year Postgraduate Certificate in Education (PGCE) and specialise in at least two of the priority teaching areas identified by the DOE (DBE, 2009, pp. 19 - 25).[26] The conditions of the scheme stipulate that recipients must be appointed to schools by the relevant provincial education departments upon graduation where they are obligated to teach for the same number of years that they received the bursary.

Unfortunately, aggregate HEMIS data does not contain any information about whether or not students are Funza Lushaka recipients. In addition, information about the annual numbers and composition of Funza Lushaka bursars that is available elsewhere tends to be fragmented and often inconsistent

[26] Students who enrol in non-ITE undergraduate degree programmes may in some instances also qualify for FL bursaries if they commit to completing a PGCE programme subsequent to completing their undergraduate studies. For example, 4.5% of the 14 507 FL recipients in 2013 were enrolled in non-ITE undergraduate degree programmes (figures based on FLBP database as received from DBE).

between sources.[27] Nonetheless, Table 3.1 provides a summary of some of the available information on Funza Lushaka bursary recipients alongside the estimated numbers of total headcount enrolments and FTEN in ITE programmes as per aggregate HEMIS between 2007 and 2013.[28]

**Table 3.1:** Total enrolments and FTEN in ITE programmes vs numbers of Funza Lushaka bursary recipients (2007 - 2013)

| | *ITE Programmes*[1] | | *Funza Lushaka Bursary Recipients*[2] | | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **All**[3] | **All (%)**[4] | **New**[5] | **New (%)**[6] |
| 2007 | 29 926 | 10 950 | 3 669 | 12.3 | 3 669 | 12.3 |
| 2008 | 34 641 | 12 807 | 5 189 | 15.0 | 2 881 | 8.3 |
| 2009 | 42 151 | 16 553 | 9 190 | 21.8 | 5 744 | 13.6 |
| 2010 | 52 477 | 18 832 | 10 073 | 19.2 | 3 745 | 7.1 |
| 2011 | 74 038 | 28 947 | 8 716 | 11.8 | 1 732 | 2.3 |
| 2012 | 86 880 | 29 737 | 11 455 | 13.2 | 5 527 | 6.4 |
| 2013 | 94 127 | 26 503 | 14 512 | 15.4 | 6 847 | 7.3 |

NOTES: [1]Estimated numbers of total headcount enrolments and FTEN in undergraduate and postgraduate ITE programmes. These figures correspond to the estimates presented in Table A.1. [2]Figures on the number of Funza Lushaka recipients derived from various sources, including DBE (2012*a*, p. 11), and FLBP data received from the DBE. [3]Total number of Funza Lushaka bursary recipients. [4] Total number of Funza Lushaka bursary recipients (as in column 4), expressed as a percentage of the estimated total number of headcount enrolments in ITE programmes (as in column 2). [5] Number of students receiving Funza Lushaka bursaries for the first time. [6]Number of new Funza Lushaka bursary recipients (as in column 6), expressed as a percentage of the estimated total number of headcount enrolments in ITE programmes (as in column 2).

It is clear that the FLBP has expanded considerably over a relatively short period of time, with the number of bursaries being awarded each year rising by an estimated 22.4%, on average, per annum from 3 670 in 2007 to just over 14 500 in 2013. One of the programme's aims is to fund at least 25% of ITE students at public HEIs (DBE, 2012*a*, p. 7). To date, the closest it has come to achieving this objective was in 2009 and 2010 when the total number of FLBP bursary recipients respectively amounted to 21.8% and 19.2% of the numbers of individuals enrolled in ITE programmes.[29] It should be noted though that these percentages are likely to be inflated estimates since at least some of the bursaries in each year would have been awarded to individuals who were enrolled in non-ITE undergraduate degree programmes.[30]

[27] For example, there are significant discrepancies between the total value of Funza Lushaka bursaries paid out per year that are presented in NSFAS's various *Annual Reports* for the years 2009 - 2014. There are also discrepancies between NSFAS figures for the number of Funza Lushaka recipients and those presented in National Treasury's respective annual budget documents.

[28] In a number of instances, there are discrepancies between the numbers presented in Table 3.1 (which are based, in part, on FLBP data received from the DBE) and the figures reported in ANC (2014, p. 21), CEPD (2009*b*, p. 27), (DBE, 2012*b*), and National Treasury (2014, p. 2).

[29] DBE (2012*a*, p. 8) claims that 28% of ITE students in 2012 received Funza Lushaka bursaries. However, this figure is based on the notion that there were only around 40 000 students enrolled in ITE programmes in 2012. This figure is less than half of the headcount enrolment estimate presented in this paper (86 880), an estimate which is in itself already lower than the estimate of 94 237 as presented in Simkins (2015, p. 4) which is based on DHET's own statistics.

[30] i.e. individuals who formally committed themselves to completing PGCE programmes subsequent to completing their undergraduate studies in order to qualify for Funza Lushaka funding.

In reviews of teacher graduate production in South Africa, it is often implied that Funza Lushaka has had a major hand in explaining the rise in the number of individuals enrolling in ITE programmes in recent years. However, the fact that the introduction and subsequent expansion of the FLBP coincided with a rise in ITE programme enrolments between 2006 and 2013 is not, in itself, evidence that Funza Lushaka has had a causal impact on the number of individuals deciding to enrol in such programmes over the period. Without more compelling empirical evidence to that effect, such interpretations wrongly infer causality from correlation.[31] Moreover, studies that only report on the number of Funza Lushaka bursaries awarded each year do not give an accurate picture of the number of individuals who have benefited from the bursary scheme over the period. Specifically, it is not always clear from the way in which Funza Lushaka figures are presented that there is a distinct difference between the total number of Funza Lushaka bursaries that have been awarded since 2007 and the number bursars who have received Funza Lushaka bursaries.

The figures in column 4 of Table 3.1 represent the annual numbers of Funza Lushaka bursaries awarded. Since 2008, many of these bursaries were awarded to individuals who had already been recipients of Funza Lushaka bursaries at least once before. Column 6 of Table 3.1 shows the number of new Funza Lushaka bursars for each year. With the exception 2007 (when all FLBP bursars were first-time recipients), the number of bursaries awarded to students who had not previously received such bursaries has, on average, amounted to only 45% of the total number of bursaries awarded each year. Thus, while a total of 62 804 Funza Lushaka bursaries were awarded between 2007 and 2013, there were only a total of 30 145 unique recipients over the period. Consequently, the number of new Funza Lushaka bursars each year on average amounted to only 8.2% of total number of students enrolled in ITE programmes at the time.

One of the critical questions regarding the impact of the FLBP relates to the extent to which it has resulted in increased numbers of individuals deciding to enter ITE programmes rather than merely providing financial support for individuals who were either already planning on enrolling in ITE programmes of their own accord or who were already existing ITE programme students. Only some of the new Funza Lushaka bursars each year are new (entering) ITE programme students. The rest are existing senior ITE students. The question is thus: to what extent do students entering ITE programmes for the first time have access to Funza Lushaka funding?

In 2013, only 2 695 (39.4%) of the 6 847 new Funza Lushaka bursary recipients were first-year BEd students. Similarly, only 372 (5.4%) new bursars were first-time PGCE students. This means that less than 45% of the Funza Lushaka bursaries awarded to new bursars in 2013 went to individuals who were entering ITE programmes for the first time.[32] Similar figures for the 2007 - 2012 period are unfortunately not readily available. However, if one were to extrapolate from the 2013 data and assume that only around 50% of new Funza Lushaka bursars each year are first-time entering ITE students, it would imply that, on average, only 11.5% of FTEN in ITE programmes between 2007 and 2012 would have been Funza Lushaka recipients.

[31] For example, when discussing the reasons underlying the growth in enrolments in ITE programmes in recent years, CDE (2015, p. 12) state that *"There is no doubt that Funza Lushaka bursaries have been a major contributing factor to the growth..."*. This is a fairly strong claim, yet it is never fully substantiated in the report, nor is any compelling empirical evidence presented to support it.

[32] These figures are based on FLBP data received from the DBE.

The discussion above suggests that the availability of Funza Lushaka bursaries to first-time ITE students may have been far more limited than annual bursary numbers would suggest at face value. Moreover, it does not appear as though the percentage of entering ITE students who receive Funza Lushaka bursaries has really increased since 2007. In light of this, it is not immediately clear how the introduction of the FLBP could explain the extent of the rise in FTEN in ITE programmes since 2006. Nonetheless, it remains plausible at the very least that the availability of some additional funding opportunities coupled with potentially inflated perceptions of the availability of Funza Lushaka bursaries could have lead some individuals to enrol in ITE programmes.[33]

It is important to emphasize that, in terms of affecting enrolments and graduations in ITE programmes, the purpose of the FLBP is not just to increase the numbers of individuals who graduate with ITE qualifications, but, more importantly, to increase the numbers of individuals who are qualified to teach specific priority subjects in certain school phases. Thus, even if it was the case that Funza Lushaka has had no real effect on the numbers of new enrolments in ITE programmes, it may still have had a positive impact on the specialisation choices of prospective and existing ITE students. However, a far more in-depth and rigorous analysis is required to determine whether Funza Lushaka has had a causal impact on enrolments and graduations in ITE programmes, and what the precise nature of that impact is.[34]

Lastly, from the perspective of this paper, whether or not the FLBP has indeed led to increased FTEN and graduations in ITE programmes is not the most important question. Instead, it is whether it has led to an increase in the supply of qualified teachers in the country. This is a critical issue since Funza Lushaka bursars are, in principal, not only guaranteed teaching positions after graduating, but are also contractually obliged to take up those positions. In a sense, the extent to which Funza Lushaka ITE graduates are absorbed into the teaching profession subsequent to graduation therefore provides what could be viewed as a best case scenario for the employment of newly qualified potential teachers in South Africa.

Given the explicit link between Funza Lushaka recipiency and teacher service, it is disconcerting that an increasing number of reports have noted that the uptake of Funza Lushaka graduates in the schooling system has been slow in general and that graduates are never allocated to schools by the provincial departments in some instances (DBE and DHET, 2011, p. 40).[35] For example, Deacon (2010*b*, p. 25) notes that by 2009, only 73% of all 2008 and 2009 Funza Lushaka graduates had been placed in schools. Similarly, of the 2 136 FLBP bursars available for placement in 2012, 11.5% had not yet been placed in teaching positions by the end of June 2012 (DBE and DHET, 2011, p. 12). Moreover, many of the Funza Lushaka bursars that are placed are only employed in temporary positions (DBE and DHET, 2011, p. 40).

In the absence of more available data, it is unfortunately not possible to comment on the true extent to which Funza Lushaka graduates effectively contribute to the supply of qualified new teachers in South

[33] It is conceivable, for example, that some students may elect to enrol in ITE programmes in the hope that they will qualify for a Funza Lushaka bursary, if not during their first year of studies, then at least in subsequent years.

[34] An impact evaluation of the FLBP is currently being conducted by the Joint Education Trust (JET) (NATIONAL PRESIDENCY, 2013, p. 23).

[35] DBE (2012*a*, p. 27) also notes that some Funza Lushaka graduates refuse to take up positions at the schools to which they are allocated by the provincial departments.

Africa. Nonetheless, the experience of the FLBP in terms of teacher uptake not only provides a poignant illustration of the difference between the number of ITE graduates being produced and the supply of new teachers, but also of the fact that interventions aimed at increasing the numbers of qualified teachers in South Africa can only be effective if they are appropriately implemented, monitored, and evaluated.

**The National Students Financial Aid Scheme (NSFAS)**

While aggregate HEMIS does not contain any information on whether or not students received Funza Lushaka bursaries, it does contain information on whether or not they received awards from the National Students Financial Aid Scheme (NSFAS).[36] Introduced in the mid-1990's, NSFAS was established to improve HE access by providing financial aid in the form of bursaries or loans to disadvantaged students from poor socio-economic backgrounds (de Villiers *et al.*, 2013, p. 6).[37] The number of NSFAS recipients has grown steadily over time and in 2013 an estimated 15.9% of all undergraduate degree and 6.1% of all postgraduate diploma/certificate programme students at public HEIs received some sort of NSFAS funding.[38]

Insofar as the availability of financial support increase the likelihood that students will enrol in certain programmes, one may expect that, similar to the rationale for the FLBP, the trends in the NSFAS funding opportunities available to ITE students may have influenced enrolments in ITE programmes.

Paterson and Arends (2009, p. 84) show that between 1996 and 2004 there was a decline in the proportion of teacher education students who received NSFAS awards as well as a decline in the share of NSFAS awards that were allocated to teacher education programme students. These trends, coupled with falling numbers of FTEN in teacher education programmes over the period, subsequently lead the DOE to allocate ring-fenced NSFAS funding specifically for students enrolled in teacher education programmes (Gordon, 2009, p. 35). As a result, the percentage of ITE students receiving NSFAS awards increased significantly in the early 2000s (Table A.10). However, the rate of change in the percentage of first-time ITE students receiving NSFAS awards since 2004 has been more moderate (Figure 3.9). Between 2004 and 2013, the percentage of FTEN in ITE programmes with NSFAS funding increased by only 2.1%, on average, per year, rising from 18.2% in 2004 to 23.6% in 2013 (Tables A.9 and A.10).

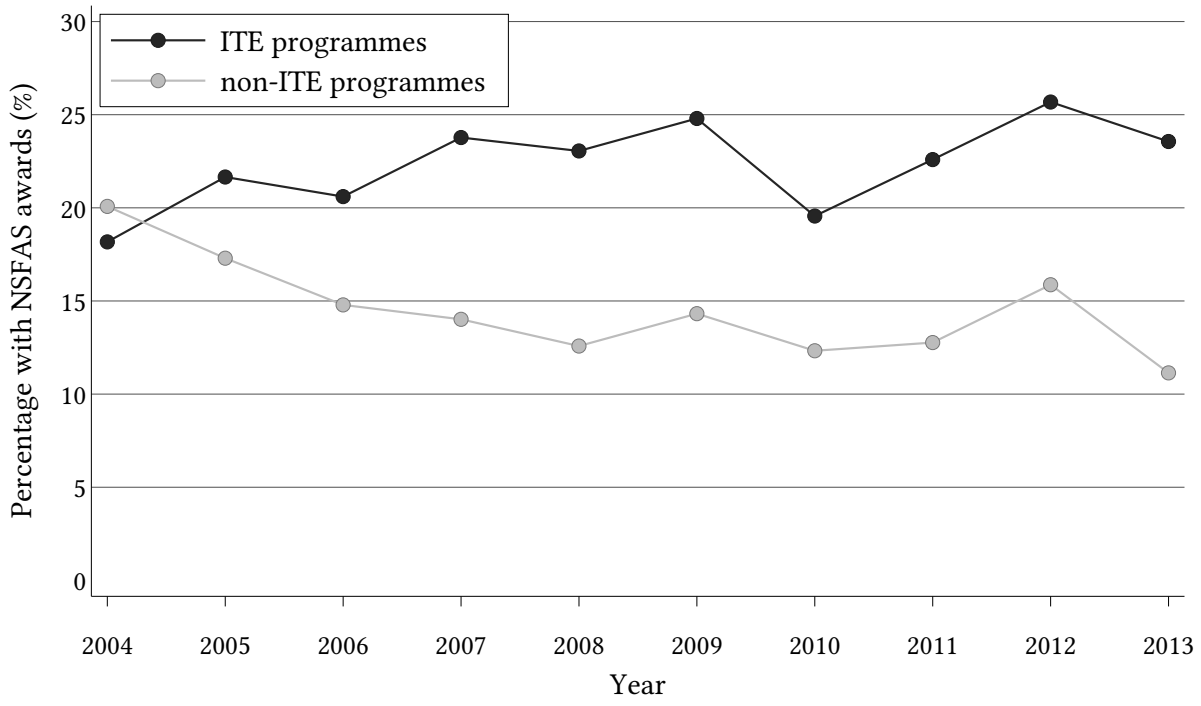
The share of NSFAS awards that are allocated to ITE students remains far lower than the share allocated to non-ITE students. However, it the number of FTEN in ITE programmes also represent a far smaller share of total FTEN than the number of FTEN in non-ITE programmes. In 2013, for example, FTEN in ITE programmes accounted for only 15.5% of all FTEN in undergraduate degree and postgraduate

[36] There are reasons to believe that HEMIS under-captures the numbers of students who receive NSFAS awards each year. However, the under-capturing of NSFAS in the HEMIS data is unlikely to substantively affect the inferences that can be drawn from the analysis presented in this section unless the extent of this under-capturing is non-random across fields of study and, therefore, across the various CESM classification field in HEMIS. There does not appear to be any good reason why this would be the case.

[37] It should be noted that, in contrast to Funza Lushaka bursaries, NSFAS loans tend to cover only part of the costs of studying at HEIs.

[38] A far greater share of annual NSFAS awards are allocated to undergraduate degree programme students than to students enrolled in postgraduate diploma/certificate programmes.

**Figure 3.9:** Percentage of FTEN ITE and non-ITE programme students with NSFAS awards (2004 - 2013)




NOTES: Figures represent the estimated annual percentages of (a) undergraduate and postgraduate ITE programme students and (b) non-ITE undergraduate degree and postgraduate diploma/certificate programme students recieving NSFAS awards.

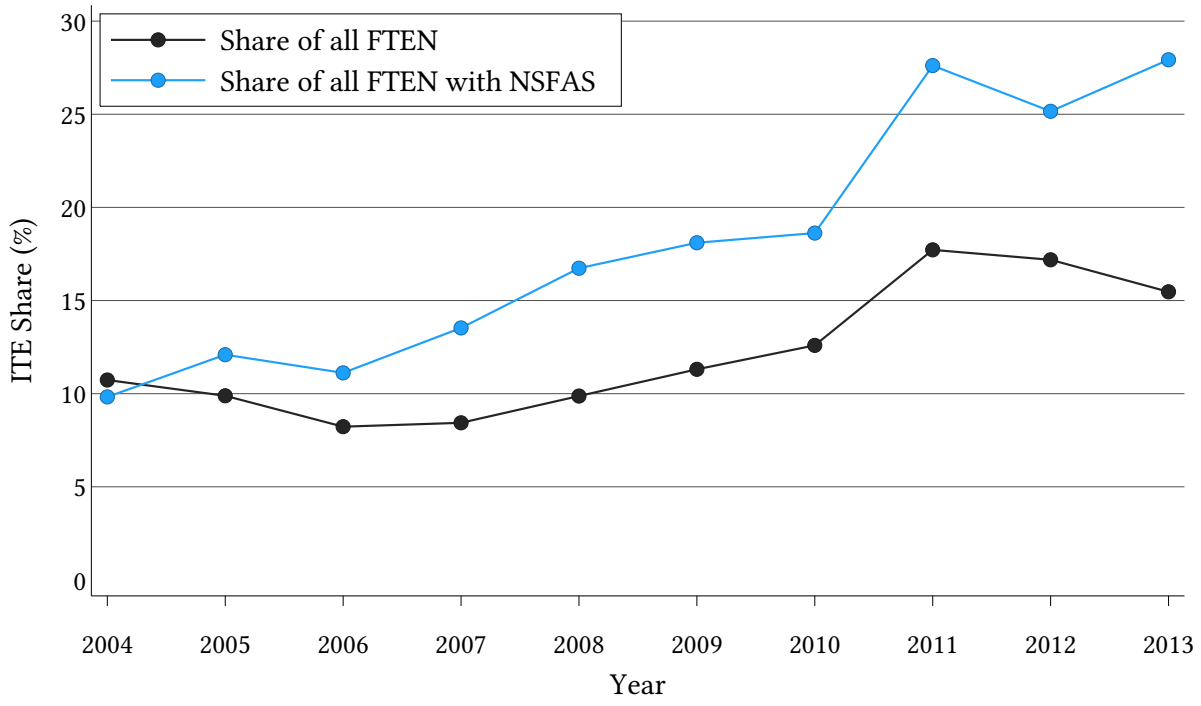
diploma/certificate programmes. For the purposes of understanding the potential role that NSFAS may have played in explaining the relative rise in ITE FTEN over the period, it is therefore important to focus on the ways in which the respective ITE and non-ITE shares of NSFAS funding have changed in relation to one another over time.

Table A.10 shows that the average rate of growth in the relative number of NSFAS awards allocated to ITE students between 2004 and 2013 was significantly greater than it had been for non-ITE students. Because of this rapid growth, the share of NSFAS awards allocated to FTEN ITE students in 2013 (27.9%) exceeded the ITE share of total FTEN (15.5%). The relative allocation of NSFAS awards to first-time ITE programme students is thus progressive. Moreover, it has become increasingly progressive since 2004 (Figure 3.10).

In light of these results, it is plausible that the relatively rapid rise in the number of FTEN in ITE programmes since 2004 could partly be explained by the relatively rapid rise in the availability of NSFAS funding to ITE students which, with all other factors held constant, may have increased the attractiveness of enrolling in ITE programmes rather than academic programmes. However, the evidence presented here and the data on which it is based is by no means sufficient to conclude that this has indeed been the case. For example, while aggregate HEMIS may contain information on which students received NSFAS awards, it does not contain any information on the size of those awards or whether they were allocated as bursaries or loans. If it is the case that differential access to NSFAS funding impacted positively on the relative attractiveness of ITE vs non-ITE programmes since 2004, these factors

would arguably have had important bearing on the extent to which it did so. In the absence of more complete data and compelling evidence, the notion that increased relative access to NSFAS funding may have incentivised enrolments in ITE programmes therefore remains largely conjecture.

**Figure 3.10:** ITE student share (%) of NSFAS awards among undergraduate degree and postgraduate diploma/certificate programme FTEN (2004 - 2013)




NOTES: Figures represent the estimated annual ITE student share of all NSFAS awards that are awarded to FTEN in undergraduate degree and postgraduate diploma/certificate programmes. In each year, the respective ITE and non-ITE shares should thus sum to 100.

## 3.4 Teacher supply vs teacher demand in South Africa

The discussion thus far has focussed primarily on the changes in FTEN and graduations in ITE programmes between 2004 and 2013 and on some of the potential reasons underlying the relatively rapid rise in ITE enrolments and, more recently, also in ITE graduations. In order to contextualise the analysis, the discussion now turns to the implications that the aforementioned findings may have for qualified teacher supply in South Africa.

As noted above, the reason why the focus in this paper falls on the production of ITE graduates in South Africa is that, in the long run, it effectively determines how many individuals can enter the teaching profession as qualified new teachers. This implies that, ultimately, the key question is not just whether sufficient numbers of ITE graduates are being produced, but whether the numbers of new ITE graduates that are being produced translate into sufficient numbers of qualified new teachers. In light of the findings presented above, three fundamental questions thus remain. First, is the current supply of

new qualified teachers to the system sufficient to meet the current demand for new teachers? Second, will the future supply of new qualified teachers to the system be sufficient to meet the future demand for new teachers? Third, if insufficient numbers of qualified new teachers are being produced to meet current or future demand, why is this the case and what can be done to change it. The remainder of this section seeks to provide some answers to the first two of these questions, starting with the issue of teacher demand in South Africa.

### 3.4.1 Teacher Demand in South Africa

While most research studies agree that South Africa has a growing shortage of qualified teachers owing to a gap between the demand for and the supply of new teachers, there appears to be little consensus on the precise extent and dimensions of this shortage. This is partly due to the fact that the precise extent of the current and future demand for new teachers is often unclear.

Table 3.2 presents a range of estimates of the numbers of new teachers that need to enter the schooling system each year in order to replace teachers who are leaving the system, as found in the existing literature on teacher demand and supply in South Africa. The Table makes it clear not only that there is considerable variation in estimates between studies, but also that most of the estimates tend to span a fairly wide range. This is partly a reflection of the fact that the type of data required to accurately estimate how many teachers enter and exit the schooling system each year is rarely available to researchers and, when it is, often contains serious inconsistencies that affect the degree of accuracy with which projections and estimations can be made.[39] However, the majority of the estimates and projections suggests that South Africa requires between 20 000 and 30 000 new teachers each year.

Projections of teacher demand, such as those presented in Table 3.2, are generally based on assumptions regarding population growth, learner enrolment rates, teacher attrition rates, teacher utilization, learner-educator ratios, and retention, progression, and repetition rates (DBE and DHET, 2011, p. 31). This means that they are predicated on the relative stability and/or predictability of various underlying parameters. Moreover, most projections tend to focus purely on teacher attrition rates and the need to maintain learner-educator ratios. In doing so, they ignore the fact that learner-educator ratios in many South African schools, particularly in rural areas, need to decrease substantially if the quality of education that learners receive is to improve. What makes this even more problematic is that CDE (2015, p. 10) estimates that, due to rising learner enrolments, the number of employed teachers in South Africa will have to experience a net increase of 30 000 between 2013 and 2025 just to maintain current learner-educator ratios. These issues imply that the teacher demand estimates presented in Table 3.2 may in truth only constitute crude lower-bound estimates of the numbers of new teachers that need to enter the South African schooling system every year.

[39] See, for example, Simkins (2015, p. 11) for a brief discussion on some of the problems with data on the numbers of educators entering and exiting the South African schooling system.

**Table 3.2:** Projections and estimates of the numbers of new teachers needed per annum in order to replace the number of teachers leaving the public school system each year

| Estimate[1] | Study[2] |
|---|---|
| 12 000 - 20 000 | CEPD (2009*a*, p. 16) |
| 17 000 - 20 000 | Pretorius (2008, p. 173) |
| 20 000 | Crouch and Perry (2003, p. 496) |
| 20 000 | Deacon (2010*a*, p. 41) |
| 20 000 | OECD (2013, p. 68) |
| 20 000 | Keevy *et al.* (2014, pp. 88) |
| 17 500 - 22 500 | Bertram *et al.* (2007, p. 79) |
| 20 000 - 25 000 | Bertram *et al.* (2006, p. 2) |
| 20 000 - 25 000 | Deacon (2010*b*, p. 3) |
| 20 000 - 25 000 | Onwu and Sehoole (2011, p. 127) |
| 25 000 | CDE (2011, p. 10) |
| 20 000 - 30 000 | Gordon (2009, p. 28) |
| 20 000 - 30 000 | DOE (2005*b*, p. 41) |
| 30 000 | Lewis (2008, p. 35) |
| 30 000 | CHE (2010, p. 14) |

NOTES: [1]Figures represent estimates numbers of new teachers that need to enter the public school system each year in order to replace the number of practising teachers exiting the public school system each year. [2] Study which cites, estimates, or projects the specified numbers of new teachers required per annum.

### 3.4.2 Current ITE graduate production and teacher supply

Given the projections of teacher demand presented above, the question that remains is whether South Africa is currently producing sufficient numbers of qualified new teachers to meet current demand. Insofar as it is true that between 20 000 and 30 000 new teachers need to enter the public schooling system every year, the simple answer to this question would appear to be a resounding "no".

If every single ITE graduate produced by the public HE system between 2004 and 2013 was immediately absorbed into the teaching profession as a new first-time teacher immediately after graduating, this would have amounted to around 92 500 new teachers over the entire period (Table A.1). Even if the annual required number of new teachers was as low as 10 000 per year - far lower than any of the estimates found in Table 3.2 - this would still mean that the number of new teachers produced amounted to only 92.5% of what was required. However, the reality of teacher supply in South Africa is more nuanced than such comparisons would suggest for the simple reason that the number of new ITE graduates is not the same as the number of potential new qualified teachers.

In contrast to what is sometimes implied, the number of ITE graduates produced by the HE system every year constitutes an inflated estimate of the number of new individuals who become available for employment as qualified first-time teachers in the schooling system. Each new group of ITE graduates effectively includes some individuals who are already employed as teachers, some who have no intention of seeking employment as teachers or at least not to do so in the immediate future, some who seek to become teachers, but cannot find employment despite applying for teaching posts, and some who both want to work as teachers and are able to find suitable positions in which they are subsequently

employed. In the short run, it is only this last group of new ITE graduates that increases the supply of qualified teachers in the country.

The distinction between different types of ITE graduates is important, as research suggests that the number of individuals who fall into one of the first three of the aforementioned categories constitute a non-negligible proportion of new ITE graduates each year. For example, while it is well known that the bulk of individuals who graduate with CPTD qualifications are existing teachers, many ITE graduates may also already be employed as teachers. According to DHET (2011*b*, p. 7), an estimated 37% of Unisa's ITE graduates in 2009 were employed teachers. Given that Unisa accounted for an estimated 21.9% of all ITE graduations in 2009, this implies that at least 8.1% of the graduates for that year were existing teachers.[40] While the number of practising teachers who enrol in ITE programmes at Unisa is likely to be much greater than the number who enrol in such programmes at contact HEIs, this nonetheless conveys the fact that a substantial proportion of each year's new ITE graduates do not contribute to the supply of qualified new teachers by virtue of the fact that they are already part of the teachers corps.[41]

In addition to the fact that some new ITE graduates every year will already be existing teachers, there are others who may not immediately seek employment as teachers, if at all, and if they do, may seek out opportunities to teach abroad rather than in South Africa. A survey conducted by Bertram *et al.* (2006), for example, showed that more than 7% of newly qualified potential teachers had no plans to enter the teaching profession and that more than a quarter planned to work abroad immediately after graduating for at least two years before returning to South Africa. Similarly, CDE (2011, p. 12) asserts that at least a quarter of all newly qualified potential teachers in South Africa never become practising teachers in South African schools. This further reduces the pool of new ITE graduates who can contribute to the supply of qualified teachers.

Lastly, an increasing number of studies have alluded to the fact that, in a similar vein to the situation for Funza Lushaka graduates, some new ITE graduates struggle to find employment as teachers after graduating, particularly in urban areas (DBE and DHET, 2011, p. 40). The inability of recently graduated ITE students to find employment as teachers is partly evidence by the widespread temporary employment of young first-time teachers. Chisholm (2009, p. 27) , for example, notes that, despite the need for individuals to fill permanent positions, provincial education departments employed 31 950 temporary teachers in July 2008. In light of pervasive teacher shortages, this is deeply disconcerting. However, again it implies that the already limited number of individuals who could be added to the stock of qualified teachers in the country is further whittled down.

If it was the case that each year's pool of new ITE graduates represented the sole source of qualified new teachers to the schooling system, the aforementioned issues would collectively imply that the HE system should be producing far more than 20 000 to 30 000 ITE graduates each year in order for supply to satisfy the demand. However, new ITE graduates are not the only source of new teachers to the South African schooling system.

[40] Similarly, DHET (2010, 2) notes that 344 of and 447 of Unisa's ITE graduates in 2007 and 2008, resepctively, were already employed in teaching posts. This again implies that at least 5.4% of all 2007 ITE graduates and 7.3% of all 2008 ITE graduates were practising teachers.

[41] DOE (2005*b*, p. 13) claim that as much as a third of all ITE graduates produced by public HEIs in 2004 may have already been practising teachers. However, this figure seems implausibly high.

Table 3.3 shows the numbers of employed teachers in public and independent schools for the years 2004 to 2014. The estimates in the table reveal an important and often overlooked feature of current teacher supply in South Africa. The figures indicate that the net increase in the number of employed teachers in the country between 2004 and 2014 (63 048 ), amounted to about 68.2% of the estimated number of ITE graduates produced between 2004 and 2013 (92 477). In other words, if one were to assume that there was no teacher attrition whatsoever over the period, this would seem to imply that 68.2% of new ITE graduates were employed as new teachers over the period. However, it is well known that teacher attrition in South Africa is high, with most studies estimating that between 4% - 6% of practising teachers leave the system every year (CEPD, 2009*b*, p. 61). Factoring in the effects of teacher attrition, a net increase in the number of employed teachers would mean that far greater numbers of new teachers would have to had to enter the schooling system over this period. Given that not all ITE graduates will try to find employment as teachers after graduating and even among those who do, not all will succeed in finding a post, this means that some of the new teachers entering the schooling system must have come from a source other than the stock of new ITE graduates that were produced over the period.

**Table 3.3:** Estimated teacher exit and entry vs ITE graduate production (2004 - 2014)

| Year | Total Teachers Employed[1] | Teachers exiting (Estimated 4%)[2] | Teachers entering (Estimated)[3] | ITE graduates produced in previous year |
|---|---|---|---|---|
| 2004 | 362 042 | 14 504 | 13 948 | 8 074 |
| 2005 | 382 133 | 14 482 | 34 573 | 10 506 |
| 2006 | 386 595 | 15 270 | 20 122 | 7 626 |
| 2007 | 395 452 | 15 464 | 24 321 | 7 188 |
| 2008 | 400 953 | 15 818 | 21 319 | 6 413 |
| 2009 | 411 164 | 16 038 | 26 249 | 6 159 |
| 2010 | 418 109 | 16 447 | 23 392 | 6 953 |
| 2011 | 420 608 | 16 724 | 19 223 | 8 284 |
| 2012 | 425 167 | 16 824 | 21 383 | 10 540 |
| 2013 | 425 023 | 17 007 | 16 863 | 13 153 |
| 2014 | 425 090 | 17 001 | 17 068 | 15 655 |
| Total | | 175 594 | 238 086 | 100 551 |

NOTES: [1] Figures represent the total numbers of educators in public and independent South African schools and were taken from DOE (2005*a*, p. 4), DoE (2007, p. 2), DoE (2009, p. 2), DBE (2011, p. 1), and DBE (2014*b*, p. 1). [2] A gross attrition rate of 4% per annum is assumed. Figures are equal 4% of the total number of teachers employed in the previous year. [3] Figures are equal to the total teachers employed in the current year minus the total teachers employed in the previous year, plus the estimated number of teachers exiting the profession.

To get a better sense of the extent to which current teacher supply in South Africa differs from the number of ITE graduates that are being produced by the public HEI system, Table 3.3 presents crude estimates of the number of existing teachers leaving the profession and the number of teachers entering the schooling system between 2004 and 2014, based on the assumption of a constant, 4% national annual gross attrition rate. Despite the fact that this 4% attrition rate is conservative compared to what is generally reported in other studies[42], the figures indicate that the estimated total number of individuals who entered teaching between 2006 and 2014 was more than double (approx. 238 000) the estimated number of ITE graduates produced between 2003 and 2013 (approx. 100 550). In other words, even if

[42] See (DHET, 2010, p. 12), CDE (2011, p. 10), Deacon (2010*a*, p. 41), and HSRC (2013, p. 6), for example.

one were to assume, unrealistically, that all of the ITE graduates produced over the period in question gained employment as new teachers, this implies that more than half of all individuals entering teaching in South Africa came from some "reserve stock of potential teachers" (hereafter *reserve teacher stock*).

South Africa's *reserve teacher stock* is likely to comprise a diverse group of individuals. Some may be former practising teachers who, having left the profession at some stage, decide to join it again at a later juncture. Some may be young ITE graduates who have been looking for work, but have not yet been able to find suitable teaching positions. Given the prevalence of teacher emigration in South Africa, some may be returning emigrant teachers who intend to continue teaching in South Africa. The group may even include technically unqualified individuals who nevertheless seek to gain employment as teachers.

The existence of a *reserve teacher stock* in South Africa is arguably a good thing, since it can serve to supplement teacher supply in times when new teacher production is insufficient to meet teacher demand. However, what is disconcerting is that the vast majority of individuals entering teaching in South Africa since 2004 and possibly even earlier, appear to have been sourced from this *reserve teacher stock*, a stock that is ultimately finite unless it is being replenished at the same rate at which it is being depleted.[43] It is not immediately clear how many studies take this point into account when they report estimates of the number of teaching graduates that should be produced by the HE system in order to satisfy teacher demand in the country.

It is not clear how large South Africa's *reserve teacher stock* is or how long it will be able to sustain current levels of teacher supply in the country. However, the estimates in Table 3.3 show that the number of ITE graduates being produced each year is steadily converging on the estimated number of individuals entering teaching every year, suggesting that fewer and fewer new teachers are coming from this reserve stock. Unfortunately, these estimates are crude and it is not possible to verify their accuracy without access to PERSAL data. However, insofar as they can be taken to be indicative, they imply that the public HE system may have to produce far more newly qualified teachers than other studies have suggested and, indeed, far more ITE graduates than are currently being produced. Again, without more detailed data, such claims remain partly conjecture. What is certain, however, is that South Africa's *reserve teacher stock* cannot serve as the primary source of teacher supply in the country indefinitely.

### 3.4.3 Future ITE graduate production and teacher supply

Taken together, the points raised above suggest that South Africa is still not producing sufficient numbers of ITE graduates to ensure that the supply of qualified new teachers can satisfy current levels of demand. The question thus becomes whether the HE system will produce sufficient numbers of ITE graduates in the near future and, if so, when. Answering this question requires projections of future

[43] Simkins (2015, p. 12) finds that the reserve teacher stock is *"...continually replenished by some of the leavers in previous years"*. However, it is also acknowledged that the stock of qualified teachers is being depleted faster than it is being replenished (Simkins, 2015, p. 18). Moreover, given the shortfall between the projected annual teacher demand and ITE graduation numbers, it does not seem plausible that the current cycle of depletion and replenishment can be sustainable in the long run.

ITE graduation numbers based on some underlying model of ITE graduate production. This section proposes such a simple model.

The most up to date and comprehensive model of current teacher supply and demand in South Africa is presented by CDE (2015) and incorporates forecasts of ITE graduation numbers for the period 2013 to 2025.[44] These forecasts are predicated on an assumed schedule of growth in total ITE programme headcount enrolments over the period and constant graduation rates. The model proposed here takes a different approach. First, instead of focussing on the estimated growth in total headcount enrolments in ITE programmes, the focus falls on the estimated trends in FTEN in ITE programmes. Second, rather than relying on graduation rates, the ability to estimate completion rates using the HEMIS data is exploited.[45]

As with any model, it is necessary to make assumptions in order to ensure tractability. The proposed model firstly assumes that FTEN in undergraduate and postgraduate ITE programmes at Unisa and contact HEIs will continue to persist linearly along the trends they have respectively been on since 2006. Second, it assumes that the completion rate schedules that have characterised throughput in undergraduate and postgraduate ITE programmes at Unisa and contact HEIs in recent years will continue to do so for the foreseeable future. The number of ITE graduates produced every year is subsequently modelled as a simple function of the predicted FTEN for each ITE programme and HEI type and their respective estimated completion rate schedules (Table A.11). A formal description of this methodology is presented in Section C.3.

Figure 3.11 shows the projected ITE FTEN and graduation numbers for the period 2014 to 2025 alongside estimates of actual FTEN and graduations in ITE programmes between 2006 and 2013.[46] From visual inspection, these projections would appear to suggest that the HE system will most likely start to produce sufficient numbers of ITE graduates to satisfy current levels of annual teacher demand at some stage between 2017 and 2022.

It is worth noting that the predictions of this model are remarkably similar to those of the CDE (2015) model in terms of the projected number of new ITE graduations per year.[47] This is surprising, since the two models not only use different approaches to project ITE graduations, but are also based on different underlying assumptions and data. There are some differences, though. For example, the present model projects that postgraduate ITE students will account for a far smaller percentage of total ITE graduations than the CDE (2015, p. 4) model suggests.[48] Notwithstanding, the two models' predictions of total annual ITE programme graduation numbers are substantively the same.

[44] The details underlying the CDE (2015) report are set out in Simkins (2015).

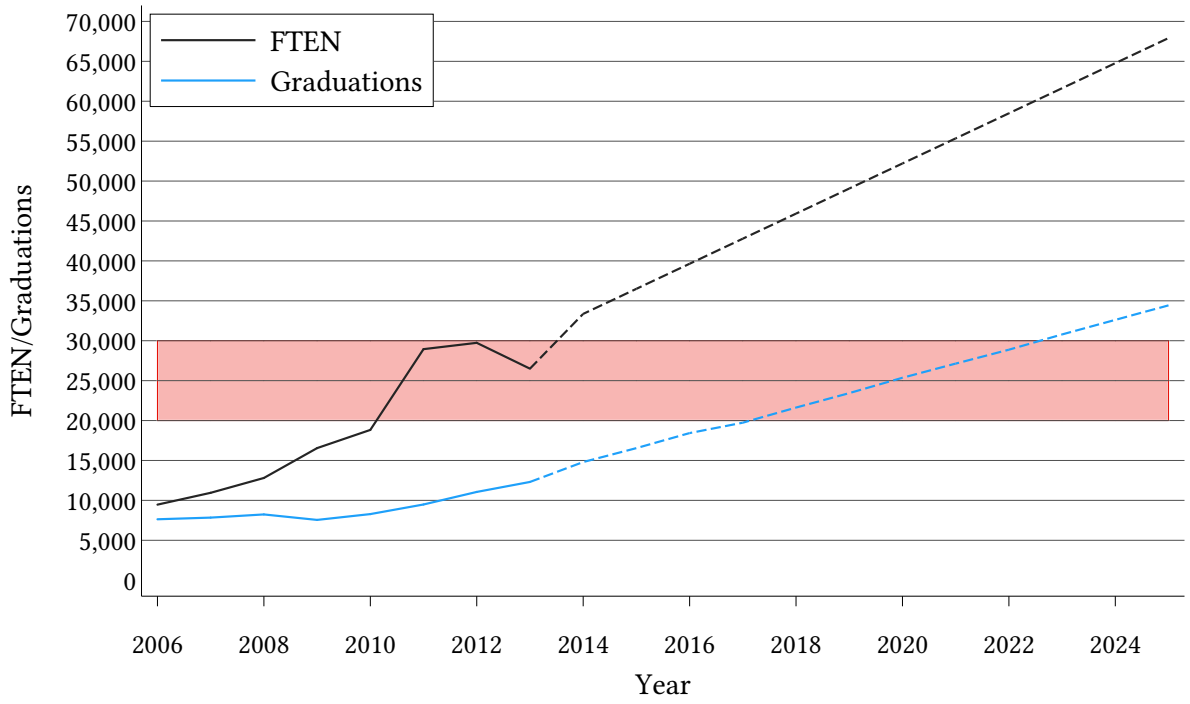
[45] A discussion on the differences between graduation and completion rates is presented in Section 5 which deals with throughput in ITE programmes between 2004 and 2013.

[46] The projected estimates on which the graph is based are presented in Table A.12.

[47] The projected total number of ITE graduations between 2014 and 2025 amounts to 293 810 graduates, approximately 97.8% of the number of graduates projected by the CDE (2015, p. 4) model (300 466).

[48] This is partly explained by the fact that the CDE (2015) model explicitly uses a growth rate for total enrolments in PGCE programmes that is higher than the growth rate for enrolments in BEd programmes, based on the notion that there will be an increased demand for secondary school teachers relative to primary school teachers over the next decade (Simkins, 2015, p. 12). By contrast, the model in this paper allows for the fact that FTEN in undergraduate ITE programmes has been growing faster, on average, than FTEN in postgraduate ITE programmes (Table A.4) since 2004 to persist into the future.

**Figure 3.11:** Actual and projected FTEN and graduations in ITE programmes (2006 - 2025)




NOTES: Figures represent (a) estimated FTEN and graduations in undergraduate and postgraduate ITE programmes for the period 2006 and 2013 and (b) projected numbers of FTEN and graduations in undergraduate and postgraduate ITE programmes based on the completion rate schedules in Table A.11 and the methodology described in Sections 3.4.3 and C.3 for the period 2014 - 2025.

While models such as the one presented here may be useful for understanding the potential future supply of ITE graduates and qualified new teachers, they are at best indicative tools, rather than definitive ones, and should therefore be viewed as such. It is important to understand not only that all of the caveats regarding the differences between annual ITE graduations and the number of potentially new qualified teachers also applies to projected ITE graduation numbers, but also that several additional caveats apply. The present model is a severely simplified abstraction. It does not and cannot account for all of the complexity underlying FTEN and graduations in ITE programmes. For example, it does not allow for differential FTEN growth trends or completion rate schedules between males and females or between different population groups. As shown in Sections 4 and 5 below, there are good reasons to believe that such differences do exist and that the ways in which they are changing over time are likely to have a significant impact on ITE graduations.

Ultimately, the projections made here are only as accurate as the underlying assumptions and data on which they are based. It is therefore important to understand the likelihood that these assumptions might be violated and what the implications of violations may be. First, the model assumes that the current trend in FTEN in ITE programmes can be sustained. That is, it assumes that the public HE system has the capacity to keep enrolling ever-increasing numbers of students in ITE programmes. Moreover, it assumes that the extent to which institutions are able to do so is the same accross all universities. Second, the model assumes that, despite rapidly rising numbers of ITE students at public HEIs, ITE programme completion rates will not change over time, either in magnitude, or in timing. Though these assumptions are necessary in order to project ITE graduation numbers, neither are par-

ticularly realistic. Therefore, if the the level of growth in FTEN in ITE programmes cannot be sustained, or if completion rates among ITE programme students decline, on average, for whatever reason, the predictions of the model will not be accurate.

In light of these concerns, it would be prudent to interpret the estimates in this section with caution. Nonetheless, one may conclude that, conditional on the aforementioned assumptions and in the absence of unforeseen changes in the underlying parameters of the model, it is likely that the public HE system will start to produce sufficient numbers of ITE graduates to satisfy the annual demand for qualified new teachers in the schooling system within the next decade.

# 4 The demographic composition and geographical distribution of FTEN and graduations in ITE programmes

Having identified and discussed the major trends in FTEN and graduations in ITE programmes between 2004 and 2013, the focus now turns to the demographic composition and geographic distribution of FTEN and graduations in ITE programmes in the public HE system, how this has changed between 2004 and 2013, how it is likely to continue to change, and what the implications are for qualified teacher supply in South Africa.

Given the nature of the aggregate HEMIS data and the shortcomings of the methodology outline in Section 2, there is an inherent trade-off between the depth of disaggregation and the accuracy of estimations that can simultaneously be achieved in the analysis. The deeper the level of disaggregation, the more the estimates are likely to be biased by the effects of classification and categorisation errors. The analysis that follows therefore tries to strike a compromise between these trade-offs by focussing on, at most, two dimensions of disaggregation at a time.

## 4.1 Gender, race, and language

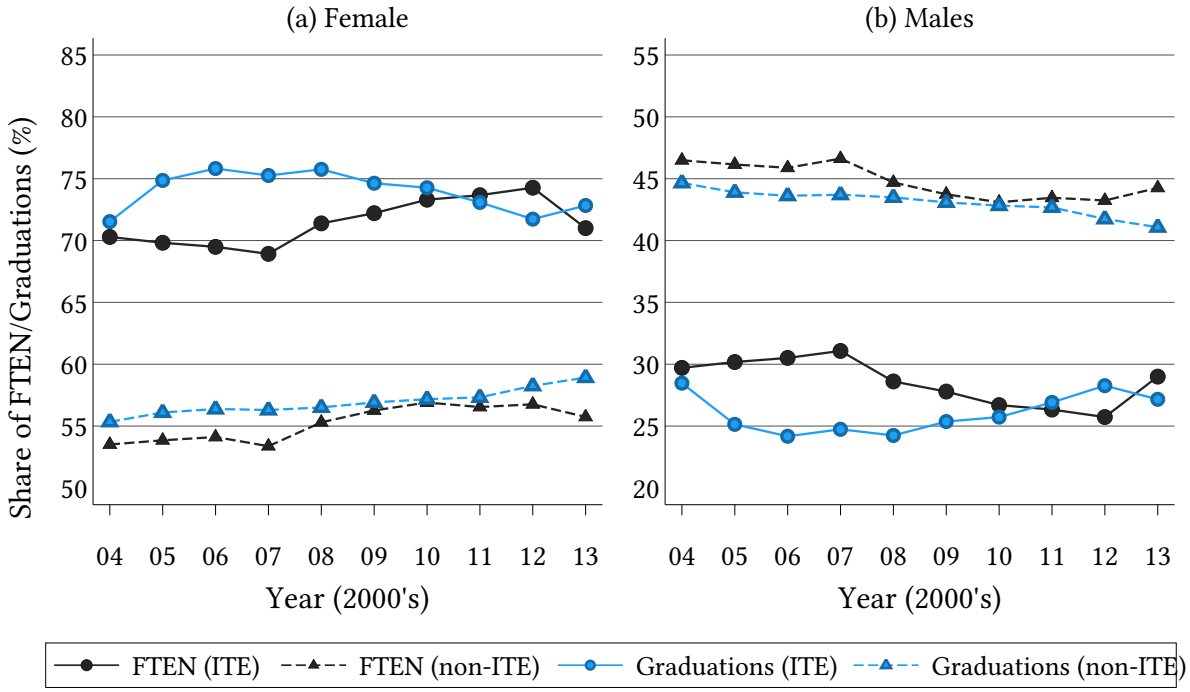
### 4.1.1 Gender

In South Africa, as in many other countries, teaching is primarily a female-dominated profession. At present, females account for around 61% of educators in South African public schools and 66% of educators in public primary schools.[49] Moreover, the data indicates that the female share of practicing teachers is increasing steadily over time. It is therefore perhaps not surprising that females accounted for 72% of all FTEN and more than 73% of all graduations in ITE programmes between 2004 and 2013 (Table A.13). Similar to the trend for FTEN in overall ITE programmes, the female share of FTEN in ITE programmes grew by an estimated 0.6% per annum over the period, rising from a low of 68.9% in 2007 to a high of 74.3% in 2012 (Table A.14 and A.13).

Between 2004 and 2013, the male share of graduations in non-ITE undergraduate degree and postgraduate diploma/certificate programmes gradually declined from 45% to just 41%. By contrast, Figure 4.1 shows that the trend for ITE programmes was nonmonotonic. The number of individuals graduating from ITE programmes declined between 2004 and 2008 and then rose between 2008 and 2013. While this trend is evident for both genders, the rate of decline and rise over the respective periods was greater for males than it was for females. For this reason, the male share of graduations in ITE programmes declined sharply between 2004 and 2008 before rising again thereafter. Over the period as a whole, however, the change in the male/female share of ITE graduates was statistically negligible. For all intents and purposes, the HE system produced just over 7 female ITE graduates for every 3 male ITE graduates in 2013, much the same as it had in 2004.

[49] These estimates are derived from Annual Survey of Schools (ASS) data for the 2000 - 2013 period. Interestingly, (CDE, 2011, p. 10) assert that 67% of teachers in South African public schools are female. However, this claim is not substantiated by the ASS data.

**Figure 4.1:** Shares of FTEN and graduations in ITE and other programmes by gender (2004 - 2013)




NOTES: Figures represent the estimated shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma/certificate programmes for males and females respectively.

The educator gender distribution has traditionally differed markedly across the various school phases in South Africa. It remains the case, for exaemple, that males are, on average, far less likely to specialise in foundation or intermediate phase teaching than females (Mashiya, 2014, p. 25). It is therefore plausible that the skewed gender distribution among newly qualified potential teachers may also imply a skewed distribution in terms of the number of individuals who are qualified to teach in different schooling phases. Unfortunately, in the same way that aggregate HEMIS does not allow for direct identification of BEd or PGCE qualifications, it does not allow for identification of teaching speciality areas. It is therefore not possible asses the extent to which this is the case. However, insofar as phase specialisation choices in ITE programmes have remained delineated along gender lines, the fact that females continue to dominate FTEN in and graduations from ITE programmes may have actually served to mitigate the extent of the current imbalance between the demand for and supply of qualified foundation phases teachers in South Africa.

### 4.1.2 Race

Black participation in HE has grown rapidly over the past 25 years and Blacks now account for the vast majority of HE enrolments in South Africa. The HEMIS data shows that the Black share of total enrolments at public HEIs rose from 59% to over 70% between 2000 and 2013. In the context of widening teacher shortages, it is thus particularly worrying that most studies on teacher production in South Africa have reported dwindling numbers of Black enrolments in ITE programmes throughout the early 2000s. However, while it is true that FTEN in ITE programmes among Blacks declined by about 50%

between 2000 and 2006, Figure 4.2 shows that FTEN in ITE programmes for the group increased by more than 400% between 2006 and 2012. This, despite the fact that Black FTEN in other undergraduate degree and postgraduate diploma/certificate programmes grew by a more modest 70% over the same period. In fact, despite the declines in FTEN between 2004 and 2006 and again between 2012 and 2013, FTEN in ITE programmes among Blacks grew by 14.62%, on average, per annum between 2004 and 2013 (Table A.16). In other words, Black enrolments in ITE programmes have not simply been increasing over the intermediate term, but have done so much faster than Black enrolments in other programmes.[50]

Between 2004 and 2013, the Black share of FTEN in ITE programmes was at least as high as, if not higher than, the Black share of FTEN in other undergraduate degree and postgraduate diploma/certificate programmes (Figure 4.3). It is therefore not surprising that the trends in FTEN in ITE programmes are driven primarily by the trends for Black FTEN in ITE programmes. This also holds true for the trends in ITE graduations, albeit to a somewhat more moderate extent (Figure 4.2 and Figure 4.3).

As mentioned above, the trends in graduations from HE programmes tend to reflect the trends in FTEN with some lag. In the wake of declining Black FTEN in ITE programmes, it is therefore to be expected that the number of Black ITE graduates produced by the public HE would have fallen, as indeed they did between 2000 and 2006.[51] Due to limited data availability, most recent studies on teacher graduate production in South Africa have based their analyses or inferences primarily on data for the 2006 - 2009 period, when the number of Blacks graduating with ITE qualifications and, consequently, the total number of individuals graduating with ITE qualifications, was close to its lowest level. Because of this, the prevailing consensus was that too few Black individuals were entering teacher training and that too few Black teacher graduates were being produced. Figure 4.2 makes it clear that the scenario regarding ITE graduate production has changed considerably since 2009.

In 2013, the public HE system produced an estimated 15 610 ITE graduates of whom roughly 9 400 were Black (60%), 1 190 were Coloured (8%), 7 70 were Asian (5%), and 4 250 were White (27%). Figure 4.3 shows how the respective shares of FTEN and graduations in ITE and other programmes changed for each race group between 2004 and 2013. The fact that the trends for Whites are more-or-less the inverse of the equivalent trends for Blacks follows logically from the fact that the two groups collectively account for the vast majority (89% between 2004 and 2013) of all ITE FTEN and graduations from public HEIs. Thus, when the number of ITE graduations among Black students fell between 2004 and 2008 while it continued to grow among White students, the White share of ITE graduates more than doubled (Table A.15).

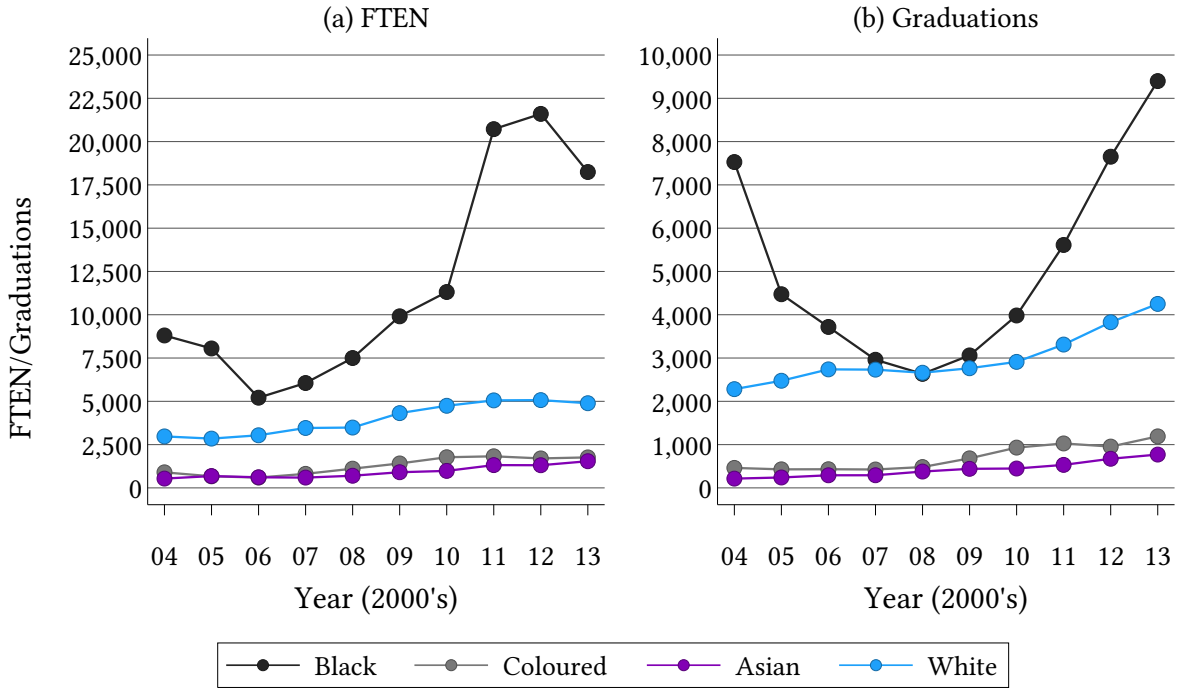
Contrary to the trend for Blacks, the number of White ITE graduations rose consistently between 2004 and 2013. However, because the number of Black ITE graduations has grown so rapidly since 2008, the White share of graduations has again declined (Figure 4.3). In fact, despite the rapid growth in the number of Coloured and Asian ITE graduations between 2004 and 2008[52], the relatively more rapid growth in the number of Black ITE graduations since 2008 means that the collective share for the two former race groups remained just over 12% in 2013.

[50] Crucially, it is the nonmonotonic nature of the changes in Black FTEN in ITE programmes over the period that is responsible for the statistical insignificance of the average rate of growth between 2004 and 2013 (Table A.16).

[51] An exception to this is the year 2004 when there was a sudden spike in the number of Black ITE graduates produced at public HEIs.

[52] Coloured and Indian individuals collectively represented 14.6% of FTEN and 16.7% of ITE graduations in 2010.

**Figure 4.2:** FTEN and graduations in ITE programmes by race (2004 - 2013)




NOTES: Figures represent the estimated number of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes for the Black, Coloured, Asian, and White population groups respectively.

### 4.1.3 Gender and Race group

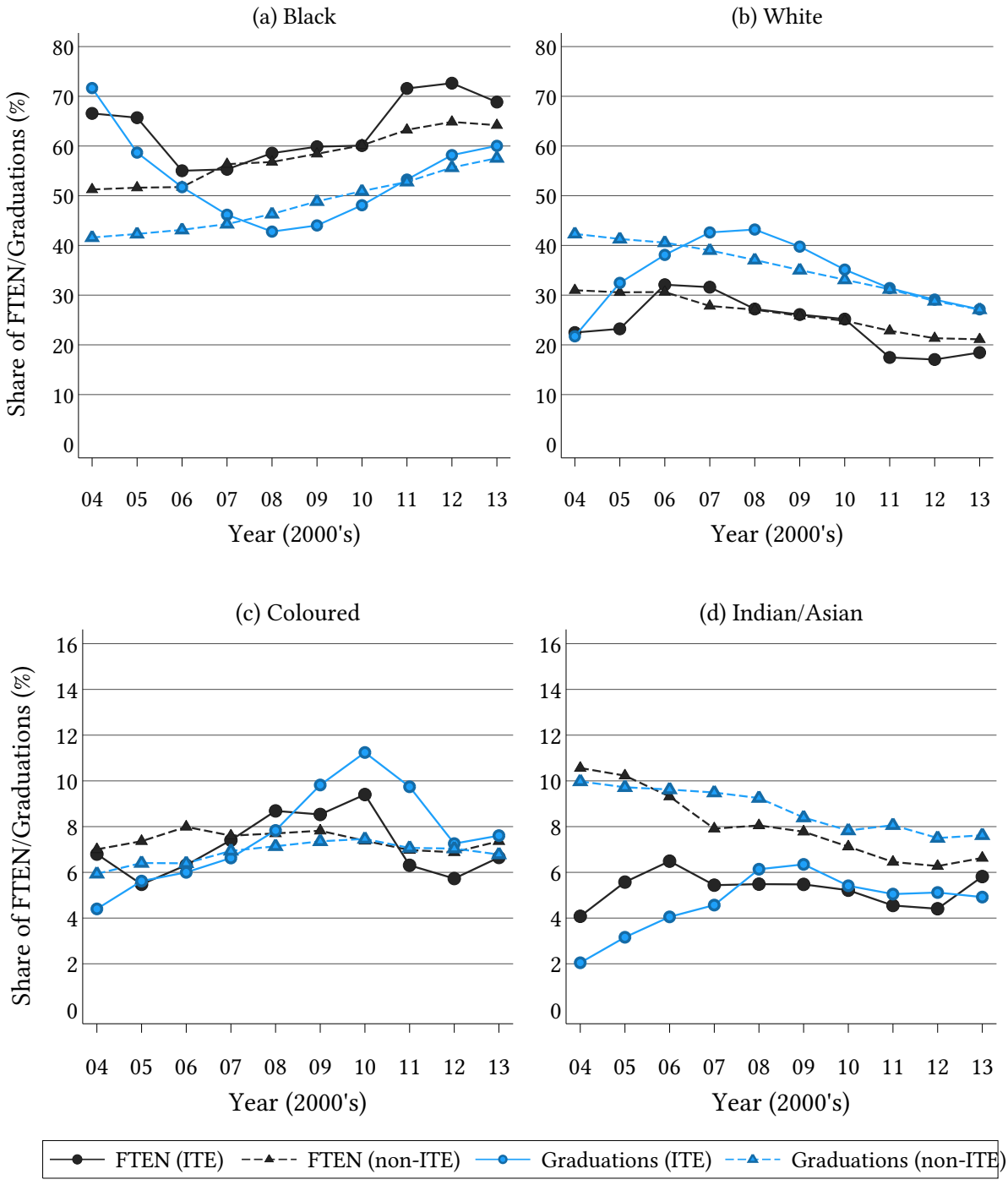
Having established that females and Blacks dominate FTEN and graduations in ITE programmes, it is useful to consider the interaction of race and gender and evaluate the potential differences in gender distribution levels and trends within each race group.

Figure 4.4 reveals that the extent to which females dominate ITE FTEN and graduations varies between race groups. Despite changes in the respective intra-race gender distributions between 2004 and 2013, it is evident that males represent a significantly greater share of ITE FTEN and graduations within the Black race group than within other race groups. Moreover, the data indicates that the male share of Black ITE graduations may be increasing over time. In 2013, more than 33% of Black ITE graduates in were male, compared to 23% for Coloureds, 15% for Asians/Indians, and 17.5% for Whites (Table A.17 and Figure 4.4).

These results suggest that males' propensity to enrol in ITE programmes, although low in general, may be highest within the Black population.[53] One potential reason why this might be the case is if weak secondary school performance limits the field of study choices that are available to Black males more so than it does for males in other race groups, effectively pushing more Black males to enrol in ITE programmes. Alternatively, it may be that Black males who choose to enrol in ITE programmes have comparatively greater access to funding via NSFAS loans or Funza Lushaka bursaries than their peer

[53] Even so, the number of Black males entering ITE programmes for the first time in 2013 was only around 5% higher than the number of Black females that entered such programmes in 2004.

**Figure 4.3:** Shares of FTEN and graduations in ITE and non-ITE programmes by race (2004 - 2013)

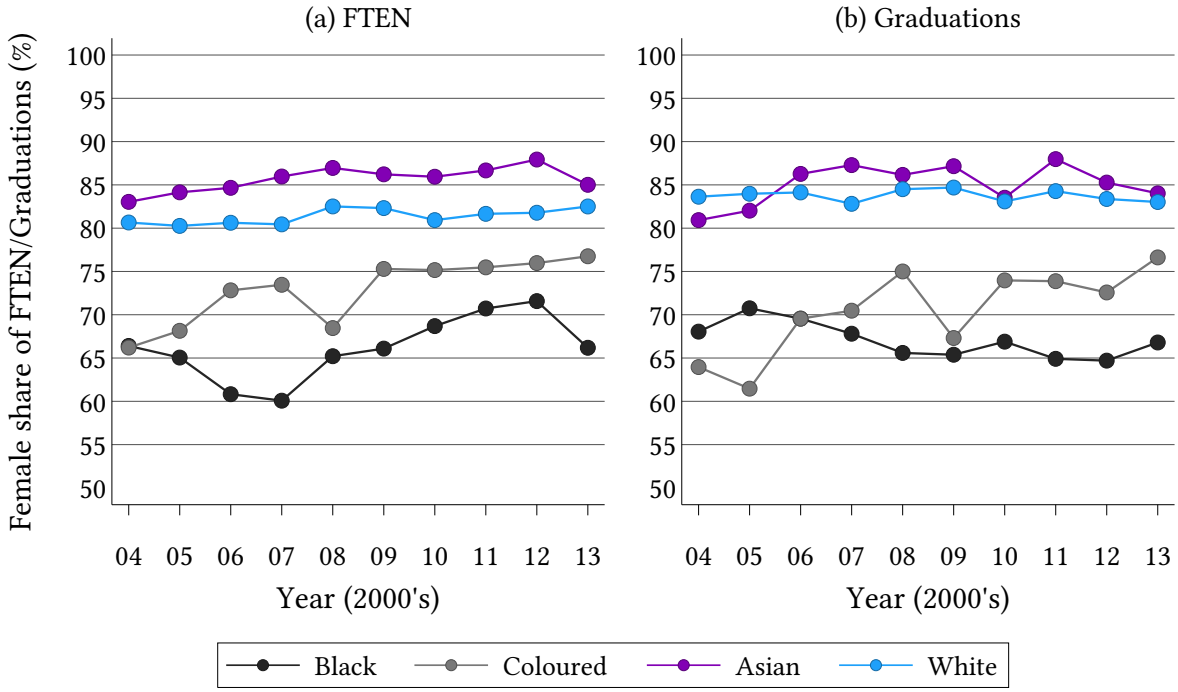



NOTES: Figures represent the estimated racial shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes as well as in other non-ITE undergraduate degree and postgraduate diploma/certificate programmes.

groups. However, without more detailed and reliable data with which such hypotheses could be tested, this remains largely conjecture. Moreover, it should be noted that the estimated average annual rate of growth in FTEN in ITE programmes for Black males between 2004 and 2013 was not statistically significantly higher than the estimated growth rates for Coloured or Indian/Asian males (Figure 4.5).

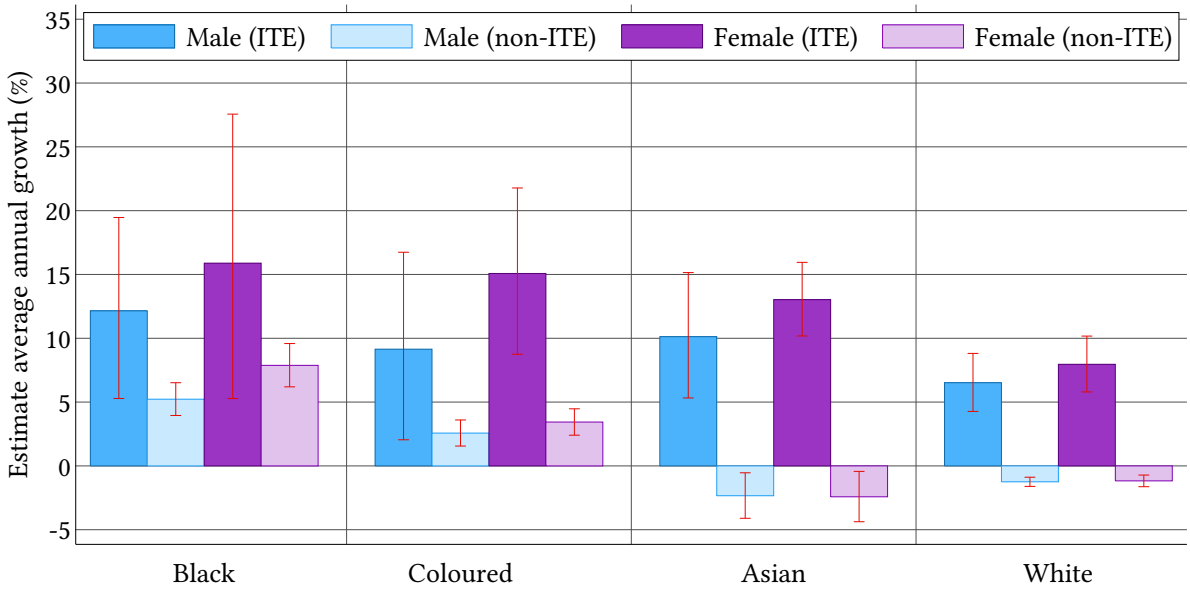
As noted above, one of the primary reasons why the trends in intra-race gender distributions are of

**Figure 4.4:** Female share of FTEN and graduations in ITE programmes within race (2004 - 2013)




NOTES: Figures represent the estimated female shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes for the Black, Coloured, Asian, and White population groups respectively.

**Figure 4.5:** Estimated average annual growth rates in FTEN in ITE and non-ITE programmes by gender and race (2004 - 2013)




NOTES: Bars represent the estimated average annual growth rates (%) in FTEN in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma/certificate programmes for males and females by population group over the period and were estimated using the least-squares methodology described in Appendix C. Capped lines represent the 95% confidence intervals surrounding the each point estimate.

importance is that male and female ITE students have traditionally been found to specialise in very

different teaching areas and school phases in general (Mashiya, 2014, pp. 25 - 26). The aforementioned differences in underlying intra-racial gender distributions are thus likely to have important bearing on the types of newly qualified potential teachers that are produced by the HE system.[54] However, such a hypothesis cannot be tested with the available HEMIS data. What is clear is that three groups effectively dominate new ITE graduates. For every 10 ITE graduates produced in 2013, approximately 4 were Black females, 2 were Black males, and just over 2 were White females. In fact, these three groups constituted more than 80% of all ITE graduates produced by public HEIs between 2004 and 2013.

### 4.1.4 Home Language

A number of studies have pointed to the need to vastly increase the number of African language mother-tongue teachers in South Africa, particularly in the foundation phase (FP) (CHEC, 2009, p. xxxviii). DBE and DHET (2011, p. 12) estimates that the public HE system should be producing at least 4 300 African mother-tongue teachers, 750 Afrikaans mother-tongue teachers and 450 English mother-tongue teacher per annum just to replace the number of FP teachers leaving the profession. These estimates are far in excess of what the system has been producing thus far. DOE (2006, p. 10) estimates that out of the roughly 6 000 ITE graduates produced in 2006, only 50 were African language mother-tongue speakers specialising in FP education. DHET (2010, p. 2) similarly shows that only 168 African mother-tongue speakers qualified to teach in the FP in 2009.

Approximately 95% of Black individuals who enrol in ITE programmes at South African public HEIs are African language mother-tongue speakers. The trends in African mother-tongue ITE FTEN and graduations between 2004 and 2013 are therefore virtually identical to the trends for Blacks as discussed above (Figure 4.6 and Figure 4.2). It is evident that there was a significant rise in the number of African mother-tongue speakers enrolling in and graduating from ITE programmes since 2006/2007 (Figure 4.6). The public HEI system produced an estimated 8 730 African language mother-tongue ITE graduates in 2013, accounting for roughly 66% of all ITE graduations for the year (Table A.15).

It is important to evaluate the estimated number of African mother-tongue ITE graduates produced by the HE system relative to the demand for African language FP teachers. Only a small portion of all ITE graduates specialise in areas that would make them qualified to teach in the FP. For example, Green *et al.* (2014, p. 6) find that only 17.1% of all ITE graduates produced by the public HE system between 2008 and 2012 specialised in FP teaching. [55] There are indications that these percentages may be much lower still for Black ITE students (DHET, 2010, p. 2).[56]

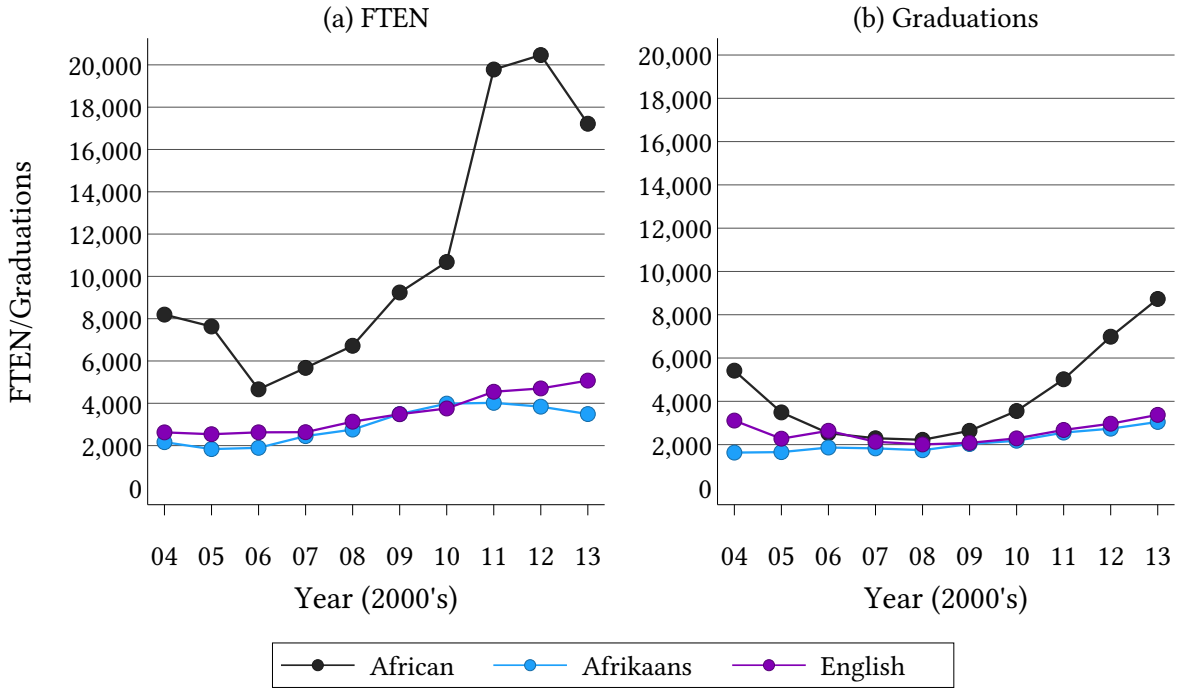
Unfortunately, aggregate HEMIS does not allow identification of the specialisation areas of ITE students. However, even if one were to abstract from likely distributional differences and assume that

[54] The gender composition may, for example, have implications for the supply of maths and science teachers in the FET phase, given that different genders and race groups tend to have different likelihoods of specialising in such fields.

[55] Similarly, DHET (2011*b*, pp. 8 - 9), shows that only 25% (1 121) of all BEd and less than 9% (220) of all PGCE students who graduated in 2009 were qualified to teach in the FP.

[56] The aggregate HEMIS data indicates, for example, that only 2 638 of the estimated 6 953 ITE graduates produced in 2009 were African language mother-tongue speakers (Table A.20). If it is true that only 168 African mother-tongue speakers qualified to teach in the FP in 2009 (DHET, 2010, p. 2), this would mean that only about 6.4% of the African mother-tongue speaking ITE graduates produced that year specialised in FP education.

**Figure 4.6:** FTEN and graduations in ITE programmes by home language (2004 - 2013)



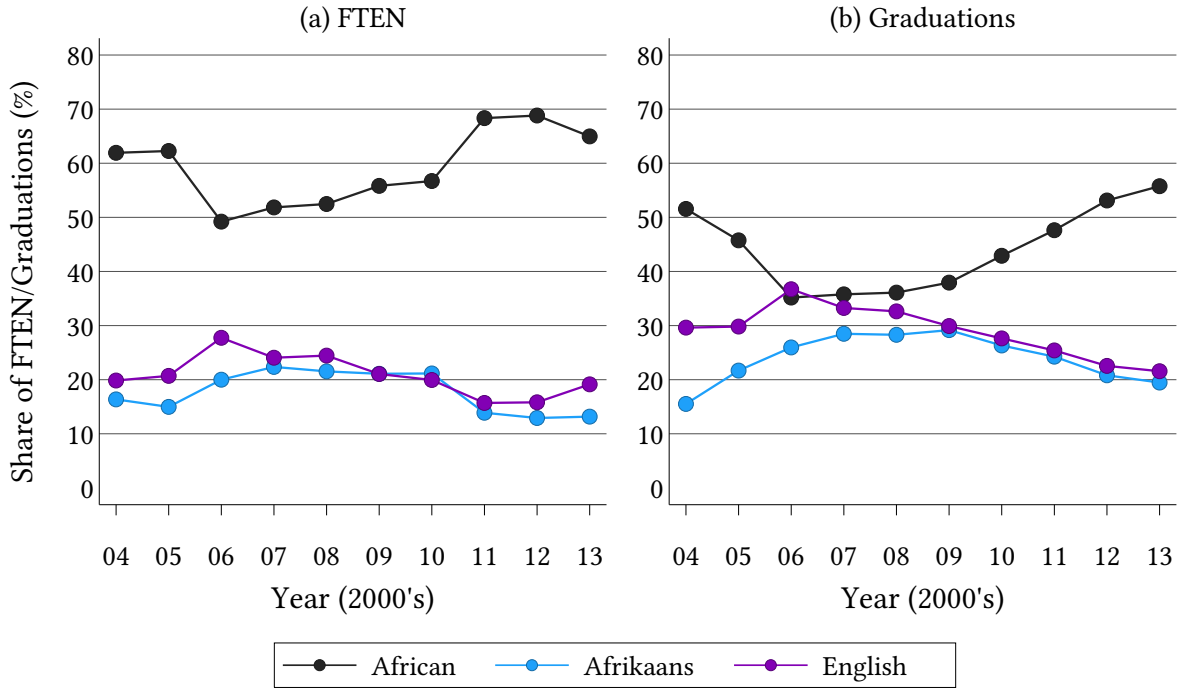

NOTES: Figures represent the estimated numbers of first-time enrolments (FTEN) and graduates in undergraduate and postgraduate ITE programmes by home language. "African" languages include Setswana, Tshivenda, Xitsonga, isiXhosa, isiNdebele, isiZulu, seSotho, seSotho sa Lebowa, and siSwati.

about 18% of all ITE graduates specialise in FP education, regardless of their home language, the HEMIS data indicates that the public HE system would still only have produced about 1 300 African language mother-tongue FP ITE graduates in 2013.[57] This figure is likely to be a significantly inflated estimate of the actual number of African language mother-tongue FP ITE graduates produced in 2013 given that Green *et al.* (2014, p. 18) find that only 701 of the FP ITE graduates produced by contact HEIs in 2012 were African language mother-tongue speakers.[58] However, even if it was accurate, it would still amount to less than a third of the estimated 4 300 African mother-tongue FP teachers that are leaving the teaching profession in South Africa every year (DBE and DHET, 2011, p. 12). This suggests that the HE system is still not producing anywhere near enough African-language FP teachers and, moreover, that it is highly unlikely to start doing so any time in the near future. In fact, DHET's own projections suggest that the public HE system can be expected to produce no more than 3 880 effective new FP ITE graduates in total in 2019 (Green *et al.*, 2014, p. 14).

[57] This figure is estimated as 18% of all undergraduate and all postgraduate ITE graduates produced by the 15 HEIs that offer FP ITE programmes in South Africa in 2013, based on aggregate HEMIS data (DBE, 2009, pp. 8 - 11).

[58] Information on phase specialisation and home language was not available for Unisa in 2012. Yet, even if one were to assume that all of Unisa's FP ITE graduates for 2012 were African language mother-tongue speakers, this would still imply that only 1219 FP ITE graduates produced in 2012 were African language mother-tongue speakers.

**Figure 4.7:** Shares of FTEN and graduations in ITE programmes by home language (2004 - 2013)




NOTES: Figures represent the estimated shares (%) of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by home language. "African" languages include Setswana, Tshivenda, Xitsonga, isiXhosa, isiNdebele, isiZulu, seSotho, seSotho sa Lebowa, and siSwati.

## 4.2 Geography

The South African schooling system is spatially heterogeneous along a range of dimensions that affect both the demand for and the supply of teachers. Differences in population density (DOE, 2005*b*, p. 33), socio-economic status (HSRC, 2013, p. 115), urbanisation (DOE, 2006, p. 10), teacher attrition rates (HSRC, 2005, p. 41), pupil-teacher ratios (OECD, 2013, p. 80), average class sizes (DBE and DHET, 2011, p. 31), educator age-profiles (DOE, 2005*b*, p. 10), and numerous other factors imply that the numbers and types of teachers that are required in schools vary between provinces and districts. It is widely accepted, for example, that the shortage of teachers is greatest in rural areas and poor communities and, therefore, that the demand for qualified teachers who are either willing to teach in such areas or can be incentivised to do so is comparatively high (CDE, 2011, p. 10).

Geographical location also plays an important role in HE in South Africa, given that public universities are spread unequally between provinces. While Gauteng, the largest and most urbanised province, is home to five separate contact HEIs, Mpumalanga, North West, and the Northern Cape each have just one university, two of which only opened in 2014.[59] The size, function, and quality of HEIs also vary between provinces. The University of Zululand in Kwazulu-Natal, for example, is a relatively small HEI in terms of total enrolments, accounting for just 1.52% of all enrolments in public HEIs between 2004

[59] Though the University of Mpumalanga (Mpumalanga) and Sol Plaatje University (Northern Cape) respectively offer the *Bachelor of Education degree in Foundation Phase Teaching* and the *Bachelor of Education in Senior Phase & FET Teaching* programmes, these institutions only started enrolling students in February 2014. As a result, neither HEI will have produced any ITE graduates yet.

and 2013 (Table A.21). However, in terms of its share of enrolments and graduations in ITE programmes, it is the largest contact HEI in the country and between 2004 and 2013, produced more ITE graduates than all of the HEIs in the Free State and Limpopo combined (Table A.21).

The spatial distribution of South Africa's HEIs invariably influences if, where, and what individuals ultimately study at university. Because of this, CHEC (2013, p. 18) points to the existence of significant *"spatial inequalities in the distribution of higher education opportunities"* in the country. This is particularly relevant in the context of teacher training. CHE (2010, p. 14) and others have argued that the decline in FTEN in ITE programmes between 1995 and the early 2000s can partly be ascribed to the fact that, in contrast to former teacher colleges which were both relatively numerous and spread across urban as well as rural areas, South Africa's 23 public HEIs are mostly concentrated in the urban centres of the richest provinces (DBE and DHET, 2011, p. 22).[60] This geographical "narrowing" in access, in conjunction with the substantially larger financial cost involved in attending university, is believed to have precluded many who may otherwise have sought to become teachers from enrolling in ITE programmes (CEPD, 2009*a*, p. 17).[61]

In addition to affecting access to ITE programmes, the spatial distribution of HEIs may also be important for understanding the spatial distribution of newly qualified teacher supply. Qualitative research suggests that, given the significant financial investments required to attend university, new ITE graduates often face strong incentives to first search for teaching jobs near the HEIs where they studied before they consider looking for teaching positions in more rural areas (SACE, 2011, p. 15). However, Boyd *et al.* (2003, p. 10) finds that new ITE graduates are most likely to search for teaching jobs in areas that are near to or at least similar to the areas where they originally come from. Which of these theories best characterises South Africa is unclear, although there appears to be at least some evidence in favour of the notion that new ITE graduates prefer to search for employment in the provinces where they studied (Cosser, 2009; DOE, 2005*b*).

Just as it is important to know where the demand for teachers is highest, it is important to know where ITE students are studying and where they come from. To shed light on the regional trends and differences in access to ITE programmes and the production of newly qualified potential teachers between 2004 and 2013, this section therefore considers provincial patterns of FTEN and graduations in ITE programmes firstly in terms of the province of enrolment/graduation (i.e. the province in which the HEI attended is located) and, secondly, in terms of the provinces that ITE students/graduates come from.

### 4.2.1 HEI location and province of enrolment for ITE students

Table A.21 shows the provincial distribution of South Africa's 23 public HEIs and the relative contribution of each HEI/province to total enrolments and graduations in the country between 2004 and 2013.[62]

[60] It should be noted that Mangosuthu University of Technology does not offer ITE programmes.

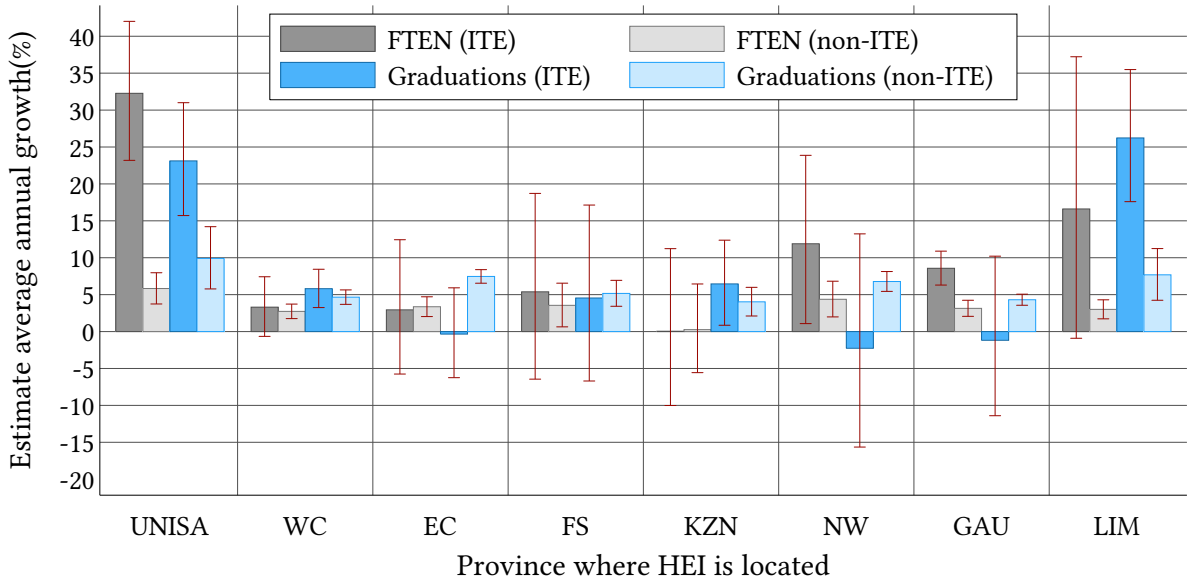
[61] The incorporation of colleges of education into the HE system is believed to have had a particularly negative impact on the training of Grade R and Foundation Phase teachers (Chisholm, 2009, p. 24).

[62] As noted above, the University of Mpumalanga (Mpumalanga) and Sol Plaatje University (Northern Cape) only opened in 2014 and is thus not included in the HEMIS data before 2014.

It is clear that HEIs have different programme structures and that some make larger/smaller contributions to the production of ITE enrolments/graduations than they do to overall enrolments/graduations. Gauteng, Limpopo, and the Western Cape are the only provinces to have made smaller contributions to the production of ITE graduates than they did to the production of total graduates between 2004 and 2013. However, this is partly due to the fact that, as discussed in Section 3.3.1, Unisa's share of ITE graduations is significantly greater than its share of overall graduations.

If one excludes Unisa, the majority of FTEN and graduations in ITE programmes come from HEIs in KwaZulu-Natal and Gauteng. Between 2004 and 2013, more than 48% of all FTEN in ITE programmes and 45% of all ITE graduates produced by contact institutions came from universities in these two provinces (Table A.22).[63] However, the respective provincial shares of ITE FTEN and graduations for most provinces fluctuated substantially over the period and, with the exception of Limpopo, all provinces experienced a general decline in share relative to Unisa where FTEN and graduations in ITE programmes continued to grow far more rapidly than it did at contact institutions.

**Figure 4.8:** Estimated average annual growth rates in FTEN and graduations in ITE and non-ITE programmes by province of HEI (2004 - 2013)




NOTES: Bars represent the estimated average annual growth rates (%) in FTEN and graduations in undergraduate and postgraduate ITE programmes and other non-ITE undergraduate degree and postgraduate diploma/certificate programmes over the period by province of enrolment (i.e. the province in which the HEI attended is located) and were estimated using the least-squares methodology described in Appendix C. Capped lines represent the 95% confidence intervals surrounding the each point estimate. Unisa is included as a separate category as it is not physically confined to a specific province.

Because of the fluctuations in enrolments and graduations over time, inferences regarding trends in FTEN from comparisons of the yearly estimates in Table A.22 can be misleading. Figure 4.8 shows that North West, Gauteng, and Limpopo were the only provinces in which there were significant positive average annual growth in ITE FTEN between 2004 and 2013. These were also the only provinces in which FTEN in ITE programmes grew statistically significantly faster, on average, than FTEN in other

[63] The HEIs located in KwaZulu-Natal are the Durban University of Technology (DUT), the University of Kwazulu-Natal (UKZN), and the University of Zululand. In Gauteng, the HEIs are the Tshwane University of Technology (TUT), the University of Johannesburg (UJ), the University of Pretoria (UP), and the University of the Witwatersrand (WITS)

undergraduate degree and postgraduate diploma/certificate programmes. In all of the other (Southern) provinces, average growth in ITE FTEN was either statistically negligible, or not statistically different from the growth in FTEN for other programmes. Over the period as a whole, these latter provinces represented approximately 62% of all FTEN in ITE programmes at contact HEIs. This reiterates the point that, as shown in Section 3.3.1, average annual growth in ITE FTEN at contact HEIs since 2004 has been very limited in general.

Only three provinces had statistically significant positive average annual growth in ITE graduations, namely the Western Cape, Kwazulu-Natal, and Limpopo (Figure 4.8) . Of these, Limpopo was the only province in which ITE graduations grew statistically significantly faster on average than graduations in other undergraduate degree and postgraduate diploma/certificate programmes. While this comparatively rapid relative growth should be viewed in a positive light, it needs to be borne in mind that Limpopo has the smallest share of ITE graduations among the provinces, contributing less than 4% of all ITE graduates in the country between 2004 and 2013 (Table A.22).

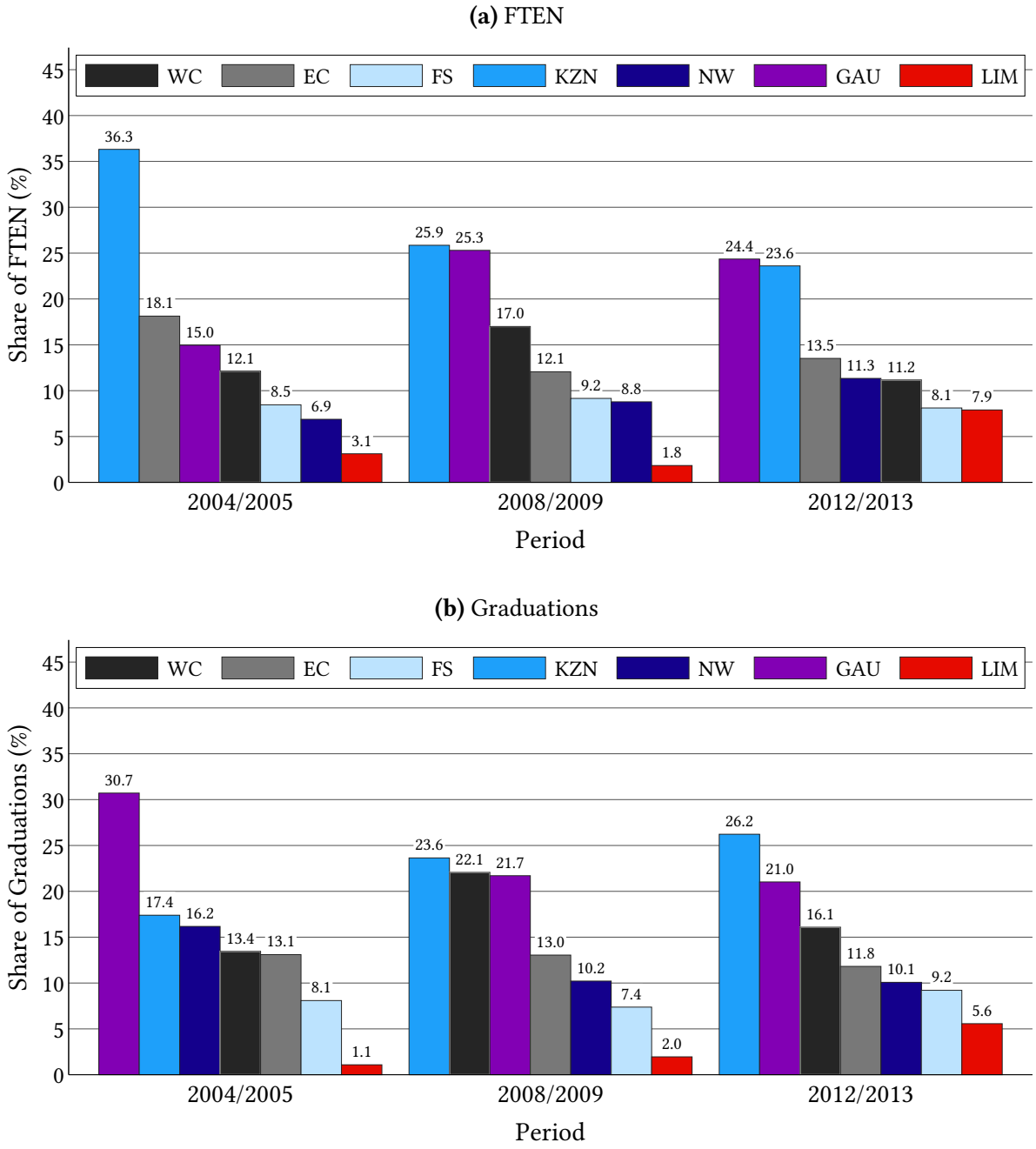
Figure 4.9 shows the shares of ITE FTEN and graduations at contact institutions by province of enrolment/graduation for three periods between 2004 and 2013. This graph highlights three important aspects regarding the spatial distribution of entering ITE students and newly qualified potential teachers at contact institutions.

First, the relative provincial shares of ITE FTEN and graduations are not constant. This is evident from the number of significant changes that occurred over the relatively short period of time. For example, between 2004/2005 and 2008/2009, the contribution of KwaZulu-Natal's HEIs to the production of ITE graduates among contact HEIs dropped from a dominant 30.7% to just 21.7% (the 3rd largest share). Similarly, Limpopo's share of FTEN in ITE programmes increased more than four-fold between 2008/2009 and 2013/2014. From this it should be clear that it would be imprudent to base any evaluation of the relative contributions of HEIs and provinces to teacher production on a single point in time. Sadly, because of restrictions on available data, this is generally what is done (CEPD, 2009*c*, pp. 23 -26).

Second, despite general fluctuations in provincial shares, Gauteng and Kwazulu-Natal's collective shares of FTEN and graduations has remained fairly stable over time. While Kwazulu-Natal's share of FTEN has declined because of stagnant growth, this has been offset by Gauteng's rising share. The converse is true for the provinces' respective shares of graduations. As a result, the two provinces accounted for around 49% of FTEN and 46% of graduations at contact institutions by the end of 2013, more or less as they had done in 2004.

Third, and perhaps most importantly, for any particular period under consideration there may be significant differences between a province's share of the number of individuals entering ITE programmes and its share of the number of individuals successfully completing ITE programmes. However, these differences do not necessarily convey any meaningful information about institutional efficiency or ITE student throughput. Rather, it is worth noting again that graduations tend to lag behind FTEN. In many ways, the shares of FTEN in ITE programmes thus provide an indication of how the shares of ITE graduations are likely to change in the short run.

**Figure 4.9:** Shares of FTEN and graduations in ITE programmes at contact HEIs by province of enrolment/graduation (2004 - 2013)




NOTES: Bars represent the estimated shares (%) of FTEN and graduations in undergraduate and postgraduate ITE programmes at contact HEIs by province of enrolment/graduation.Provinces are Western Cape (WC), Eastern Cape (EC), Free State (FS), KwaZulu-Natal (KZN), North West (NW) , Gauteng (GAU), and Limpopo (LIM). Years are grouped together to mitigate effects of year-on-year fluctuations in FTEN and graduation numbers.

### 4.2.2 Sending regions

The province of enrolment/graduation provides a useful way of gauging how the physical location of HEIs in South Africa impacts access to ITE programmes and the production of ITE graduates in different provinces. It is also often used to draw inferences about the spatial distribution of newly

qualified potential teachers in the country. However, there are at least two reasons why it should not be used as a definitive measure for this purpose.

First, since Unisa is a distance education provider and thus not physically confined to a single province, the province of enrolment/graduation does not give any information regarding the provincial domiciles of individuals who enrol in or graduate with ITE qualifications at Unisa. Even if it were the case that individuals who graduate with ITE qualifications are more likely to seek employment near the HEIs they attended than near the areas they originally come form, it thus remains unclear where Unisa's ITE graduates are likely to seek employment. Given that Unisa accounts for by far the largest share of FTEN and graduations in ITE programmes in the country, this is clearly problematic.

Second, while it may seem reasonable to assume that individuals generally choose to study at HEIs located in the provinces where they are resident, there are bound to be exceptions to this rule. For various reasons, some students may elect to study at specific institutions that are located outside their own provinces. Others may have no other alternative but to enrol at a university in another province. Prior to 2014, for example, it was not possible for individuals from Mpumalanga or the Northern Cape to enrol at contact HEIs in those provinces. Insofar as the spatial distribution of ITE graduates conveys information about the areas where those graduates may seek employment as teachers, it is therefore not just of interest to know where individuals study, but also where they come from.

The extent to which the province of enrolment/graduation differs from the province from which students hail is rarely investigated, primarily because the data required to do so is generally not available. However, the availability of residential postal code information in HEMIS makes it possible to identify the provinces where students originally come from (hereafter referred to as sending regions).[64] This not only means that one can determine where Unisa ITE students/graduates reside, but also where ITE students who graduate from contact institutions may return to after graduation.

CHE (2010, pp.79 - 80) states that *"there is sufficient unverified evidence to indicate a reasonably close correlation between province of study and home province"*. However, the HEMIS data indicates that the extent to which this is true varies considerably between provinces. Tables A.24 and A.25 show the shares of FTEN and graduations in ITE programmes between 2004 and 2013, disaggregated by province of enrolment/graduation and sending region.

The highest correlation between province of enrolment/graduation and sending region is in KwaZulu-Natal. More than 95% of individuals entering ITE programmes and 92% of individuals graduating with ITE qualifications at HEIs in KwaZulu-Natal indicated that they were KwaZulu-Natal residents. In other provinces, non-residents represented far greater shares of total FTEN and graduations. For example, less than 60% of all students entering ITE programmes and only 50% of ITE graduates at HEIs in Gauteng over the period were residential in Gauteng. Moreover, the number of Gauteng residents entering ITE programmes and graduating with ITE qualifications in the North West province over the period exceeded the number of North West residents who did so. Overall, more than a quarter of all FTEN in

[64] HEIs capture students' home addresses when they formally register for academic programmes. To ensure that these addresses reflect where students originally come from, HEMIS requires that the permanent residential address submitted by HEIs may not be the same as the student's semester or term address. (DOE, 2014, DATA ELEMENTS 011 TO 020)

ITE programmes and nearly 31% of ITE graduates produced at contact institutions between 2004 and 2013 were non-residents in the province of enrolment/graduation.

In terms of the provincial origins of Unisa's ITE students, Table A.29 reveals that an estimated 55.5% and 20.9% of all FTEN in ITE programmes respectively came from KwaZulu-Natal and Gauteng. Collectively, these two provinces thus accounted for more than three in every four FTEN in ITE programmes at Unisa over the period. Similarly, 64.6% of the ITE graduates produced by Unisa during this time came from KwaZulu-Natal (35.3%) and Gauteng (29.3%).

Given that Unisa is a distance-education provider, it theoretically affords individuals who are unable to access contact HEIs because of barriers to physical access the opportunity to enrol in HE programmes, regardless of where they live. As such, one may have expected Unisa to contribute to a more equal distribution of graduates across provinces. However, because of the highly unequal spatial pattern of enrolments in ITE programmes at Unisa, this has not been the case. In fact, Table A.25 shows that, in terms of sending regions, the spatial distribution of South Africa's ITE graduates is actually more unequal between provinces when one includes Unisa than when one only considers contact HEIs. Specifically, the pattern of ITE graduate production at Unisa reinforces the extent to which Gauteng and KwaZulu-Natal dominate the overall production of ITE graduates in South Africa.

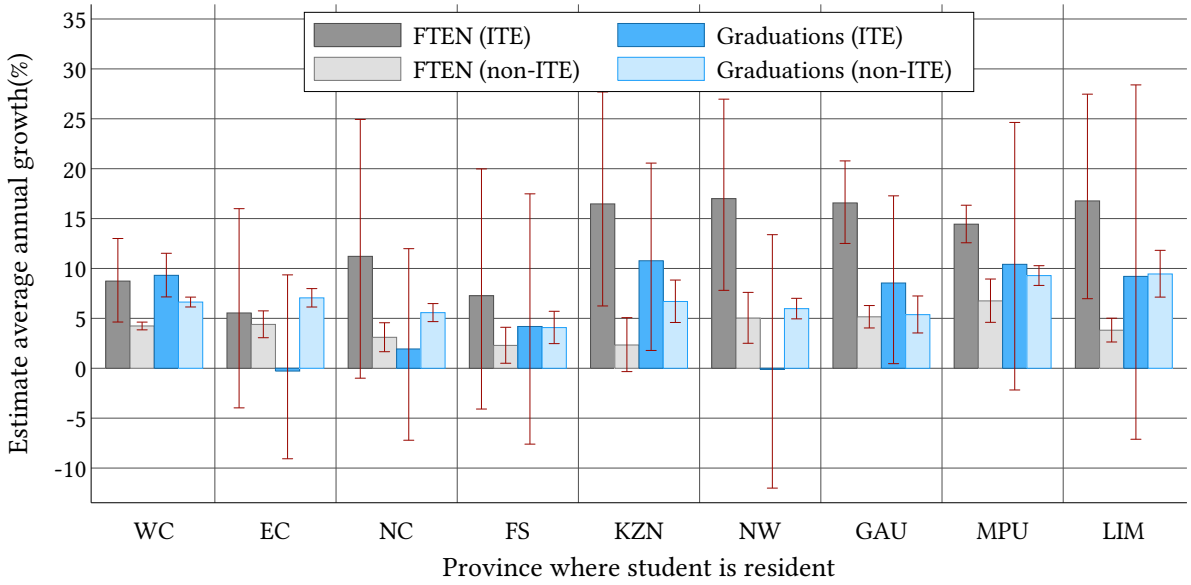
As in the case of the province of enrolment/graduation, the respective provincial shares of ITE FTEN and graduations in terms of sending regions fluctuated between 2004 and 2013 (Table A.26). However, Figure 4.10 shows that there was positive and statistically significant average annual growth in ITE FTEN for virtually all of the sending regions over the period. In fact, with the exception of the Eastern Cape, FTEN in ITE programmes grew significantly faster, on average, than FTEN in other undergraduate degree and postgradaute diploma/certificate programmes in all sending regions. As expected, the average rate of growth in ITE graduations was lower than the growth in FTEN for all sending regions other than the Western Cape. The Western Cape, KwaZulu-Natal, and Gauteng were also the only provinces in which ITE graduations grew faster, on average, than graduations in other undergraduate degree and postgraduate diploma/certificate programmes.

A comparison between Figure 4.11, which shows the shares of ITE FTEN and graduations by sending region between 2004 and 2013, and Figure 4.9 reveals some interesting findings. First, for virtually every period under consideration, KwaZulu-Natal's share of FTEN and graduations in ITE programmes was substantially larger in terms of sending region than it was in terms of the province of enrolment. Second, while KwaZulu-Natal's share of ITE FTEN as province of enrolment fell between 2004 and 2013, its share has not fallen in terms of sending region and may actually have increased slightly between 2008/2009 and 2012/2013. Third, because of the extent to which individuals from Gauteng and KwaZulu-Natal dominate FTEN in ITE programmes at Unisa - a dominance which has only grown over time - the two provinces' collective share of ITE FTEN and graduations grew substantially between 2004 and 2013.

### 4.2.3 Spatial distribution of ITE graduates and teacher supply

By 2013, nearly 72% of all students entering ITE programmes and 68% of all ITE graduates in South Africa's public HE system came from just three provinces: KwaZulu-Natal, Gauteng, and the Western

**Figure 4.10:** Estimated average annual growth rates in FTEN and graduations in ITE and non-ITE programmes by sending province (2004 - 2013)



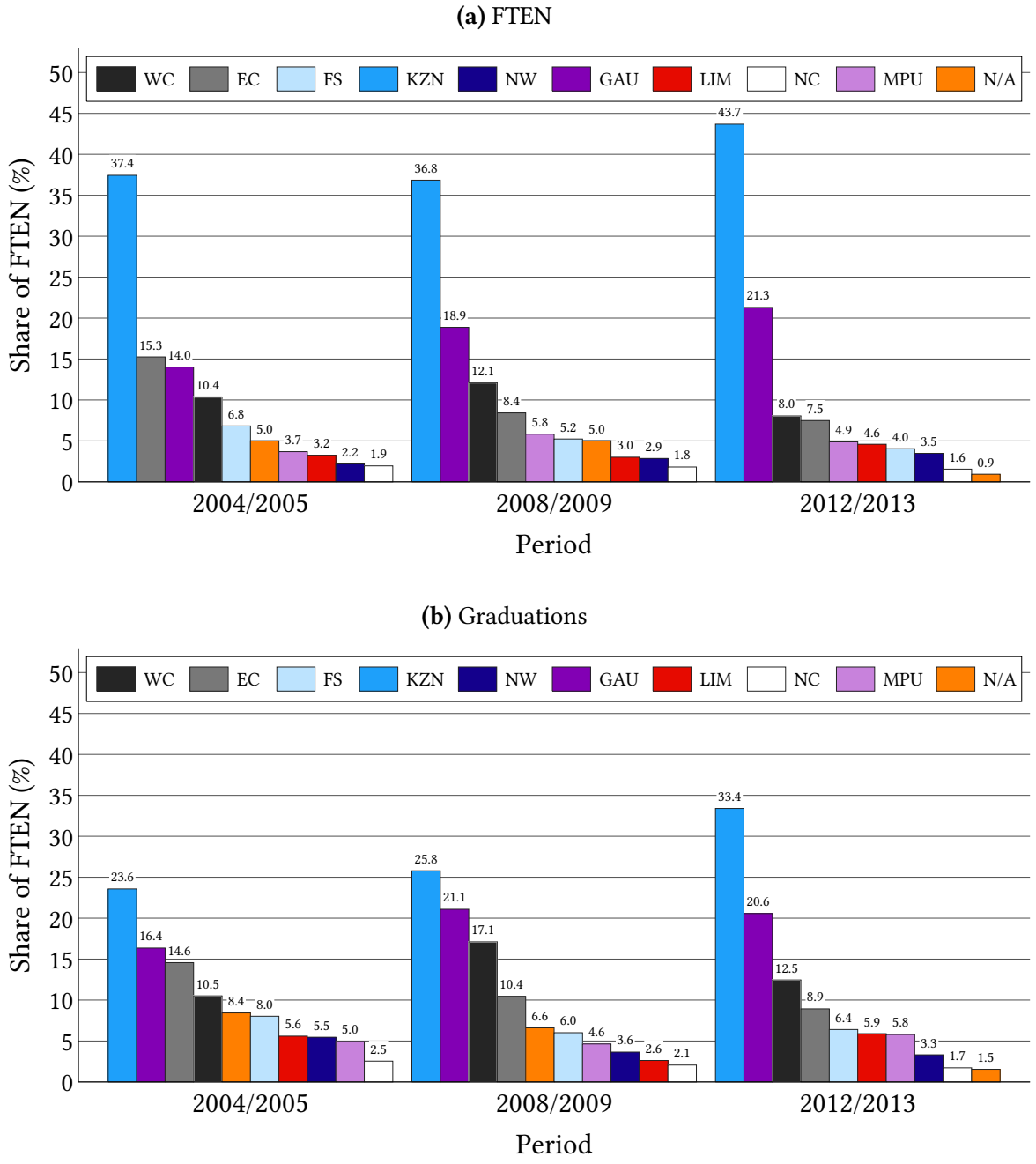

NOTES: Bars represent the estimated average annual growth rates (%) in FTEN and graduations in undergraduate and postgraduate ITE programmes and other non-ITE undergraduate degree and postgraduate diploma/certificate programmes over the period by sending region (province of permanent residence) and were estimated using the least-squares methodology described in Appendix C. Capped lines represent the 95% confidence intervals surrounding the each point estimate.

Cape. These provinces were also the province of graduation for 63% of all graduations in ITE programmes at contact HEIs in 2013. Regardless of whether or not sending regions are a better proxy for the provincial distribution of newly qualified potential teachers than the province of graduation, it is thus clear that teacher production in South Africa is highly unequal across provinces. This begs the question of how this unequal distribution is likely to affect teacher supply in the various provinces.

To truly understand where ITE graduates from different sending regions and HEIs supply their labour, it would be necessary to track them to the areas where they search for and ultimately find employment as teachers. However, this would require the ability to link student records from the HEMIS data to teacher employment records in PERSAL. Sadly, even if one were to ignore the fact that public use of either of these data sources is severely restricted, to the author's knowledge, there is currently no way of linking records between HEMIS and PERSAL.

In the absence of a way of explicitly matching newly qualified potential teachers with newly employed teachers in the public school system, it is nevertheless useful to juxtapose the provincial distribution of ITE graduates, based on province of graduation and sending region, and the provincial distribution of employed teachers over the period as is done in Table 4.1. The table shows that, in some instances, the provincial shares of employed teachers in 2004 and 2014 differ substantially from the provincial shares of ITE graduate production between 2004 and 2013. However, the provinces with the largest net increases in the number of employed teachers between 2004 and 2014, namely Gauteng, KwaZulu-Natal, and the Western Cape, aslo tended to be the provinces where the greatest number of ITE graduates were from.

**Figure 4.11:** Shares of FTEN and graduations in ITE programmes by sending region (province of permanent residence) (2004 - 2013)




NOTES: Bars represent the estimated shares (%) of FTEN and graduations in undergraduate and postgraduate ITE programmes by sending region (province of student's permanent residence). Provinces are the Western Cape (WC), Eastern Cape (EC), Free State (FS), KwaZulu-Natal (KZN), North West (NW) , Gauteng (GAU), Limpopo (LIM), Northern Cape (NC), and Mpumalanga (MPU). N/A include all individuals who are either not South African residents (majority) or failed to provide residential information (minority).Years are grouped together to mitigate effects of year-on-year fluctuations in FTEN and graduations.

## 4.3 Age

The extent of South Africa's current and likely future teacher shortages is closely linked to the age profile of practising teachers in the country. The teaching workforce is not only older, on average, than the non-teaching workforce, but is also ageing rapidly over time HSRC (2005, p. 5). Of particular

**Table 4.1:** Provincial distribution of practising teachers and ITE graduations (2004 - 2013)

| | Practicing/Employed Teachers | | | | ITE Graduations (2004 - 2013) | | | |
|---|---|---|---|---|---|---|---|---|
| | *2004*[1] | | *2014*[2] | | *HEI Province* | | *Sending Province* | |
| **Province** | **Number** | **(%)** | **Number** | **(%)** | **Number** | **(%)** | **Number** | **(%)** |
| Western Cape | 25 180 | 8.0 | 35 931 | 8.5 | 13 056 | 14.1 | 13 032 | 14.1 |
| Eastern Cape | 63 498 | 20.2 | 64 258 | 15.1 | 9 122 | 9.9 | 10 009 | 10.8 |
| Northern Cape | 6 067 | 1.9 | 9 182 | 2.2 | | | 1 914 | 2.1 |
| Free State | 22 451 | 7.1 | 24 552 | 5.8 | 6 031 | 6.5 | 6 261 | 6.8 |
| KwaZulu-natal | 73 637 | 23.4 | 95 560 | 22.5 | 15 879 | 17.2 | 25 730 | 27.8 |
| North West | 29 752 | 9.5 | 26 086 | 6.1 | 8 266 | 8.9 | 3 665 | 4.0 |
| Gauteng | 40 916 | 13.0 | 77 265 | 18.2 | 16 768 | 18.1 | 17 785 | 19.2 |
| Mpumalanga | 25 631 | 8.1 | 35 000 | 8.2 | | | 4 782 | 5.2 |
| Limpopo | 52 571 | 16.7 | 57 256 | 13.5 | 2 555 | 2.8 | 4 575 | 4.9 |
| Total | 314 523 | 100 | 425 090 | 100.0 | 92 477 | 77.5[3] | 92 477 | 94.9[4] |

NOTES: [1] Figures from DOE (2005*a*, p. 4). [2] Figures from DBE (2014*b*, p. 1). [3] Shares do not add to 100% because of the exclusion of Unisa, which produced 22.5% of ITE graduates over the period. [4] Shares do not add to 100% because of the 5.1% of ITE graduations who were either not South Africa residents or who failed to provide any information on their permanent residential addresses.

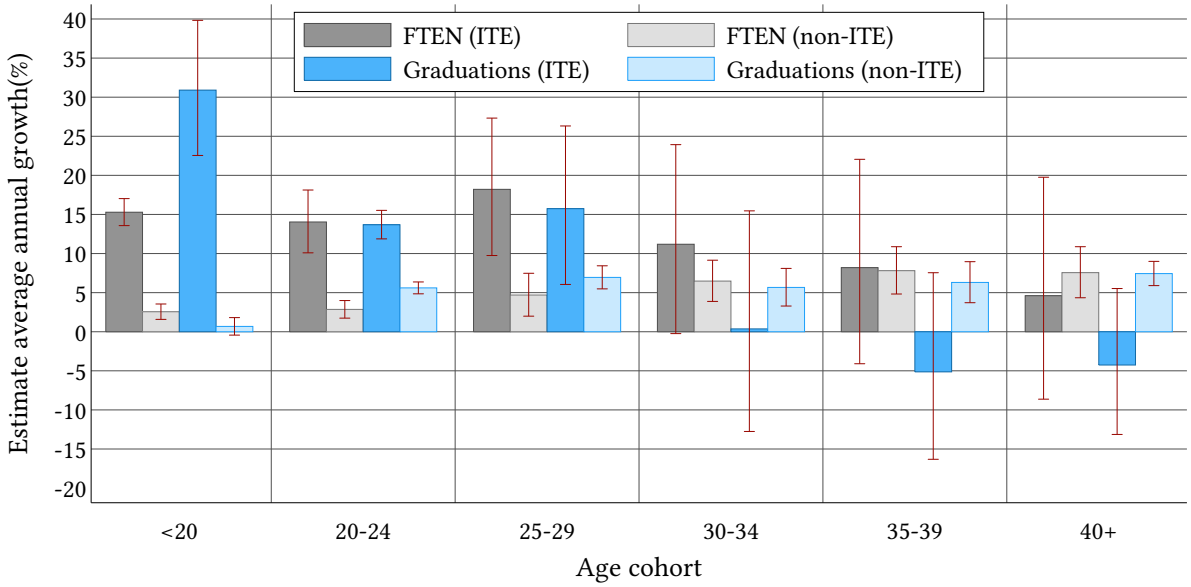
concern is the small and declining percentage of young teachers. Between 1994 and 2005, the percentage of teachers below the age of 30 fell from 54% to just 5.4% (DBE and DHET, 2011, p. 31). While more recent data indicates that this figure may have risen marginally since 2005, the present situation clearly remains untenable.[65] An ever-rising age profile only increases the proportion of teachers who retire each year, further raising the demand for new teachers.

Given South Africa's present teacher age-profile, it is clear that more young individuals need to be attracted to the teaching profession. This not only means that more more young ITE graduates need to be produced, but also that more of those graduates have to enter and remain in the teaching profession for extended periods of time. It is therefore disconcerting that many studies have noted declining enrolments in ITE programmes among younger cohorts between 1995 and 2004 (Paterson and Arends, 2009; CHE, 2010; Onwu and Sehoole, 2011). However, the HEMIS data indicates that the number of young individuals enrolling in and subsequently graduating from ITE programmes has risen significantly since 2004 (Table A.30).

Figure 4.12 shows that FTEN in ITE programmes between 2004 and 2013 grew significantly faster, on average, among younger cohorts than it did among older cohorts. In fact, the number of individuals below the age of 25 who enrolled in ITE programmes for the first time increased more than threefold over the period, rising from approximately 5 400 in 2004 to 16 250 in 2013. Because of this rapid increase, the rate of average annual growth in subsequent ITE graduations among individuals below the age of 30 was not only statistically significantly higher than it was for older cohorts, but also statistically significantly higher than the average annual rate of growth in graduations for individuals under the age of 30 who enrolled in non-ITE undergraduate degree and postgraduate diploma/certificate programmes.

[65] PERSAL 2012 indicates that around 6.5% of employed teachers were below the age of 30 in 2012.

**Figure 4.12:** Estimated average annual growth rates (%) in FTEN and graduations in ITE and non-ITE programmes by age cohort (2004 - 2013)



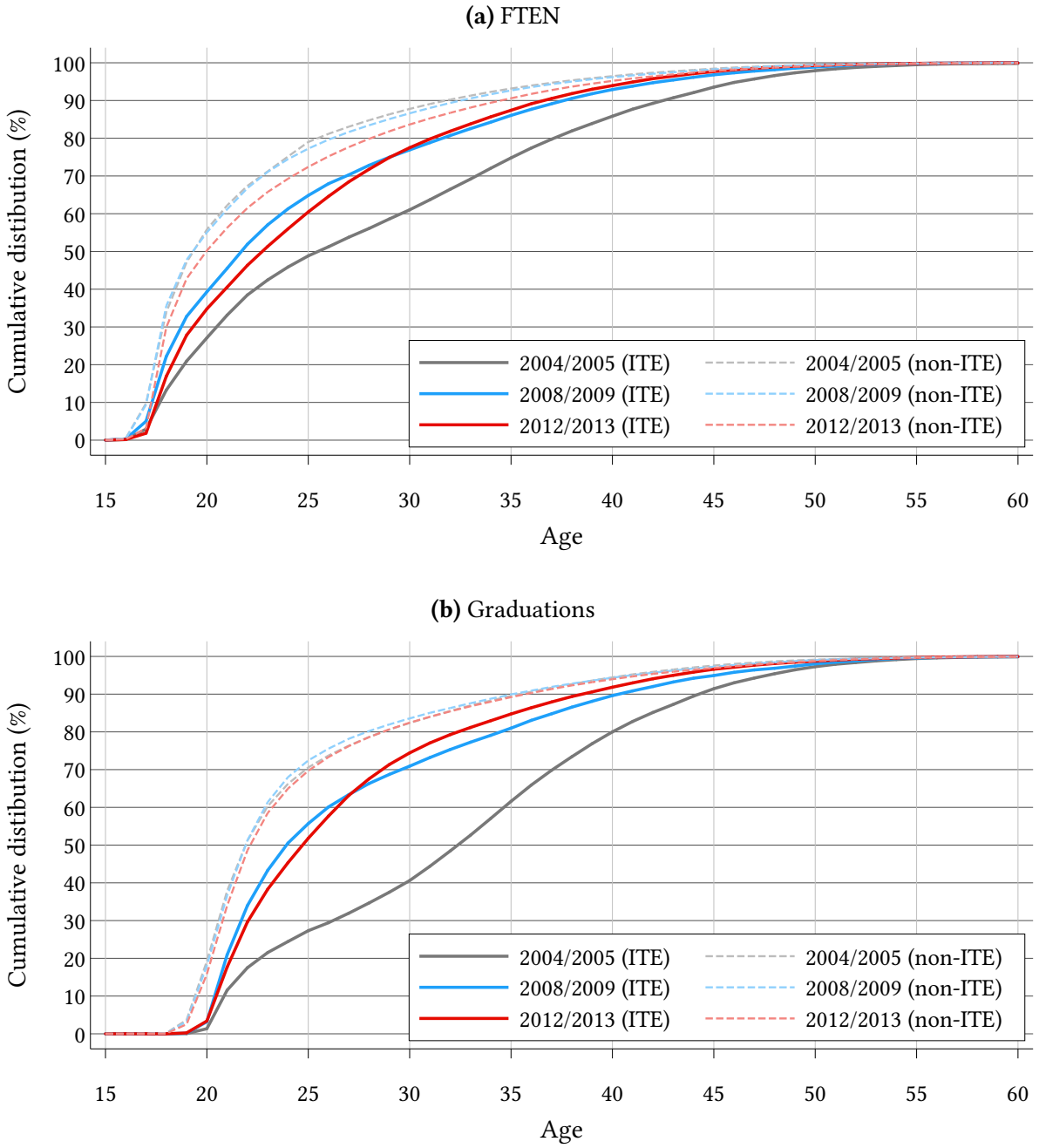

NOTES: Bars represent the estimated average annual growth rates (%) in FTEN for the respective dependent variables over the period and were estimated using the least-squares methodology described in Appendix C. Capped lines represent the 95% confidence intervals surrounding the each point estimate. "Other" programmes represent all non-ITE undergraduate degree and postgraduate diploma/certificate programmes.

The relatively rapid rate of growth in FTEN and graduations in ITE programmes among younger cohorts over the period means that ITE students and graduates have, on average, become younger since 2004. The drop in the average age of ITE students and graduates has also been relatively large and has occurred fairly rapidly in comparison to the changes for students and graduates in non-ITE undergraduate degree and postgraduate diploma/certificate programmes. This can clearly be seen in Figure 4.13, which shows the cumulative percentage of ITE FTEN and graduations over the student age distribution for three periods between 2004 and 2013.

The median age at first-time enrolment in ITE programmes in 2004 was 25. By 2013, it had fallen to below 23. This seemingly minor change has had a significant impact in terms of altering the age distribution of new ITE graduates. Only 40% of all ITE graduates produced in 2004 and 2005 were below the age of 30. By 2012/2013, this percentage had grown to nearly 75%. In other words, what is encouraging is not just that the overall number of ITE graduates being produced by the HE system has been increasing over time, but, critically, that the number of ITE graduates below the age of 30 has been increasing faster than for other age cohorts. This is also evident from the fact that, while more than two in every three ITE graduates produced in 2004 were above the age of 30, the opposite was true in 2013.

It appears to unambiguously be the case that new ITE graduates in South Africa are, on average, becoming younger over time. Nonetheless, the average age at which individuals enter into ITE programmes remains significantly higher that the age at which students tend to enter other undergraduate degree and postgraduate diploma/certificate programmes. Consequently individuals who graduate with ITE qualifications are still older, on average, than individuals who graduate with non-ITE qualifications.

**Figure 4.13:** Cumulative distribution of FTEN and graduations in ITE and non-ITE programmes by age (2004 - 2013)




NOTES: Lines represent the cumulative percentage of FTEN/graduations that are below a certain age for undergraduate and postgraduate ITE programmes and other non-ITE undergraduate degree and postgraduate diploma/certificate programmes. Years are grouped together to mitigate effects of year-on-year fluctuations in FTEN and graduations.

To better understand why these age differences obtain, Figure 4.14 shows the cumulative share of ITE FTEN and graduations over the student age distribution for undergraduate degrees[66] and postgraduate diploma/certificate qualifications, respectively. The graphs provide evidence that the age distribution of ITE FTEN shifted to the left between 2004 and 2008, moderately shifting to the right again thereafter. As a result, the median age of entry into non-ITE undergraduate degrees in 2012/2013 (between 19 and

[66] In the case of ITE programmes, only 4-year Bachelor's degrees are considered.

20) was still roughly two years less than the median age of entry into undergraduate ITE programmes (between 21 and 22).

It is not immediately clear why there is such a big difference in age distribution between ITE and non-ITE undergraduate FTEN. One possible reason might be that practising under-qualified teachers who enrol in Bachelor of Education programmes are raising the overall age profile of ITE FTEN. It could also be the case that a substantial number of BEd students initially enrolled in other programmes before switching to ITE programmes. However, these hypotheses cannot be tested with aggregate HEMIS.

Panel (a) of Figure 4.14 reveals that the shift in the age distribution of undergraduate ITE graduates was primarily restricted to the 2004 - 2008/2009 period, with very little further changes taking place thereafter. Given that most non-ITE undergraduate Bachelor's degrees are 3-year programmes whilst the Bachelor of Education degree is a 4-year programme, it is partly to be expected that the age at graduation for ITE students would be higher, on average, than the age at graduation for non-ITE students, even if individuals first enrolled in their programmes at the same age. In light of the aforementioned median age difference at FTEN, it is thus encouraging that more than 80% of ITE graduates produced in 2013 were below the age of 30.

In line with expectations, the age profile for individuals enrolling in postgraduate diploma/certificate programmes is older than it is for undergraduate degree programmes. In contrast to undergraduate degree programmes, postgraduate ITE students in the 2012/2013 period tended to be younger, on average, over certain age ranges than their non-ITE counterparts. For example, a greater percentage of 2012/2013 postgraduate ITE graduates were below the age of 30 (approx 62%) than was the case for graduates from non-ITE postgraduate diploma/certificate programmes (approx 57%). Admittedly, as is evidenced by the differences in the slopes of the lines in the respective graphs, a far smaller percentage of postgraduate ITE graduates were below the age of 25 (roughly 29%) than was the case for undergraduate degree ITE students (59%).

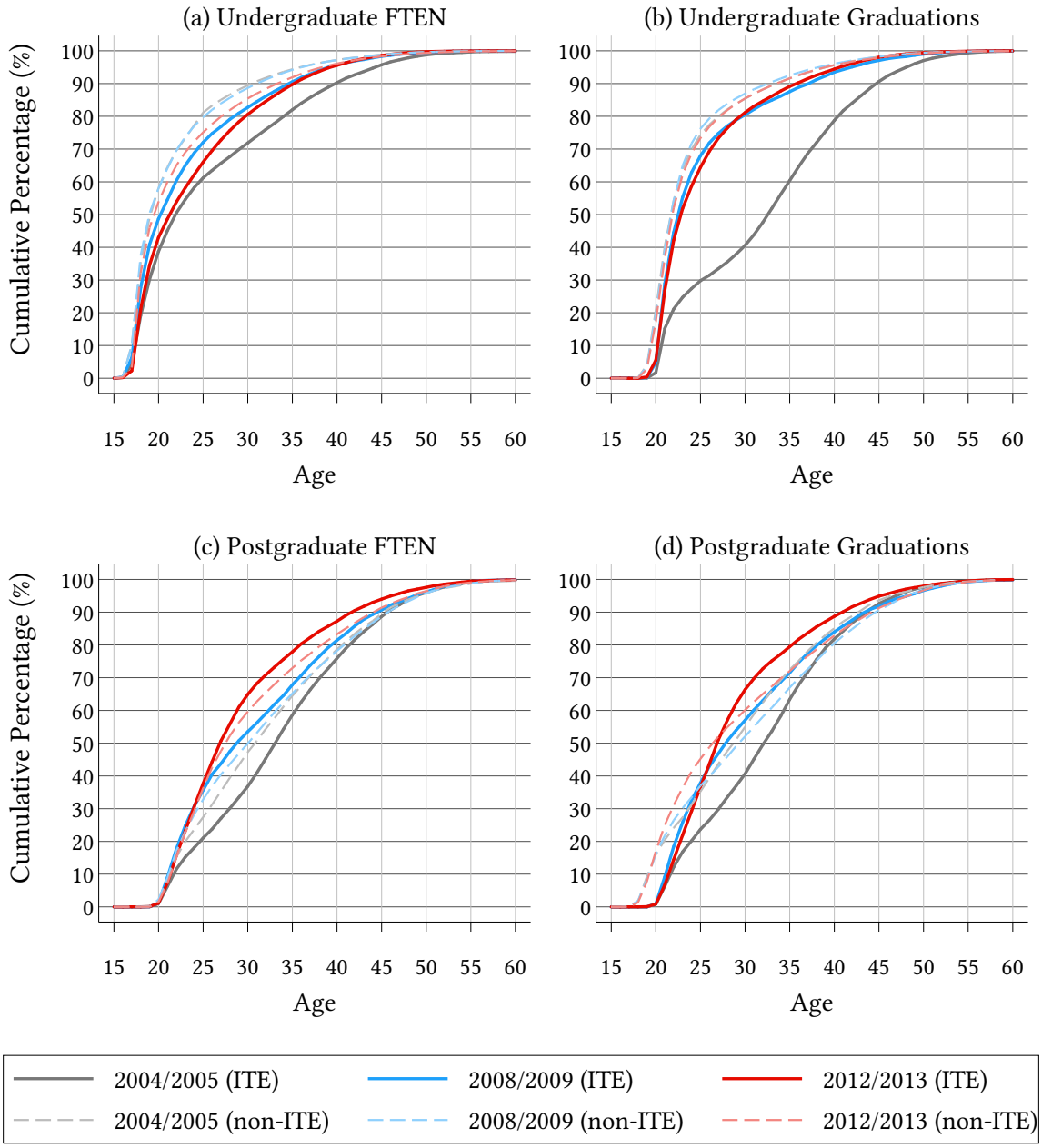
### 4.3.1 Young ITE graduates and young entering teachers

One of the Department of Basic Education's strategic goals is to increase the number of qualified individuals aged 30 and below who enter the teaching profession for the first time (DBE, 2014*a*, p. 25). In light of this, it is important to understand what the capacity for such an increase is, given current levels of, and trends in, young ITE graduate production and young teacher employment in South Africa ("young" is hereafter used to refer to individuals aged 30 or below).

The age at which young students graduate from HEIs places an absolute lower bound on the age at which they can enter the teaching profession for the first time. It is therefore important to consider the age distribution among young graduates.

Figure 4.15 shows the age distribution of young ITE graduates for the years 2012 - 2013. The graph indicates that roughly 36.5% of young ITE graduates produced over the period were between the ages

**Figure 4.14:** Cumulative distribution of FTEN and graduations in undergraduate and postgraduate ITE and non-ITE programmes by age (2004 - 2013)

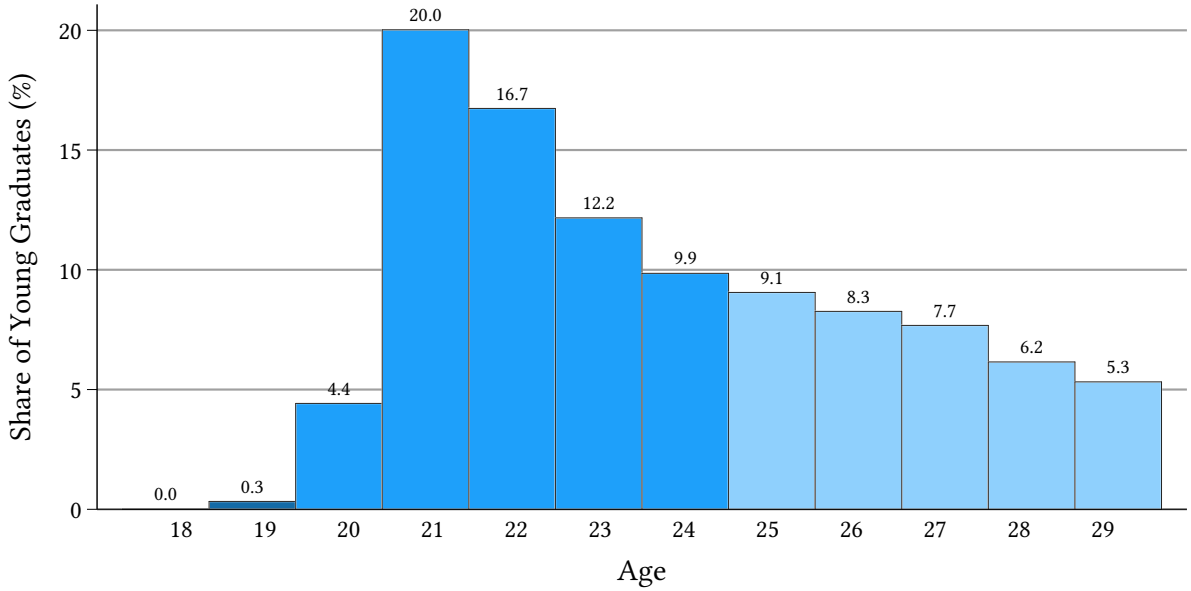



NOTES: Lines represent the cumulative percentage of FTEN/graduations that are below a certain age for (a) undergraduates ITE and non-ITE undergraduate degree programmes and (b) postgraduate ITE and non-ITE postgraduate dimploma/certificate programmes. Years are grouped together to mitigate effects of year-on-year fluctuations in FTEN and graduations. *In the case of ITE programmes, only 4-year Bachelor's degrees are considered.

of 25 and 29. It follows that these individuals would have been in the 26 - 30 age group in the year subsequent to graduation. For those ITE graduates who plan on entering the teaching profession in South Africa, most are likely to begin searching for positions only in the year after graduation. Of course, as noted above, some young ITE graduates may choose to first teach abroad or seek non-teaching employment opportunities immediately after graduating, such that there is a delay between graduation and

employment as teachers in South African schools. This potentially has important implications for the DBE's aforementioned strategic goal as it implies that the time window in which young ITE graduates can be employed as young teachers may be small in certain instances. In fact, holding all else constant, any delays in absorbing new ITE graduates into the teaching profession effectively reduces the available pool of young qualified potential teachers in the country.

**Figure 4.15:** Age distribution among young ITE graduates (2012 - 2013)




NOTES: Bars represent the percentage of "young" 2012/2013 undergraduate and postgraduate ITE programme graduates by the age at graduation. Years are grouped together to mitigate effects of year-on-year fluctuations in FTEN and graduations.

To conclude this section, it is useful to compare the production of young ITE graduates with the employment of young, qualified potential teachers as done in Table 4.2. The table presents three sets of figures. Column one simply reports the estimated number of new ITE graduates, aged 29 and younger, produced by public HEIs for each year between 2007 and 2013. Column two reports the cumulative number of ITE graduates produced by the public HE system since 2000 who are 30 years of age or younger. This group represents the total population of young, qualified, potential teachers, regardless of whether or not they are practising teachers. The implicit assumption is that all new, young ITE graduates join this pool the year after they graduate and remain part of the pool until such time as they turn 31. In any year, the pool of young, qualified, potential teachers thus increases by the number of ITE graduates who graduated at age 29 or younger in the preceding year and decreases by the number of ITE graduates produced in previous years who are no longer below the age of 31.[67] The implica-

[67] Since HEMIS data is not available before 2000, the estimated pool of young, qualified, potential teachers in 2007 reported in Table 4.2 will exclude all individuals who graduated from ITE programmes in 1999 aged 22 or younger, all 1998 ITE graduates aged 21 and younger, all 1997 ITE graduates aged 20 and younger, and so on. The HEMIS data for 2000 indicates that roughly 24% of young ITE graduates produced that year were 22 or younger, 15% were 21 or younger, 3% were 20 or younger, and less than 1% were younger than 20. The implication is that, while the estimate for 2007 will be a downward-biased estimated of the true total number of young, qualified, potential teachers in the country, the bias should not be significant. Moreover, the number of young, qualified, potential teachers in 2011 and later years cannot include anyone who graduated before 2000 since all such individuals would already have been above the age of 30 by 2011.

tion is that, within some margin of error, the total number of qualified young individuals employed as teachers in South Africa cannot exceed this number.[68]

**Table 4.2:** Young ITE graduate production, the pool of young qualified individuals, and new young practising teachers (2007 - 2014)

| Year | New young ITE graduates Produced [1] | Pool of young, qualified, potential teachers[2] | New young, qualified, entering teachers[3] |
|---|---|---|---|
| 2007 | 3 873 | 13 356* | 4 882 |
| 2008 | 4 141 | 15 931* | 4 954 |
| 2009 | 4 556 | 18 361* | 4 369 |
| 2010 | 5 575 | 20 819* | 5 582 |
| 2011 | 7 202 | 24 043 | 5 790 |
| 2012 | 9 081 | 28 404 | 5 213 |
| 2013 | 10 384 | 33 879 | 4 669 |
| 2014 | | 39 699 | |

NOTES: [1] Estimated number of new ITE graduates aged 29 or below produced by the public HE system per year based on HEMIS. [2] Cumulative number of ITE graduates produced by the public HE system since 2000 who are 30 years of age or younger. In any year, this group represents the population of young, qualified, potential teachers, regardless of whether or not they are practising teachers. [*] Figures are likely to exclude individuals who graduated with ITE qualifications at very young ages before 2000. [3] Figures for 2007 - 2012 taken from Gustafsson (2014) and for 2013 from DBE (2013). Figures reflect the number of qualified first-time teachers aged 30 or below entering the public school system for the first time in respective years based on PERSAL data.

Column three of Table 4.2 shows the number of young, qualified individuals entering the public school system as teachers for the first time for the years 2007 - 2013. The data shows that an average of 5 065 young, qualified individuals entered the teaching profession every year over the period. In total, 35 459 young, qualified individuals entered the public school system as new teachers over the period. This number appears perplexing at first, as it exceeds the estimated 33 879 individuals in the pool of young, qualified, individuals from which new teachers could be drawn according to the HEMIS data. However, it is necessary to bear in mind that many of these young new teachers sadly left the teaching system shortly after entering it. This also explains why the total number of young, qualified teachers employed in South Africa in 2012 according to PERSAL (21 665) was significantly lower than the total number of young qualified individuals who entered the teaching system for the first time between 2007 and 2012 (30 790).

Until 2011, the number of young teachers entering the system exceeded the number of young ITE graduates produced in the preceding year. This means that at least some of the newly employed teachers must have graduated in earlier years. However, in both 2012 and 2013, the number of young, qualified individuals entering the teaching profession was less than the number of young ITE graduates produced in the preceding year. In fact, at least 1 989 (Est.) young 2011 ITE graduates and 4 412 young 2012 ITE graduates could not have entered the teaching profession for the first time the year after they graduated. While it may be expected that some of these individuals would already have been employed as teachers or that some may not immediately have sought to become employed as teachers, it is nevertheless disconcerting that there is such a large difference.

[68] The PERSAL data for 2012, for example, show that there were an estimated 21 665 young, qualified (REQV 13 or higher) teachers employed in South Africa. Based on the estimates presented here, this amounted to roughly 76% of the estimated total number of young, qualified, potential teachers in the country at the time (28 404).

In conclusion, the data suggests that until recent years, the schooling system's ability to employ young teachers was constrained by the fact that the HE system was producing too few young ITE graduates. However, insofar as this is the case, it is not clear why more young teachers weren't employed in 2012 and 2013. For example, the employment of 5 213 young new teachers in 2012 was well below the DBE's baseline goal of 8 227 new young teachers as stated in DBE (2014*a*, p. 25). Whatever the reasons for these shortfalls may be, the present example poignantly illustrates the fact that increased production of ITE graduates does not necessarily translate into increased teacher supply and that other measures are necessary to ensure that new ITE graduates can be absorbed into the teaching profession in South Africa. As noted by DOE (2005*b*, p. 83): *"if an increased number of younger candidates do not enter the teaching profession, and remain in it for an extended period, there will be inadequate numbers to replace those who leave the profession due to age. To avert an imminent shortage, government must embark on an intense drive to interest younger people into the profession."*

# 5 Converting inputs into outputs: ITE student throughput in HE

The number of individuals who enter ITE programmes for the first time each year is of critical importance as it imposes an upper bound on the number of new, qualified potential teachers that can be produced by the public HE system. However, the number of ITE graduates that are actually produced is not just a function of FTEN, but also of the extent to which HEIs are able to convert those enrolments into graduations.

Positive growth in ITE programme FTEN over time can only translate into increased qualified teacher supply if it firstly leads to growth in the number of individuals who graduate with ITE qualifications. Moreover, the rate at which new, qualified potential teachers become available is dependent on the time it takes, on average, for ITE students to complete their qualifications. An evaluation of university throughput in ITE programmes is thus essential in order to understand the trends and patterns in qualified teacher supply. In many ways, throughput is also a measure of institutional efficiency and provides what is a potentially useful indicator for identifying areas where policy intervention may be required.

## 5.1 Measuring throughput

The bulk of studies on South African HE focus on graduation rates as sole measures of university throughput.[69] This is partly due to the fact that graduation rates are simple to calculate, but also partly because the type of data that is required for calculating more nuanced and accurate measures of throughput is generally not publicly accessible.

Graduation rates express the number of graduations in a particular programme as a percentage of the total number of enrolments for that programme in the same year. As such, they are only crude measures

[69] The Department of Higher Education and Training (DHET) itself exclusively uses graduation rates when reporting on student throughput in its annual *"Statistics on Post-School Education and Training in South Africa"* publications.

of throughput, being highly sensitive to changes in the number of FTEN, student repetition, drop-out, and retention rates.[70] This sensitivity makes graduation rates inherently volatile and means that they can yield very misleading impressions of throughput and performance.

From the perspective of evaluating student performance and HEI efficiency, knowing what percentage of all enrolled individuals graduate in a given year is of less importance than knowing what proportion of a cohort of students who enrol for a qualification ultimately complete that qualification (such individuals are hereafter referred to as "completers") and how long it takes for them to do so. As measures of throughput, graduation rates are thus inferior to completion rates.

Completion rates (CRs) express the number of graduations for a given cohort in a particular year as a percentage of the total initial enrolment for that cohort in its commencement year. This has two major implications. First, it means that CRs are cohort-specific. Unlike graduation rates, they are thus insensitive to the number of FTEN, and the repetition rates, drop-out rates, and retention rates for other cohorts. Second, the CR for a particular cohort depends on the year for which it is estimated. For example, the 1-year marginal completion rate (MCR) for a cohort will reflect the percentage of that cohort that graduated within the first year of enrolment. Similarly, the 5-year MCR for a cohort will reflect the percentage of that cohort that graduated in the 5th year of enrolment.

While marginal completion rates (MCR) are useful for comparing throughput between different enrolment years for a particular cohort[71], what is generally of greater interest is the cumulative completion rate (CCR), i.e. the total percentage of a cohort that has graduated after a certain number of years. Unless explicitly stated otherwise, "completion rates" (CRs) are thus hereafter used to refer to cumulative completion rates.

### 5.1.1 Calculating completion rates in aggregate HEMIS

The calculation of CRs requires the ability to track cohorts of students over time as they progress through the HE system. The fact that the type of information required to identify cohorts of students (such as identifiable student unit-records) is generally not available to researchers is therefore one of the main reasons why CRs are seldom reported in South African research studies. However, the availability of information regarding the year in which students commenced their qualifications in aggregate HEMIS allows partial identification of such cohorts.

The *qualification commencement year* (QCY) variable in HEMIS reflects the year in which students first commenced with their current academic programmes at their current HEIs. Since the commencement year is time-invariant within any given HEI and academic programme, it enables identification of the same cohorts of individuals in successive years of aggregate data. In other words, cohorts in aggregate HEMIS are effectively defined based on the year in which they commenced their current academic programmes at the HEI where they are currently enrolled. For example, all students who commenced

[70] Section C.2 in C provides an example of how changes in FTEN can cause graduation rates to fluctuate, even if underlying throughput is constant over time.

[71] They can, for example, be used to determine the year in which the bulk of all completers in a cohort actually graduated.

with ITE programmes at NMMU in 2003 would be part of NMMU's 2003 ITE cohort and remain part of that cohort as long as they remain enrolled in the same ITE programmes at NMMU. The presence of these identifiable cohorts of students in aggregate HEMIS enables estimation of various marginal and cumulative completion rates which are the primary metrics considered in the analysis that follows.

A detailed discussion of the *qualification commencement year* variable in aggregate HEMIS, the calculation of graduation rates and completion rates, and the potential problems that may arise from the methodology employed in this section is presented in Section C.2 of C. However, it is worth noting here that the same methodological issues that are likely to bias aggregate HEMIS-based estimates of FTEN and graduations in ITE programmes (as discussed in Section 2), are likely to bias estimates of completion rates. These are issues that are inherent when using HEMIS variable fields to estimate enrolments, graduations, and throughput by field of study. The only way in which they can be avoided is by tracking individuals through the HE system via their unit records in the original HEMIS data. As before, all estimates presented in the analysis that follows are thus, at best, indicative rather than definitive.

## 5.2 Simple completion rates

### 5.2.1 Cohort progression and time to completion

To contextualise the analysis on CRs presented below, it is important to consider how long individuals generally take to complete ITE qualifications at public HEIs in South Africa. All approved HE academic programmes in South Africa have associated minimum time requirements that determine the minimum total amount of study time (generally in terms of a number of years) required for their completion (DOE, 2014, DATA ELEMENTS 051 TO 060). For example, the BEd degree, an undergraduate ITE qualification, commonly requires a minimum of 4 years of study to complete. Similarly, the PGCE (and former advanced diploma in teaching), in turn, is a postgraduate ITE qualification that generally requires a minimum of 1 year of study to complete.

It is well-known that many HE graduates in South Africa do not complete their studies within the predetermined minimum required times, but often take considerably longer (CHE, 2013). This has important implications for the analysis of CRs, as it means that, in order to get an accurate sense of the number individuals from a cohort who ultimately graduate, one needs to allow for a fairly long time-horizon when tracking progression through HE. In practice, however, the length of the time-horizon available is constrained by the length of the data series that is available.[72]

Since aggregate HEMIS is only available for the period 2000 - 2013, the longest duration over which any single cohort of students can be tracked is 14 years. Table 5.1 summarizes enrolment and completion data for the 2000 ITE cohort between 2000 and 2013. The figures reveal a number of important findings regarding the progression of the cohort, many of which extend to the progression of cohorts in South African HE more generally.

[72] *"Enrolment horizon"* is used throughout this section to refer to the amount of time (number of years) that has elapsed since a cohort or cohorts initially commenced with the academic programme(s) in question.

Of the estimated 19 784 individuals constituting the 2000 ITE cohort, only 13 160 were still enrolled in the same academic programmes at the same HEIs in the year subsequent to commencement (i.e. the second year). However, this does not imply that 33.5% of the cohort dropped out of HE after just one year. Because of the structure of the aggregate HEMIS data and the way in which cohorts are defined, individuals are considered to be enrolled as part of the 2000 ITE cohort only if they are (a) recorded as having commenced with an ITE programme at a HEI in 2000, (b) enrolled in the programme for which they were registered in the commencement year, and (c) enrolled at the HEI where they were registered in the commencement year. Thus, it would be more accurate to say that nearly 33.5% of the 2000 ITE cohort were no longer enrolled as part of the cohort (hereafter *enrolled*) after just one year.

Given the definition of enrolment in the current context, there are four distinct groups of individuals who will effectively *exit the cohort* over time: (1) those who successfully complete their commencement programme at the commencement HEI, (2) those who de-register from their commencement programme and re-register for a different programme, (3) those who transfer from the commencement HEI to a different HEI, and (4) those who completely drop out of the public HE system. The fact that it is not possible to distinguish between the last three of these groups without detailed uni-record data provides the rationale for focussing only on the estimates of cohort-based CRs, rather than drop-out rates, using aggregate HEMIS.

Table 5.1 shows that, though enrolment among the 2000 ITE cohort declined rapidly over time, there were still some individuals who were enrolled more than 10 years after commencement. In fact, the data indicates that 2 individuals from the cohort were still enrolled in 2013, 14 years after commencing with their programmes. It should be noted that few of these individuals would have been continuously enrolled for 10 or more consecutive years. Instead, many would have been enrolled in HE intermittently, effectively taking a leave of absence from their studies at some point in time, only to return again at a later stage in order to complete their programmes. This intermittent attendance means that enrolment among a cohort can change non-monotonically over time. For example, the HEMIS data indicates a noticeable jump in enrolments for the 2000 ITE cohort between 2007 and 2008 and to a lesser extent also between 2009 and 2010. These increases can be attributed to individuals who "dropped out" of the cohort at some stage after 2000, only to "drop in" again in 2008 or 2009.

As explained in Section C.2 of C, any given commencement cohort in aggregate HEMIS is likely to include some students for whom the course credits acquired while previously registered for other academic programmes (or at other HEIs) have effectively been transferred/credited to their new academic programmes. In many instances, these credit-transfer students may already have satisfied part of the official requirements for the completion of their new academic programmes. This is one of the reasons why estimates of CRs that are based on the QCY can make it seem as though reasonably large numbers of students are completing their qualifications in less than the minimum required time.[73] Whenever there are large numbers of credit-transfer students in a cohort, the estimated CRs for the years immediately following commencement are likely to be biased upwards. More importantly, as explained in 2

[73] For example, holding all else constant, it would be possible for a BEd student who has already completed three years of study and subsequently transfers to another HEI to graduate within only 1 year after commencement at the new HEI.

**Table 5.1:** Enrolment and completion for the 2000 ITE cohort (2000 - 2013)

| Year | Time[1] | Enrolled[2] | Not Enrolled[2] | Enrolled (%) [3] | Gradua-tions | MCR (%) | CCR (%) | % of all Completers[4] |
|---|---|---|---|---|---|---|---|---|
| 2000 | 1 | 19 784 | 0 | 100.0 | 1 683 | 8.5 | 8.5 | 25.6 |
| 2001 | 2 | 13 160 | 6 624 | 66.5 | 2 212 | 11.2 | 19.7 | 59.2 |
| 2002 | 3 | 9 868 | 9 916 | 49.9 | 1 371 | 6.9 | 26.6 | 80.0 |
| 2003 | 4 | 7 595 | 12 189 | 38.4 | 634 | 3.2 | 29.8 | 89.6 |
| 2004 | 5 | 6 129 | 13 655 | 31.0 | 344 | 1.7 | 31.6 | 94.9 |
| 2005 | 6 | 3 981 | 15 803 | 20.1 | 195 | 1.0 | 32.5 | 97.8 |
| 2006 | 7 | 2 756 | 17 029 | 13.9 | 108 | 0.6 | 33.1 | 99.5 |
| 2007 | 8 | 243 | 19 541 | 1.2 | 15 | 0.1 | 33.2 | 99.7 |
| 2008 | 9 | 649 | 19 135 | 3.3 | 9 | 0.0 | 33.2 | 99.8 |
| 2009 | 10 | 16 | 19 768 | 0.1 | 6 | 0.0 | 33.2 | 99.9 |
| 2010 | 11 | 18 | 19 766 | 0.1 | 2 | 0.0 | 33.2 | 99.9 |
| 2011 | 12 | 12 | 19 772 | 0.1 | 3 | 0.0 | 33.3 | 100.0 |
| 2012 | 13 | 5 | 19 779 | 0.0 | 1 | 0.0 | 33.3 | 100.0 |
| 2013 | 14 | 2 | 19 782 | 0.0 | 0 | 0.0 | 33.3 | 100.0 |

NOTES: [1]Number of years following cohort's commencement. [2]Individuals are considered to be enrolled as part of the 2000 ITE cohort as long as they (a) commenced with ITE programmes in 2000, (b) are registered for the same ITE programme as they were in the commencement year, and (c) are registered at the same HEI as they were in the commencement year. [3]Expresses the number of individuals who are enrolled (as defined in note [2]) as a percentage of the original cohort. [4]Expresses the cumulative number of graduations from the cohort as a percentage of all individuals who ultimately graduate (i.e. all completers). is HEI and programme specific.

and C, ITE programmes in this paper include Baccalaureus Technologiae and postgraduate Bachelor's degrees as well as postgraduate diplomas and certificates - qualifications for which the official minimum time requirements tend to be between 1 and 2 years of study. Combined, these factors are likely to explain why 5 266 individuals (26.6%) from the 2000 ITE cohort already graduated within the first three years of enrolment.[74]

Table 5.1 makes it clear that some individuals take much longer than 4-years to complete ITE programmes. For example, there were some students in the 2000 ITE cohort who only completed their programmes after more than 10 years. In order to know exactly how many individuals from a cohort ultimately graduate, it would thus be necessary to track the cohort over a fairly long period. However, doing so implies that one can only ever consider cohorts who commenced with their studies a long time ago and who may, therefore, no longer be representative of more recent cohorts of students. As such, there is effectively a trade-off between the accuracy/comprehensiveness with which total CCRs (see Section C.2) can be estimated and the recency/relevance of the cohorts for whom they are estimated.

While it is true that some students in the 2000 ITE cohort only graduated after a considerable amount of time, these individuals represented only a small percentage of all completers in the cohort. Of the estimated 33.3% of individuals in the cohort who ultimately graduated, approximately 95% graduated within 5 years of commencing their studies. In fact, it is a general feature of progression in HE that MCRs begin to decline sharply after a certain number of years as ever-fewer numbers of individuals remain enrolled as part of their original commencement cohorts. This has a useful practical implica-

[74] The qualification type breakdown in the commencement year for the 2000 ITE cohort (Table 5.1) is as follows: Baccalaureus Technologiae degrees (21.8%), 4-year Bachelor's degrees (14,9%), 1- or 2-year postgraduate diplomas (23.3%), and postgraduate Bachelor's degrees (40.0%). The data also indicates that only 48% of the 2000 ITE cohort were *first-time entering undergraduate* students in 2000.

tion for the analysis of CRs for different cohorts as it means that one can infer much about the extent of completion among a cohort, even if one only considers the first few years of data following commencement. This, in turn, means that one can draw at least some inferences regarding the trends in completion for different cohorts over time.

Figure 5.1 shows the CCRs for the 2004, 2006, 2008, 2010, and 2012 ITE cohorts by qualification type. The graph reveals several important findings.

First, the CCRs for postgraduate diploma/certificate ITE programmes are consistently higher than the CCRs for 4-year Bachelor's degree ITE programmes, regardless of the time period under consideration. Second, the CCRs for postgraduate diploma/certificate ITE programmes also initially rise much faster over time than the CCRs for 4-year Bachelor's degree ITE programmes.[75] Third, there appears to have been a significant change in the overall CCR-schedule for both undergraduate and postgraduate ITE programmes. The near consistent rise in the 2-year and 3-year CCRs for postgraduate ITE cohorts between 2004 and 2011/2012, in particular, is striking. Similarly, if one excludes the 2005 cohort, there seems to have been a consistent rise in the 5-year CCR for individuals enrolled in undergraduate ITE programmes between 2004 and 2009 (Table A.33). Fourth, the percentage of undergraduate ITE students who complete their qualifications within fewer than 4 years seems to have declined slightly over time (Table A.33), such that there is a far more noticeable jump between the 3-year and 4-year CCRs for the group in recent years. This can largely be explained by the fact that enrolments in 4-year Bachelor's degree programmes (rather than in BTech or postgraduate Bachelor's degree programmes) represent an increasing share of enrolments in undergraduate ITE programmes.[76]

The estimates presented in Table A.33 make it clear that, despite what appears to be a rising trend over time, the extent of completion among undergraduate ITE programmes is still very low. Even for more recent cohorts of undergraduate ITE students, only around 50% - 55% of students are expected to ultimately graduate and, with the exception of the 2005 cohort, less than a third of the initial cohorts are estimated to complete their qualifications within 4 years. By contrast, the data indicates that more than 75% of current postgraduate ITE programme students can be expected to complete their programmes within 3 years and that the ultimate total CCR for some cohorts could be as high as 90%.

Figure 5.1 and Table A.33 clearly show that, the more recent the cohorts under consideration, the shorter the available period of time over which their progression can be tracked. For the purposes of conducting comparative analysis, it is thus necessary to reach a compromise between the recency of the cohorts being analysed and the duration over which their progression can be tracked. As stated above, such a compromise may be possible because of the fact that MCRs diminish over time for all ITE cohorts.

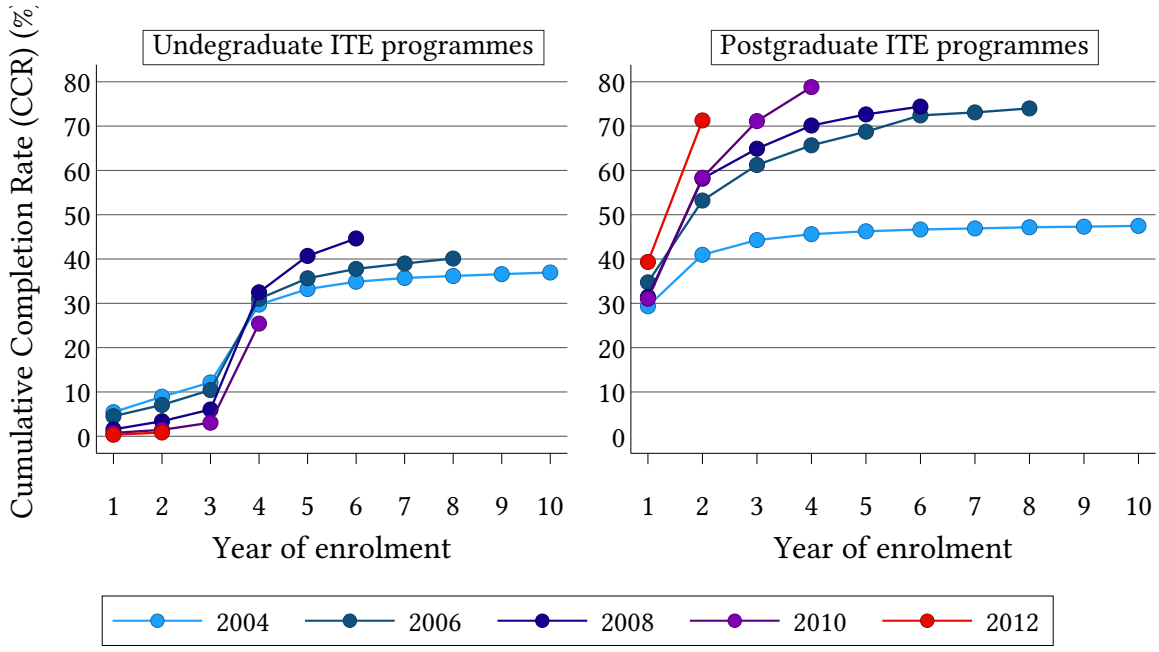
If one were to assume that virtually all individuals who ultimately complete either an undergraduate or postgraduate ITE programme do so within 14 years after commencement[77], one can use the available

[75] Given the different minimum time requirements for the respective qualification types, this is hardly surprising.

[76] 4-year Bachelor's degrees accounted for 60% of all initial enrolments among the 2004 undergraduate ITE cohort. The same figure for the 2009 undergraduate ITE cohort was 96%.

[77] It should be clear that this hypothesis is not directly testable without a data series that extends beyond 14 years. However, the HEMIS data suggests that the MCRs for ITE programmes strongly tend to zero after 10 years. In fact, for the 2000, 2001, and 2002 cohorts, the number of additional individuals completing ITE programmes after 9 years amounted to no more 0.20% of the original cohort. It follows that, while some individuals may indeed graduate only after 13 years or more, they are likely to represent a negligible percentage of all completers.

**Figure 5.1:** Cumulative completion rates (CCR) for ITE cohorts (2004 - 2013)




NOTES: Figures represent the estimated cumulative completion rates per year of enrolment for different commencement cohorts (each series represents a specific cohort) in undergraduate and postgraduate ITE programmes (See Table A.33 in Appendix A for the full set of estimates.

data on programme completion in aggregate HEMIS to produce crude estimates of the percentage of completers who can be expected to complete their programmes within a given number of years. Using simple repeated log-linear regressions, it is estimated that, for all completers from the 2004 - 2013 undergraduate ITE cohorts, roughly 63.3% graduate(d) within 4 years, 78.8% graduate(d) within 5 years, and 84.9% graduate(d) within 6 years (Table A.34). Similarly, for all individuals who completed postgraduate ITE programmes over the period, it is estimated that roughly 73% graduate(d) within 2 years, 85.1% graduate(d) within 3 years, and 90.8% graduate(d) within 4 years. While these estimates provide some indication of the time individuals take, on average, to complete ITE programmes, it is important to reiterate that they are based on imputations and, as such, are likely to be subject to error. It would therefore be imprudent to view them as definitive or to use them explicitly for the purpose of statistical inference.[78]

Direct comparisons of finite time-horizon CCRs between cohorts are subject to several caveats. The most significant of these is the fact that the extent of programme completion between cohorts as well as the structure/timing of completion within cohorts may be changing over time and in different ways. This implies that the extent to which total CCRs can be inferred from short-run or even medium-run CCRs is likely to vary over time in unknown ways, making such inferences imprudent. For example, the fact that the 4-year CCR for the 2010 undergraduate ITE cohort is lower than it was for the 2009 cohort (Table A.33) could either imply that fewer individuals from the 2010 cohort will ultimately complete

[78] The approach used to impute CRs in this paper produces estimates that compare well with those presented in CHE (2013, p. 45). Using unit-record HEMIS data, the CHE study estimates that, of all *first-time entering* 4-year undergraduate degree students at public HEIs in South Africa in 2006, 37% graduated within 5 years. They further estimate that 50% of this cohort would never graduate, implying that of the 50% who do, roughly 74% graduated within 5 years. Using log-linear regressions on the aggregate HEMIS data, it is estimated that 55.5% of the 2006 4-year undergraduate degree ITE cohort will never graduate and, of those who do, roughly 80% (i.e. 5-year CCR = 35.6%) graduated within 5 years.

their programmes than was the case for the 2009 cohort, that individuals from the 2010 cohort will, on average, take longer to complete their programmes than individuals from the 2009 cohort, or both. It may even be possible that a greater percentage of the 2010 cohort than the 2009 cohort will ultimately graduate, but simply that they take longer on average to do so. The critical point is that is it not possible to use the data to determine which of these hypotheses is true. This is a limitation that is inherent when analysing academic programme completion.

## 5.3 Disaggregated completion rates

Having considered the overall trends in CRs for ITE cohorts between 2004 and 2013, the focus now turns to the description of CR-differentials between groups of ITE students. Specifically, this section presents and compares estimates of CRs at a dissagregated level in order to cast light on the dimensions along which ITE programme completion rates in South Africa are found to vary.

Since the calculation of CRs in this paper is based on identifiable cohorts in aggregate HEMIS data rather than identifiable unit-records in original HEMIS, the level of disaggregation that can be achieved is limited. In essence, student cohorts in aggregate HEMIS can only be defined based on time-invariant factors such as race or gender. Therefore, it is only possible to estimated disaggregated CRs over time-invariant dimensions.[79]

### 5.3.1 Disaggregated fixed-horizon completion rates by ITE cohort

Table A.35 presents estimated 5-year CRs for the 2004 - 2009 undergraduate ITE programme cohorts, disaggregated by contact vs distance institutions, gender, race, home language, province of enrolment, and age cohort at commencement.

The extent of the differences between the estimated CCRs for Unisa and contact HEIs is immediately striking. Over the period under consideration, the percentage of undergraduate ITE students completing their programmes within 5 years at contact HEIs was, on average, 3 times as high as it was at Unisa. In other words, even if the number of individuals enteing ITE programmes at Unisa was three times greater than the number entering such programmes at contact institutions, the estimates suggest that Unisa would produce no more ITE graduates than contact HEIs would within the first five years. Though it appears as though CRs at Unisa improved somewhat between 2006 and 2009, even among Unisa's 2009 undergraduate ITE cohort, fewer than 22% of students completed their programmes within the first five years, compared to almost 60% of undergraduate ITE students at contact HEIs.

Though it is reasonable to expect that distance education students will take longer, on average, to complete their undergraduate programmes than students at contact HEIs, Unisa's low 5-year CCR is clearly problematic, particularly considering the fact that the university currently accounts for around half of all FTEN in undergraduate ITE programmes in the public HE system. Moreover, as discussed in

[79] It is not, for example, possible to calculate CRs by NSFAS status since students who receive NSFAS funding in one year may or may not receive NSFAS funding in another year.

Section 3.3.1, Unisa's share of enrolments in undergraduate ITE programmes has increased substantially since 2004 and the available evidence suggests that it is likely to continue to do so for the foreseeable future.

In accordance with what appears to be a general feature in the South African education system, females consistently outperform males in terms of completion rates with the female 5-year CCR for undergraduate ITE programmes over the period being 8.4 percentage points (25%) higher, on average, than it was for Males. Table A.35 also shows that there is a distinct racial dimension to undergraduate ITE programme CR differentials. Despite movements over time, Whites consistently have the highest 5-year CCRs, followed by Indians, and thereafter by Coloureds and Blacks. Among the 6 cohorts under consideration, the 5-year CCR for White undergraduate ITE students was, on average, 43% higher than it was for Black students. This figure is similar to the 45% differential found by CHE (2013, p. 49) when comparing the 5-year CCRs for all Black and White students from the 2006 first-time entering undergraduate student cohort in South Africa.

Undergraduate ITE programme CRs by home language are broadly reflective of the disaggregated CRs for the respective race groups. Since virtually all African language students are Black, it is not surprising that the 5-year CCRs for African language and Black undergraduate ITE students are, with the notable exception of the 2004 cohort, very similar.[80] Afrikaans-speaking students have the highest 5-year CCRs, with the CRs for English-speaking students lying somewhere between that for Afrikaans and African language students.

5-year CCRs by province of enrolment varied considerably between the 2004 - 2009 undergraduate ITE cohorts. In some provinces, like Limpopo and KwaZulu-Natal, CRs seem to have increased on average, while the opposite is observed for the North West. However, there do not appear to be any clearly discernible trends in the patterns of changes for the other provinces.

The 5-year CCRs for the 2009 undergraduate ITE cohorts from the Western Cape, Eastern Cape, Free State, and North West provinces were all between 61.9% and 63.8% while those from Limpopo had the highest CCR (67.0%) . However, it should be noted that Limpopo accounted for only 2.5% of all individuals who commenced with undergraduate ITE programmes at contact HEIs between 2004 and 2009. By contrast, KwaZulu-Natal had the second highest 5-year CCR in 2009 and accounted for a far more meaningful 29% of individuals commencing with undergraduate ITE programmes at contact HEIs over the period. The primary reason why the overall 5-year CCR for the 2009 undergraduate ITE cohort from contact HEIs is lower than what might be expected given the respective provincial CRs, is that Gauteng, the province with the lowest 5-year CCR for the 2009 cohort, accounted for a relatively large share (28%) of all undergraduate ITE programme commencements in 2009.

Lastly, Table A.35 shows that the 5-year CCR for undergraduate ITE programmes over the period was highest among cohorts who commenced with their programmes at a young age. On average, the CCR for individuals who commenced with ITE programmes before the age of 20 was 35% higher than it was for those who entered such programmes between the ages of 20 and 24, which in itself was 13% higher

[80] The HEMIS data shows that, while about 86% of all Black students from the 2004 - 2009 undergraduate ITE cohorts were African-language speakers, the 2004 cohort had a disproportionately large number of Black English home language students (32%).

that the average CCR for older cohorts. Thus, while the CCRs for individuals who were 25 years old or older when they commenced with their ITE programmes fluctuated somewhat over time, it seems clear that, with all else being equal, the extent of ITE programme completion is highest among young cohorts.

When considering CR differentials between different age cohorts, it is important to bear in mind that senior students tend to differ from younger students (who generally enter university shortly after completing secondary school) in a number of ways that may affect the extent of programme completion over the medium term for the respective groups. For example, the percentage of older undergraduate ITE students (aged 25 and above) who commenced with programmes at Unisa between 2004 and 2009, rather than at contact HEIs, was more than twice as high as the percentage of younger undergraduate ITE students who did so. Many of these older students may thus have been studying towards their ITE programmes on a part-time basis only and, moreover, at an institution with a relatively low rate of student throughput in general. This is likely to at least partly explain why the 5-year CCRs differ so markedly across age cohorts.

Table A.35 presents estimated 3-year CRs for the 2004 - 2011 postgraduate ITE programme cohorts, disaggregated along the same time-invariant factors as discussed above. While there are many similarities regarding the dimensions over which CRs differ for both undergraduate and postgraduate ITE programmes, the table shows that the extent of programme completion is much higher for postgraduate students. Given that individuals who qualify for entry into postgraduate HE programmes must already have successfully completed some form of undergraduate HE qualification, this is to be expected. Postgraduate students generally constitute a more select group of individuals and it is not uncommon for them to have higher completion rates, on average, than undergraduate students. This is particularly true in the case of individuals who enrol for postgraduate diploma or certificate programmes.

While it is true that postgraduate ITE CRs are higher at contact HEIs than at Unisa, the extent of the difference is far less than in the case for undergradaute ITE programmes. For the 2004 - 2011 postgraduate ITE cohorts, the 3-year CCR at contact institutions was, on average, only 20.4% higher than at Unisa. Given that students generally take longer to complete their qualifications via distance education, it is therefore not unlikely that the 4-year or 5-year CCRs for postgraduate ITE students at Unisa may be just as high as, if not higher than, they are for students at contact HEIs.

The differences in the 3-year CCRs for postgraduate ITE students by gender, race, and home language are similar to those for the 5-year undergraduate ITE CCRs. On average, the 3-year CR for female postgraduate ITE cohorts between 2004 and 2011 was 18.5% higher than it is for males. Similarly, as in the case for undergraduate ITE programmes, Whites have the highest 3-year CRs in terms of postgraduate ITE programmes. It must be said, however, that the extent of the difference between White and Black 3-year CCRs declined significantly, on average between the 2004 - 2011 cohorts such that, for the 2011 postgraduate ITE cohort, the 3-year CCR for Whites was only 19% higher than it was for Blacks. The estimatesthus show that the gap between the 3-year CCRs for postgraduate Black/African-language students and other cohorts of postgraduate ITE students is closing rapidly over time. In fact, if one were to assume that the rate at which CRs changed for the respective race groups between 2004

and 2011 persisted for subsequent cohorts, the data suggests that the 3-year CCRs for postgraduate ITE programmes should more-or-less be the same among all race groups from the 2014 cohort onwards.

As in the case for undergraduate ITE programmes, it is difficult to discern a clear relationship between the province of enrolment and the 3-year CCR for postgradaute ITE programmes. However, it does seem to be the case that the CRs in question rose in all provinces, on average, between 2004 and 2011. While the provincial rank-ordering in terms of the 3-year CCRs varied between cohorts over the period, the Eastern Cape had the highest 3-year CCRs on average, whilst the Free State had the lowest.

Finally, the trends and differences in the 3-year CCRs for postgraduate ITE programmes by age cohort are effectively the same as for 5-year undergraduate ITE CCRs. One notable difference is that, in the context of postgraduate programmes, the better performing "younger" cohorts appear to also include individuals who commence with their programmes between the ages of 25 and 29. Again, this is in line with expectations given that individuals who commence with postgraduate studies must have already completed undergraduate study and, as such, will be older on average than undergraduate students at the point of commencement. In fact, individuals who commenced with postgraduate ITE programmes before the age of 20 accounted for less than 0.5% of all stundents in the 2004 - 2011 cohorts.

### 5.3.2 Disaggregated weighted-average completion rates by ITE cohort

The preceding section highlighted the extent to which the 5-year CCRs for undergraduate ITE students and 3-year CCRs for postgraduate ITE students differed between groups and cohorts between 2004 and 2011. However, as mentioned before, it is not just the ultimate extent of program completion that differs between groups of students, but also the average time taken to complete (hereafter *time to completion*) among those who manage to graduate. Consequently, it is important to investigate if and how the CR differentials reported in Tables A.35 and A.36 change over the duration of a cohort's studies in order to cast light on the extent to which certain differentials persist, shrink, or grow over time.

Table A.37 shows estimated weighted average 4-year, 5-year, and 6-year CCRs for undergraduate ITE students in the 2004 - 2008 cohorts alongside the weighted average 1-year, 2-year, 3-year, and 4-year CCRs for postgraduate ITE students in the 2004 - 2010 cohorts. These estimates provide an indication of the degree to which CRs and CR differentials change, on average, over time within ITE cohorts.

The estimates for undergraduate ITE students in Table A.37 make it apparent that most of the CR differentials identified in the preceding section are persistent over time. The estimated CR for female undergraduate ITE students, for example, remains around 8.6 to 9 percentage points higher than the figure for males, regardless of whether or not one looks at the 4-year, 5-year, or 6-year period. This translates into a marginal reduction in the female undergraduate ITE student CCR premium relative to males over time, from 32.7% after 4 years to 26.1% after 6 years.

The "relative narrowing" of CR differentials over the study-horizon appears to hold in general for undergraduate ITE programmes over all of the time-invariant dimensions under consideration. In general, the extent of this narrowing is fairly modest, owing to diminishing marginal CRs over the enrolment-horizon. A notable exception is the estimated undergraduate ITE programme CR differentials between

Unisa and contact HEIs which is shown to decline substantially between 4 and 6 years of study. This attenuation is again a reflection of the fact that undergraduate ITE students at Unisa generally take much longer to complete their programmes than students at contact HEIs. Despite this narrowing, however, it remains clear that the total CR for undergraduate ITE students at Unisa will ultimately still be much lower than it is at contact HEIs. This can partly be deduced from the fact that, 6 years after commencement, the CR among undergraduate ITE students at contact HEIs is estimated to still be more than twice as high as the equivalent figure for students studying via Unisa.

In terms of the persistence and relative narrowing of CR differentials between groups, what holds for undergraduate ITE students broadly appears to hold for postgraduate ITE students as well. For the most part, the differentials in ITE CRs between groups appear to decline only marginally in relative terms over the 2-4-year enrolment-horizon. Again, the differential between Unisa and contact HEIs is the notable exception, declining much faster over time than any of the other differentials considered. In fact, Table A.37 reveals that the average 4-year CCR for postgraduate ITE students at Unisa among the 2004 - 2010 cohorts was actually higher than it was at contact HEIs. This reiterates the point made above that it is not necessarily the case that fewer postgraduate ITE students at Unisa complete their programmes, but rather that those who do take longer to do so, on average, than students from contact HEIs.

## 5.4 Multivariate analysis

Unbiased univariate comparisons of disaggregated CRs between groups of ITE cohorts are confounded whenever there are significant differences in the underlying composition of the groups under consideration. For example, it seems fair to deduce from the estimates in Table A.37 that females outperform males in terms of ITE programme completion. However, if it were the case that far greater proportions of male ITE students study via Unisa than is the case for females, the differentials shown in Table A.37 may not necessarily mean that females outperform males in terms of completing ITE programmes. Instead, they may simply be capturing the fact that contact students generally have higher CRs than distance students.

The associations between demographic characteristics and institutional factors in South Africa HE mean that the CR differentials that are observed to manifest along any particular single dimension may, in truth, derive from several underlying interrelated dimensions. Failure to explicitly account for this fact can easily lead to misleading inferences. To get a better sense of the correlation between CRs and race, for example, it is necessary to explicitly control for any underlying compositional differences in terms of gender, qualification type, age, HEI type, and other factors that are likely not only to differ between race groups, but also to impact CRs. One of the ways in which this can be done is by using multiple regression to estimate CRs as a function of several dimensions simultaneously, thereby allowing more accurate identification of the true partial associations between cohort characteristics and CRs. The results of these estimations, while not necessarily accurately reflecting the true completion rates for the group in question, provide a more accurate sense of the extent to which CRs between groups would differ if other observable factors that can be controlled for were being held constant.

Tables A.38 and A.39 present the results from various estimations modelling CRs as functions of selected time-invariant factors available in aggregate HEMIS.[81] As before, the focus falls on the 4-year, 5-year, and 6-year CRs for undergraduate ITE programmes and the 2-year, 3-year, and 4-year CRs for postgraduate ITE programmes.

Broadly speaking, the regression results support the descriptive findings discussed above. Even after controlling for differences in gender, race, home language, age, and other factors, undergraduate ITE students at Unisa are found to have far lower CRs than undergraduate ITE students at contact institutions. While the extent of the undergraduate ITE CR-differential between Unisa and contact HEIs appears to decrease over the enrolment horizon, the results still indicate that, on average and with other factors held constant, CRs among Unisa's undergraduate ITE students are expected to be around 72% (or 47.4 percentage points) lower than they are at contact HEIs 6 years after commencement. By contrast, the estimation results indicate that, while there may also be large differences in the postgraduate ITE CRs at Unisa and at contact HEIs initially, these differences decline substantially after 2 years of study. In fact, the rate at which these differentials are found to decline over the enrolment horizon in the estimation results suggest that whatever differences between the postgraduate ITE CR at Unisa and the postgraduate ITE CR at contact HEIs remain after 5 or 6 years of study are unlikely to be statistically significant.

Again, these results suggest that it is not necessarily the extent of completion that differs between postgraduate ITE students at Unisa and contact HEIs, but rather the average time required to complete qualifications. Specifically, while the total CR among postrgraduate ITE students at Unisa and contact HEIs may ultimately be broadly similar, Unisa's completers take longer, on average, to complete their qualifications. The situation is markedly different for undergraduate ITE students. The results seem to imply not only that Unisa's undergraduate ITE students take longer to complete their qualifications than students at contact HEIs, but also that a far smaller percentage of Unisa's undergraduate ITE students ultimately graduate.

The regression estimates provide little new information on the nature of gender and racial CR differentials among ITE student cohorts, save to reaffirm the findings from the descriptive summaries in Table A.37. None of the other factors controlled for in the estimations can account for the fact that females have higher CRs for both undergraduate and postgraduate ITE programmes. Interestingly, while the magnitude of the gender differential for undergraduate ITE programmes decreases over the enrolment horizon, the opposite holds true for postgraduate ITE programmes. In other words, females not only appear to be more likely to complete ITE qualifications than male ITE students, but also to require less time, on average, to do so.

Significant racial ITE programme CR differentials remain even after other observable characteristics have been taken into account. In fact, the regression results suggest that White-Black and Indian-Black CR-differentials for undergraduate ITE programmes may be even larger than what is implied by the

[81] A series of regressions was also estimated to determine if and how the partial correlations between the various demographic and institutional dimensions and 5-year undergraduate ITE CCRs and 3-year postgraduate ITE CCRs, resepctively, changed over time between cohorts. The results from these regression (not shown) indicated that the estimated coefficients either remained relatively stable over cohorts or that they fluctuated marginally without any clearly discernible pattern or trend to those fluctuations.

simple univariate estimates in Table A.37. For example, the estimates in Table A.37 suggest that the 6-year undergraduate ITE CR is, on average, 16.8 percentage points (47.1%) higher for Whites than it is for Blacks. However, the coefficients in Tables A.38 and A.39 show that this estimated CR-differential may be closer to 17.9% (75.6%) once other underlying compositional differences have been controlled for. By contrast, the multivariate estimates suggest that racial CR differentials may be smaller in magnitude than those found in Table A.37. Notwithstanding, it seems clear that the magnitude of the differences that exist on average between the CRs for White, Indian, and Black ITE students increase over the enrolment horizon for both undergraduate and postgraduate programmes.

As expected, the coefficients on the home language variables in Tables A.38 and A.39 reveal that the observed univariate associations between home language and ITE program CRs are closely related to race. Thus, while the results confirm that Afrikaans and English undergraduate ITE students may be expected to have higher CRs than African language speakers, the extent to which these differences can be explained by language is not nearly as great as the estimates in Table A.37 would suggest. Moreover, the results show that the association between undergraduate ITE CRs and being either an English or an Afrikaans home language speaker (as opposed to an African language speaker), is only statistically significant and positive over the 4-year and 6-year enrolment horizons, and not over the 5-year horizon. This provides some insights into the timing of undergraduate programme completion among Black African language ITE graduates. Specifically, it suggests that while they are no less likely, on average, to graduate after 5 years than their English or Afrikaans counterparts, Black African language ITE students who have not yet graduated after 5 years are far less likely to ever do so than English or Afrikaans Black ITE students.

The association between home language and program completion at the postgraduate level is also interesting. The results show that what is initially a positive and statistically significant average association between English or Afrikaans and programme completion over the 2-year enrolment horizon, becomes statistically insignificant over the 3-year horizon, before becoming negative and statistically significant thereafter. Again, this change over the enrolment horizon reflects something about the differences in the extent and timing of postgraduate ITE completion among Black students. Specifically, it shows that Black African language ITE students on average perform better than other Black ITE sutdents in terms of the extent of postgraduate programme completion, but worse in terms of the time taken to complete. In other words, a greater percentage of Black African language students ultimately complete their postgraduate ITE programmes than Black English or Afrikaans students. However, those who do complete take longer, on average, to graduate than their Afrikaans and English counterparts.

The regression results provide mixed evidence regarding the associations between *age at programme commencement* and programme completion among undergraduate ITE students. It would seem as though older cohorts have higher CRs over the short-run enrolment horizon (4 years) than individuals who commence with their programmes below the age of 25. However, the results over the 5-year and 6-year horizons are inconclusive, save to suggest that a greater percentage of individuals who started their programmes while below the age of 20 ultimately graduate than those who were older at the time of commencement. The evidence regarding the association between *age at programme commencement* and CRs for postgraduate ITE programmes is more robust. Individuals who commence with their postgraduate ITE programmes between the ages of 20 and 24 are predicted to have higher CRs than

other age cohorts, regardless of the enrolment horizon under consideration. This result is hardly surprising. Individuals who commence with postgraduate ITE studies before the age of 25 are not only likely to have successfully completed their undergraduate studies in a relatively short period of time but may also be expected to benefit from a greater degree of continuity between undergraduate and postgraduate study than older cohorts.

Owing to the limitations of the data, the regressions underlying the estimates in Tables A.38 and A.39 only control for a limited selection of time-invariant factors. It is important to recognize that there are many other, potentially critical factors which are likely to differ between gender, language, race, and age groups and also relate to the extent and timing of HEI programme completion. The estimations do not, for example, account for differences in socio-economic background, income, or levels of secondary school performance between cohorts of students. It may well be that the unexplained gap in CRs between race groups, for example, becomes insignificant if one were to control for these and other factors. Unfortunately, the present estimations cannot shed light on the extent to which this may or may not be the case. What is clear though, is that the demographic distribution of newly qualified, potential teachers, is not simply a function of the demographic composition of FTEN in ITE programmes, but is also driven by the differences in programme CRs between various ITE student cohorts, as identified above.

# 6 Implications for teacher supply in South Africa

Increasing the supply of qualified teachers in South Africa is essential for ensuring a functional schooling system. However, teacher supply is not only a pressing issue, but also one which is inherently complex and difficult to unpack. Understanding it well requires an approach that is simultaneously comprehensive, yet nuanced.

This paper has taken an admittedly narrow view on the issue of qualified teacher supply in South Africa by focussing predominantly on quantitative aspects pertaining to the production of new ITE graduates by the public HE system between 2004 and 2013. Nevertheless, by focussing on the trends in first-time enrolments and graduations in ITE programmes, the throughput of ITE programme students, and the foremost demographic and geographic correlates underlying these measures, the findings from the empirical analysis presented above provide several insights into the nature and extent of qualified teacher supply in the country.

In order to synthesise the paper's main findings, it is useful to contextualise them within a simple conceptual framework of qualified new teacher supply, such as the one presented in Figure 6.1. At a basic level, one can think of qualified new teacher supply as a continuous cycle involving four phases, each of which comprises a range of objectives. In the *recruitment* phase, individuals are attracted into initial teacher programmes with a view to becoming qualified teachers. In the *conversion* phase, ITE programme students are converted into qualified and competent potential teachers through the training they receive. This is followed by an *absorption* phase in which newly qualified ITE graduates are absorbed into the teaching profession as qualified new teachers in the schooling system. Lastly, there is a *retention and utilisation* phase in which new teachers are retained within the schooling system for an extended period of time, further developed as educators, and utilised appropriately.

Critically, the qualified teacher supply chain is only as strong as its weakest link. Weaknesses in a particular phase not only serve to constrain teacher supply, but also compound the adverse consequences of any weaknesses in the other phases. Ensuring that the supply of qualified and competent teachers in South Africa is sufficient to meet demand therefore arguably necessitates interventions that speak to each of the four aforementioned phases of the qualified teacher supply process. In light of this, this section relates the implications of the findings presented throughout this paper to the various objectives underlying the teacher supply process and also highlights which critical questions pertaining to teacher supply in South Africa remain unanswered.

## 6.1 Recruitment into initial teacher training

The numbers of individuals entering ITE programmes for the first time at public HEIs rose significantly over the past decade, effectively doubling between 2004 and 2013 due largely to the substantial rise in the numbers of individuals entering undergraduate ITE programmes. Moreover, FTEN in ITE programmes not only grew fast in absolute terms, but also when compared to the growth in FTEN in other non-ITE undergraduate degree and postgraduate diploma/certificate programmes.

**Figure 6.1:** Basic conceptual framework of qualified new teacher supply

| Phase | Basic Objective | Nuanced Objectives |
|---|---|---|
| *1. Recruitment* | Ensure that sufficient numbers of individuals enrol in ITE progammes | Ensure that sufficient numbers and the right types of individuals<br>• want to become teachers<br>• are able to enrol in ITE programmes<br>• enrol in high quality ITE programmes<br>• choose to specialize in subjects and phases for which demand is greatest |
| *2. Conversion* | Ensure that sufficient numbers of ITE students (a) complete their programmes and (b) do so within the shortest possible amount of time | Ensure that sufficient numbers of ITE students<br>• acquire the necessary competencies and relevant experiences to be effective and motivated teachers<br>• are able to succesfully complete their initial teacher training with minimal repetition or delay<br>• are adequately prepared for the realities of teaching in South Africa schools |
| *3. Absorption* | Ensure that sufficient numbers of new ITE graduates are absorbed into teaching posts with minimal delay | Ensure that sufficient numbers of new ITE graduates<br>• Want to become teachers<br>• Apply for teaching positions<br>• Are placed in the right schools with minimal delay |
| *4. Retention and utilisation* | Ensure that sufficient numbers of new teachers stay in the schooling system for an extended period of time | • Minimize the extent of teacher turnover, voluntary attrition, and early retirement<br>• Ensure that teachers are utilised appropriately<br>• Provide adequate development and further training for teachers |

Some have argued that the growth in FTEN in ITE programmes since 2004 can largely be attributed to the expansion of funding opportunities for ITE students. It is certainly true that the introduction and subsequent expansion of the FLBP coincided with the rapid rise in ITE programme FTEN since 2006. In addition, the relative availability of NSFAS awards to undergraduate ITE programme students also appears to have increased over this period. It would thus seem as though the availability of financial support to ITE programme students has increased in relative, if not also in absolute, terms since 2004. However, while it may be plausible to believe that this increased availability of financial support may have influenced enrolments in ITE programmes, one cannot draw definitive causal inferences regarding the relationship between the FLBP, NSFAS, and enrolments in ITE programmes from the findings presented here or those presented in other existing studies. More evidence is needed on the extent to which these factors have truly served to incentivise new enrolments in ITE programmes, rather than merely providing funding opportunities for an already expanding group of ITE students in the public HE system.

While present trends in FTEN in ITE programmes are arguably encouraging from the perspective of new teacher recruitment, present levels of enrolment are not. Even with a 100% completion rate, the numbers of individuals currently entering ITE programmes would in all likelihood still only just be enough to ensure that the numbers of ITE graduates produced within the next three to five years would satisfy lower-bound estimates of current annual qualified teacher demand. In reality, low programme throughput in general implies that the numbers of ITE graduates being produced will fall far short of this already low benchmark.

If the public HE system is to start consistently producing sufficient numbers of ITE graduates within the next decade, it is essential that current trends in ITE programme FTEN persist. Yet, it is difficult to see how these trends can be sustained unless HEIs have access to significant additional resources and the public HE system experiences an unprecedented expansion of its infrastructural and instructive capacity to accommodate additional ITE students every year. Unfortunately, the potential for such changes is questionable. Qualitative evidence already suggests that the decline in ITE FTEN at Unisa between 2011 and 2013 was the direct consequence of new policies that were implemented to curtail the excessively rapid rise in individuals entering such programmes at the university. Given that Unisa has been the major driver of growth in ITE FTEN since 2004 and that, in many ways, it faces fewer physical constraints to expansion than most contact HEIs, the need for such policies at the institution does not bode well for the system's ability to accommodate ever increasing numbers of ITE programme students.

Of course, recruitment is not just about getting sufficient numbers of individuals to enrol in ITE programmes, but also about getting the right types of individuals to specialise in the right subjects and schooling phases at the right HEIs. It is well-known, for example, that the demand for qualified teachers in South Africa is unequally distributed across lines of race and language with the need for greater numbers of qualified African-language teachers being particularly acute. In light of this, it is encouraging that the growth in ITE programme FTEN has been particularly strong among Black, African language mother-tongue speakers. Despite these trends, however, levels of enrolment in ITE programmes among African language students still remain far too low to ensure that sufficient numbers of qualified African language teachers are being produced, particularly given the fact that African language

students appear to have far lower programme completion rates, on average, than English or Afrikaans ITE students.[82]

The data also shows that there has been a substantial increase in the number of young individuals entering ITE programmes between 2004 and 2013. Again, this trend is encouraging and has had the effect of lowering the overall age profile of first-time ITE programme students. Nonetheless, individuals entering ITE programmes remain older, on average, than those who enrol in non-ITE undergraduate degree and postgraduate diploma/certificate programmes. In fact, the median age of entry into undergraduate ITE programmes remains roughly two years more than the median age of entry into non-ITE undergraduate degree programmes. It is not immediately clear why such a difference in the age-at-entry exists, yet this clearly has implications for the age at which individuals can graduate from ITE programmes and enter the labour market for the first time.

As far as the recruitment of individuals into ITE programmes in South Africa is concerned, the findings from other studies in conjunction with those presented in this paper point to a sobering reality. First, it remains the case that too few individuals are enrolling in ITE programmes at public universities, despite significant growth in FTEN in ITE programmes since 2004. Second, it is doubtful whether the public HE system can sustain the level of growth in ITE programme FTEN that has been seen in recent years without significant additional support from government and access to substantial additional resources. Third, and perhaps most disconcertingly, even if FTEN in ITE programmes continue to grow as it has since 2006, the underlying composition of ITE programme students is unlikely to be conducive to producing the kinds of ITE graduates that the schooling system needs the most.

## 6.2 Conversion of ITE programme students into qualified potential teachers

Recruitment into ITE programmes is critical as the number of individuals entering such programmes effectively sets the limit on the numbers of individuals who can qualify to teach in South African schools. However, it is not just the numbers of individuals entering ITE programmes, but also the types of individuals and the institutions where they study that ultimately determine how many and the types of ITE graduates are produced. As such, it is not recruitment into ITE programmes itself that is important for qualified teacher supply, but rather what the nature of that recruitment means for the conversion of ITE students into qualified potential teachers. In the end, the trends in ITE programme graduations not only lag behind movements in ITE programme FTEN, but are also invariably influenced by the composition of those enrolments.

Graduations in ITE programmes grew rapidly between 2008 and 2013, increasing almost threefold in just 6 years. Yet, this growth occurred from a very low base. The public HE system produced only about 15 650 ITE graduates in 2013, just 50% more than it did in 2004. The message regarding ITE graduations is thus similar to the message regarding ITE programme FTEN: while current trends are encouraging, current numbers are still not sufficient to satisfy demand. Moreover, while the projections presented in this paper suggest that the HE system could potentially start to produce sufficient numbers

[82] Also, it is important to note that the substantial growth in ITE programme FTEN among African language students has chiefly been limited to isiZulu, and to a lesser extent, isiNdebele and SeSotho speakers (Table A.20).

of ITE graduates each year to satisfy demand within the next decade, these projections are conditional on sustained growth in ITE programme FTEN and sustained levels of ITE programme throughput. Various changes in the nature of enrolments in ITE programmes since 2004 mean that these prospects are dubious at best.

Perhaps the most important change to occur in the ITE landscape since 2004 is the fact that Unisa has begun to account for ever-increasing shares of FTEN in ITE programmes in the public HE system. Unisa experienced unprecedented growth in FTEN in ITE programmes between 2006 to 2013 and accounted for half of all individuals entering ITE programmes for the first time in the public HE system between 2008 and 2013. This not only has implications for the numbers and types of ITE graduates that the HE system is likely to produce, but also for the time it will take to produce them. Only a small percentage of individuals who commence with undergraduate ITE programmes at Unisa ever complete those programmes. Moreover, those who do graduate take a much longer time to do so than students who graduate from contact HEIs. Similarly, while the ultimate extent of postgraduate ITE programme completion at Unisa may be similar to, if not higher than, it is at contact HEIs, Unisa students still tend to take longer, on average, to complete their programmes.

It is problematic that much of the expansion of FTEN in ITE programmes since 2004 has been limited to what has historically proved to be one of the least efficient parts of an already generally inefficient public HE system. Increased enrolments in ITE programmes will count for little if they do not lead to commensurate increases in ITE graduations. Indeed, the compositional shift in ITE programme enrolments between Unisa and contact HEIs most likely means that there will be a continued divergence between the rate of growth in ITE programme FTEN and the growth in graduations from such programmes. This inefficiency is clearly costly both in terms of the supply of qualified teachers in South Africa and the funding of ITE students at South African HEIs. If interventions aimed at improving the production of qualified new teachers in South Africa are to be effective, it is clear that they will need to speak directly to the low levels of throughput at Unisa and the implications that this is likely to have for the production of ITE graduates in the public HE system as a whole.

Finally, it is worth highlighting that qualifying to teach in a South African school by virtue of completing an ITE qualification at a public HEI by no means guarantees that one will be a good or a competent teacher. Several studies have expressed serious concerns about the quality of ITE programmes at some South African HEIs and the quality of the ITE graduates they consequently produce.[83] It is therefore important that the focus on improving ITE programme throughput is not misplaced. Instead, it is imperative that quality of training issues are addressed and that ITE students are not merely *pushed through* the HE system. Converting ITE enrolments into ITE graduates is little more than a rubber-stamping exercise if those graduates have not acquired the necessary competencies and relevant experiences required to be effective and motivated teachers in South African schools by the time they leave university. Unfortunately, it is not only the case that very few ITE students ultimately graduate with ITE qualifications in South Africa, but also that very few ITE graduates leave university with the kinds of competencies that would make them quality, rather than simply qualified, teachers.

[83] See CHE (2010), for example, for a review of the quality of ITE programmes at various HEIs in South Africa.

## 6.3 Absorption into the teaching profession

Getting increasing numbers of individuals to enter ITE programmes and graduate with qualifications that allow them to teach in South African schools is arguably a necessary precondition for increasing the supply of qualified teachers in South Africa. Yet, it is critical to understand that it cannot be a sufficient condition. For ITE graduate production to truly influence qualified teacher supply, it is essential that sufficient numbers of newly qualified potential teachers are absorbed into the schooling system as qualified new teachers.

The absorption of ITE graduates is a supply as a well as a demand side issue. On the supply side, absorption requires that new ITE graduates must firstly want to become teachers and, moreover, take active steps towards applying for teaching positions. On the demand side, absorption requires that new teaching vacancies are well-advertised and that individuals who apply for positions for which they are adequately qualified are appointed to posts by the relevant schools and/or provincial education departments. Unfortunately, there is evidence to suggest that both supply and demand-side inefficiencies are driving a wedge between the numbers of ITE graduates produced by the HE system and the numbers of newly qualified individuals joining the schooling system each year.

As discussed above, it is clear that not all individuals who qualify to teach in South African schools endeavour to do so. Because of this, large numbers of ITE graduates are effectively lost to the South African schooling system. There remains a need to better understand why individuals enrol in ITE programmes and the extent to which their decision to do so implies that they are likely to seek employment as teachers in the South African schooling system subsequent to graduation. These motivations also have important implications for the nature of the interventions that have thus far been used to increase the production of new ITE graduates in South Africa. While the findings in this paper suggest that ITE programmes have become relatively more attractive as fields of study since 2004, it is important to understand that this does not mean that the teaching profession in South Africa has become more attractive as a field of employment. Ultimately, qualified teacher supply is not a function of the numbers of individuals who want to study ITE programmes, but rather of the numbers of individuals who want to become teachers and are able to do so. Interventions aimed at increasing the supply of qualified teachers in the country can therefore only be effective in the long run if they also address the deteriorating status of the teaching profession in South Africa.

Teacher supply is not only impacted by the extent of ITE graduate absorption, but also by the time it takes for ITE graduates to be absorbed into the schooling system. The younger overall age profile among new ITE graduates means little if there are significant delays in absorbing young ITE graduates into the teaching profession. The window of opportunity for the DBE to reach its strategic goal of increasing the number of qualified teachers below the age of 30 is very narrow. Nearly 40% of new ITE graduates below the age of 30 are between the ages of 25 and 29. Any significant delays in the absorption of new ITE graduates into the teaching profession will therefore substantially reduce the available pool of qualified young potential teachers in the country. In this regard, it is worrying that the number of qualified individuals aged 30 or younger who entered the schooling system as teachers for the first time between 2012 and 2013 amounted to only 51% of new ITE graduates below the age of 30 produced by the public HE system between 2011 and 2012.

More generally, given that only a proportion of new ITE graduates seek employment as teachers, it is disconcerting to hear of reports that many newly qualified potential teachers are either unaware of relevant teaching vacancies in their provinces or are unable to find employment after extended periods of searching for work. What is particularly worrisome is the prevalence of practices in some provinces whereby older, unqualified individuals are employed in teaching positions despite the fact that there are qualified younger ITE graduates who apply for those positions.

Lastly, even if greater numbers of ITE graduates applied for teaching positions and greater numbers of applicants were appointed to teaching posts, the fragmented nature of teacher demand and supply in South Africa means that it remains unlikely that sufficient numbers of teachers will be appointed to the schools where they are needed the most. The fact of the matter is that the incentive structures facing new ITE graduates are rarely aligned with the socio-demographic dimensions of teacher demand in South Africa. The part of the schooling system where the demand for qualified new teachers is probably also the part of the schooling system where new ITE graduates are least likely to seek employment. In effect, there remains a mismatch between the types of schools where new qualified teachers are needed the most and the types of schools where newly qualified potential teachers want to work. While service-linked funding programmes such as the FLBP aim to remedy this situation, there are limits to the extent to which they can do so.[84] Ultimately, the only way of ensuring that greater numbers of new ITE graduates apply for teaching positions in poor and rural schools is by ensuring that they have incentives to do so.

## 6.4 Retention and utilisation of newly employed teachers

The retention of qualified practising teachers in the schooling system and the production and subsequent absorption of newly qualified ITE graduates serve complementary roles in the supply of qualified teachers in South Africa. Even if increased levels of ITE graduate production lead to greater numbers of qualified new teachers being employed in South African schools in the short run, its long-run impact on qualified teacher supply will depend on the extent to which newly employed teachers can be retained within the schooling system.

A number of studies have alluded to the fact that teacher retention and turnover rates in South African schools appear to be deteriorating over time with ever larger numbers of practising teachers leaving the system each year. What makes the situation particularly problematic is that teacher attrition appears to be highest amongst qualified teachers. This clearly has negative implications for qualified teacher supply.

In light of an ageing teachers corps, the DBE's drive to increase the number of qualified young individuals entering the teaching profession is commendable. However, getting younger individuals to enter teaching is only part of the solution. If the age profile of the teaching workforce is to change meaningfully, it is not only imperative that greater numbers of younger teachers enter the teaching profession, but also that greater numbers of those individuals are retained as teachers for a meaningful period of time. Moreover, if the increased supply of qualified new teachers in the country is to

[84] In fact, there is already evidence that some Funza Lushaka bursars have refused to be placed in certain schools.

make a real difference to the education system, it is important that teachers are not just retained, but also developed and utilised appropriately. Unfortunately, while there is little systematic information on teacher utilisation in South African schools, qualitative evidence suggests that many teachers are employed to teach subjects for which they are not trained.

## 6.5 Understanding teacher supply: the need for better and more integrated information

While this paper has viewed teacher supply through a particularly narrow quantitative lens and therefore cannot shed light on many of the issues that have important bearing on qualified teacher supply in South Africa, the analysis and discussion presented above nevertheless provides new insights into the scale and shape of the production of qualified potential new teachers by the public HE system. However, it is important to emphasise that the accuracy of these insights are only as good as the data on which they are based. While every step has been taken to ensure that the results presented here are representative of the underlying data, methodological rigour can never fully compensate for incomplete or inaccurate data.

Many of the critical unanswered questions pertaining to teacher supply in South Africa remain unanswered primarily because the type of data required to answer such questions cannot be accessed by researchers. In conjunction, the Annual Survey of Schools (ASS), PERSAL, and HEMIS databases contain incredibly rich information on the types of individuals who are studying to become teachers and the types of individuals who are ultimately employed as teachers in South African schools. Individually, these datasets could be used to provide far more fine-grained information on the types of individuals entering and subsequently graduating from teacher training programmes at South African universities, or the types of individuals entering or leaving the teaching profession each year than is currently available in the literature. Moreover, linking information across the various data would provide invaluable information regarding the dynamics of teacher demand and supply in South Africa. By linking HEMIS and PERSAL, for example, one could for the first time analyse the transition between the production of ITE graduates by the public HE system and the absorption of ITE graduates into the teaching profession. Unfortunately, for various reasons - none of which are compelling - access to ASS, PERSAL, and HEMIS is restricted to the point where few researchers are ever able to access even crude subsets of the data. Moreover, there is no evidence than any attempts have been made to integrate or link detailed information across these datasets.

The ability to ensure that South Africa has sufficient numbers of adequately qualified competent teachers necessitates a comprehensive understanding of current and future teacher supply and demand in the country. It is true that there are already numerous studies on teacher demand and supply in South Africa. Yet despite the extant body of evidence, our understanding of teacher demand and supply remains sorely lacking. Sadly, our understanding of this issue and the ways in which we choose to address it, will remain lacking as long as there is a systemic failure to fully exploit and integrate existing sources of information on teacher production in the HE system and teachers flows in the schooling system.

# References

ANC (2014). Radical Socio-Economic Transformation for Women: Women and Education. Report, African National Congress (ANC).

Arends, F. (2010). Teacher Shortages?: The need for more reliable information at school level. *Review of Education, Skills Development and Innovation (RESDI)* **2010**.

Armstrong, P. (2009). Teacher pay in South Africa: How attractive is the teaching profession? Stellenbosch Economic Working Paper 04/09, Department of Economics and the Bureau for Economic Research at the University of Stellenbosch.

Bertram, C., Appleton, S., Muthukrishna, N. and Wedekind, V. (2006). The career plan of newly qualified South African teachers. *South African Journal of Education* **26**(1).

Bertram, C., Wedekind, V. and Muthukrishna, N. (2007). Newly qualified South African teachers: Staying or leaving. *Perspectives in Education* **25**(2).

Boyd, D., Lankford, H., Loeb, S. and Wyckoff, J. (2003). The Draw of Home: How Teachers' Preferences for Proximity Disadvantage Urban Schools. Working Paper 9953, National Bureau of Economic Research.
[online] available from http://www.nber.org/papers/w9953

Branson, N., Leibbrandt, M. and Zuze, T. L. (2009). The Demand for Tertiary Education in South Africa. Research report, Southern Africa Labour and Development Research Unit (SALDRU), University of Cape Town (UCT).

Cameron, A. C. and Trivedi, P. K. (2009). *Microeconometrics Using Stata*. College Station: Stata Press.

CDE (2011). Value in the classoom: The quantity and quality of South Africa's teachers. CDE in depth september 2011, Johannesburg: Centre for Development and Enterprise.

CDE (2015). Teachers in South Afriaca: Supply and Demand 2013-2025. Cde in depth, Centre for Development and Enterprise.

CEPD (2009*a*). Access to Pre-Service Teacher Education. In *Joint Centre for Education Policy Development (CEPD) and UMALUSI seminar hosted by the CEPD*, WITS Education Campus, Johannesburg: CEPD.

——— (2009*b*). Choices in the design, delivery and management of initial professional teacher education in South Africa: Increasing diversity, quality and success. Synthesis report, Centre for Education Policy Development (CEPD).

——— (2009*c*). Choices in the design, delivery and management of initial professional teacher education in South Africa: Increasing diversity, quality and success. Research report, Centre for Education Policy Development, Braamfontein.

CHE (2010). Report on the National Review of Academic and Professional Programmes in Education. He monitor no. 11, Council on Higher Education.

——— (2013). A proposal for undergraduate curriculum reform in South Africa: The case for a flexible curriculum structure. Report of the task team on undergraduate curriculum structure, Council on Higher Education.

CHEC (2009). Educator Supply and Demand in the Western Cape. Tech. rep., Cape Higher Education Consortium and Western Cape Education Department.

——— (2013). *Pathways from University to Work: A Graduate Destination Survey of the 2010 Cohort of Graduates from the Western Cape Universities*. Wynberg: Cape Higher Education Consortium (CHEC).

Chisholm, L. (2009). *An Overvie of Research, Policy, and Practive in Teacher Supply and Demand 1994 - 2008*. Teacher Education in South Africa Series, Cape Town: HSRC Press.

Cosser, M. (2008). Anyone for teaching? Students, Teachers and Choices in South Africa.

——— (2009). *Studying Ambitions. Pathways from Grade 12 and the Factors that Shape them*. Teach Education in South Africa Series, Cape Town: HSRC Press.

Crouch, L. and Perry, H. (2003). *Human resources development review 2003: Education*, chap. Educators, pp. 477 – 499. HSRC Press.

DBE (2009). Information Guide on Initial Teacher Education. Information guide, Department of Basic Education.

——— (2011). School Realities 2011. Report, Department of Basic Education.

——— (2012*a*). Report on Funza Lushaka Bursary Programme in 2012. Report, Department of Basic Education.

——— (2012*b*). WQ 1076 NA Funza Lushaka bursaries, 04 May 2012. National assembly internal question paper 11/2012, Department of Basic Education.
[online] available from http://www.education.gov.za/Newsroom/ParliamentaryQuestions/2012ParliamentaryQuestions/tabid/709/ctl/Details/mid/1991/ItemID/3375/Default.aspx

——— (2013). Department of Basic Education on its First Quarter 2013/14 Performance Report. Online. [online] available from https://pmg.org.za/committee-meeting/16521/

——— (2014*a*). Five-Year Strategic Plan 2014/15 - 2018/19. Strategic plan, Department of Basic Education.

——— (2014*b*). School Realities 2014, EMIS 14/2/010. Report, Department of Basic Education.

DBE and DHET (2011). Integrated Strategic Planning Framework for Teacher Education and Development in South Africa 2011 - 2025. Technical report, Pretoria: Department of Basic Education (DET) and Department of Higher Education and Training.

de Villiers, P., van Wyk, C. and van der Berg, S. (2013). The first five years project - a cohort study of students awarded NSFAS loans in the first five years 2000 - 2004. Stellenbosch Economic Working Paper 11/13, Department of Economics and the Bureau for Economic Research at the University of Stellenbosch.

Deacon, R. (2010*a*). Educating the Educators: Challenges facing Teacher Education and Development in South Africa. *FOCUS* **2010**(59), pp. 38 – 43.

——— (2010*b*). Teacherr Demand, Supply and Quality in South Africa and in International Perspective: A Review of the Literature. Cde draft publication, Centre for Development and Enterprise.

DHET (2010). The Supply and Development of Teachers by Public Higher Education Institutions in South Africa. Report, Department of Higher Education and Training.
[online] available from http://www.sace.org.za/upload/files/Teacher%20production%20and%20development%20by%20public%20HEIs%20.pdf

——— (2011*a*). National Qualifications Framework Act 67 of 2008: Policy on the Minimum Requirements for Teacher Education Qualifications. Act, Department of Higher Education and Training.

——— (2011*b*). Trends in Teacher Education 2009-2010: Teacher Education Enrolment and Graduation Patterns at Public Universities in South Africa. Report, Department of Higher Education and Training.

DHET, CHE and SAQA (2008). Procedures and Guidelines for Academic Programme AApplication: 2009 and 2010. Communiqué, Department of Higher Education and Training, Council on Higher Education and South African Qualifications Authority.

DOE (2005*a*). Education Statistics in South Africa at a Glance in 2004. Report, Department of Education.

——— (2005*b*). Teachers for the Future: Meeeting Teacher Shortages to Achieve Education For All. Report, Department of Education (DOE).

——— (2006). The National Policy Framework For Teacher Education and Development In South Africa. Policy paper, Department of Education, Pretoria.

DoE (2007). School Realities 2007. Report, Department of Education.

DOE (2008). *Classification of Educational Subject Matter*. Department of Education, Pretoria.
[online] available from http://www.dhet.gov.za/Management%20and%20Information%20Systems/CESM%20August%202008.pdf

DoE (2009). School Realities 2009. Report, Department of Education.

DOE (2014). VALPAC - Specifications for unit record student, staff, and building space collections. Website.
[online] available from http://41.72.139.116/Valpac_Help/Main_menu.htm

Erens, G., Louw, J. and Venter, R. (1982). *Classification of Educational Subject Matter (SA-CESM)*. Department of Education (DOE), first edition manual: sapse-003 edn.

Gordon, A. (2009). Restructuring Teacher Education. Issues in Education Policy 6, Centre for Education Policy Development (CEPD).

Green, W., Adendorf, M. and Mathebula, B. (2014). 'Minding the gap?' A national foundation phase teacher supply and demand analysis: 2012-2020. *South African Journal of Childhood Education* **2**(4), pp. 1–23.

Gujarati, D. (2003). *Basic Econometrics*. New York: MeGraw-Hill.

Gurgand, M., Lorenceau, A. and Mélonio, T. (2011). Student Loans: Liquidity Constraint and Higher Education in South Africa. Working Paper 117, Agence Française de Cévelopment.

Gustafsson, M. (2014). Inflow of new teachers into the public system. Indicator report, Department of Basic Education.

HEDA (2014). Higher Education Data Analyzer.
[online] available from http://www.heda.co.za/pds/background.aspx

HSRC (2005). *Educator Supply and Demand in the South African Public Education System*. Cape Town: HSRC Press.

——— (2013). *Towards a 20 year review: Basic and Post School Education*. Education and Skills Development, Cape Town: HSRC Press.

JET (2014). The Initial Teacher Education Research Project: An examination of aspects of initial teacher education curricula at five higher education institutions. Progress report, Joint Education Trust (JET).

Keevy, J., Green, W. and Manik, S. (2014). The Status of Migrant Teachers in South Africa. Implications for policy, research, practice. Report, The South African Qualifications Authority.

Lewis, F. (2008). Re-thinking teacher education and development - Can other models provide a solution for improving teacher training programmes? In *Reflections on the Human Capital Development Strategy (HCDS): the third series of conceptual papers supporting the implementation of the HCDS*, Western Cape Education Department (WCED).

Manik, S. (2014). South African Migrant Teachers' Decision-Making: Levels of Influence and 'Relative Depravation'. *Journal of Southern African Studies* **40**(1), pp. 151 – 165.
[online] available from http://dx.doi.org/10.1080/03057070.2014.889360

Mashiya, N. (2014). Becoming a (male) foundation phase teacher: A need in South African schools? *South African Journal of Childhood Education* **4**(3), pp. 24 – 36.

NATIONAL PRESIDENCY (2013). National Evaluation Plan 2014/15 - 2016/17. Tech. rep., Department of Performance Monitoring and Evaluation.

National Treasury (2014). Budget 2014. Estimates of National Expenditure. Vote 15: Basic Education. Budget, National Treasury.

NPC (2011). National Development Plan: Vision for 2030. Tech. rep., Pretoria: National Planning Commission.

OECD (2008). *Reviews of National Policies for Education: South Africa*. OECD Publishing.

——— (2013). *OECD Economic Surveys: South Africa 2013*. OECD Publishing.
[online] available from http://dx.doi.org/10.1787/eco_surveys-zaf-2013-en

Onwu, G. O. M. and Sehoole, C. T. (2011). Why Teachers matter: Policy issues in the professional development of teachers in South Africa. In *Africa-Asia University Dialogue for Educational Development Report of the International Experience Sharing Seminar(2) - Actual Status and Issues of Teacher Professional Development*, CICE Series 4, pp. 121–136, Hiroshima University: Center for the Study of International Cooperation in Education.

Paterson, A. and Arends, F. (2009). Teacher Graduate Production in South Africa. Human sciences research council report, Cape Town: HSRC Press.

Pretorius, F. (2008). Keeping abreast of changing times and demands in education: Implications for teacher education in South Africa. *South African Review of Education* **14**(1-2), pp. 165 – 182.

Pritchett, L. (2000). Where has all the education gone? Tech. rep., World Bank.

SACE (2010). A review of teacher demand and supply. Identifying research gaps and the role of SACE. Tech. rep., South African Council for Educators.

——— (2011). Teacher Migration in South Africa. Advice to the ministries of basic and higher training, South African Council for Educators.

Simkins, C. (2015). Teacher Supply and Demand in South Africa: 2013 to 2012. Technical report, Centre for Development and Enterprise.

Steyn, M. G., Harris, T. and Hartell, C. G. (2014). Institutional factors that affect blackck South African students' perceptions of early chilchild teacher education. *South African Journal of Education* **34**(3).

van Schalkwyk, F. (2013). Supply-side variants in the supply of open data in university governance. In *Processings of the 7th International Conference on Theory and Practice of Electronic Governance*, pp. 334– 337, ACM New York.
[online] available from http://dx.doi.org/10.1145/2591888.2591948

Van Zyl, D. and Barnes, G. (2012*a*). An institutional profile of UNISA: UNISA Facts & Figures. Report, Department of Institutional Statistics & Analysis.

——— (2012*b*). An update of the institutional profile of UNISA. HEMIS 2007 - 2011. Report, Department of Institutional Statistics & Analysis.

# A Tables

**Table A.1:** Total headcount enrolments, FTEN, and graduations in ITE and non-ITE programmes (2004 - 2013)

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **Graduates** | **Enrolments** | **FTEN** | **Graduates** |
| 2004 | 39 892 | 13 229 | 10 506 | 330 710 | 109 879 | 45 537 |
| 2005 | 29 316 | 12 258 | 7 626 | 336 364 | 111 588 | 48 685 |
| 2006 | 29 884 | 9 469 | 7 188 | 346 104 | 105 466 | 51 059 |
| 2007 | 29 926 | 10 950 | 6 413 | 355 782 | 118 710 | 52 611 |
| 2008 | 34 641 | 12 807 | 6 159 | 365 718 | 116 779 | 55 512 |
| 2009 | 42 151 | 16 553 | 6 953 | 384 374 | 129 693 | 59 193 |
| 2010 | 52 477 | 18 832 | 8 284 | 412 069 | 130 574 | 62 770 |
| 2011 | 74 038 | 28 947 | 10 540 | 429 184 | 134 266 | 64 824 |
| 2012 | 86 880 | 29 737 | 13 153 | 445 997 | 143 133 | 71 094 |
| 2013 | 94 127 | 26 503 | 15 655 | 465 755 | 144 692 | 78 177 |

NOTES: Figures represent the estimated numbers of total headcount enrolments, first-time enrolments (FTEN), and graduations for undergraduate and postgraduate ITE programmes and for non-ITE undergraduate degree and post-graduate diploma/certificate programmes respectively.

**Table A.2:** Estimated total growth (%) and average annual growth (%) in ITE and non-ITE total headcount enrolments, FTEN, and graduations

**(a)** Total growth (%)[1]

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Period** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2000 - 2004 | 16.89 | 5.65 | 31.34 | 18.94 | 12.07 | 9.74 |
| 2004 - 2008 | −13.16 | −3.19 | −41.38 | 10.59 | 6.28 | 21.90 |
| 2008 - 2013 | 171.72 | 106.94 | 154.21 | 27.35 | 23.90 | 40.83 |
| 2004 - 2013 | 135.95 | 100.35 | 49.01 | 40.84 | 31.68 | 71.68 |

**(b)** Average annual growth rates (%)[2]

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Period** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2000 - 2004 | 4.39** | 3.06 | 7.53 | 4.54* | 2.38 | 2.51 |
| 2004 - 2008 | −2.58 | −1.76 | −11.68** | 2.61*** | 1.85* | 4.85*** |
| 2008 - 2013 | 23.94*** | 18.10** | 21.51*** | 4.96*** | 4.07** | 6.77*** |
| 2004 - 2013 | 14.09** | 12.84** | 6.38 | 4.10*** | 3.59*** | 5.80*** |

NOTES: [1]Figures represent the total percentage change in the dependent variable(s) over the indicated periods.[2]Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.3:** Total headcount enrolments, FTEN, and graduates in ITE and non-ITE programmes by programme level (2004 - 2013)

**(a)** Undergraduate degree programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2004 | 27 688 | 8 385 | 5 962 | 322 182 | 105 426 | 41 716 |
| 2005 | 23 187 | 9 240 | 4 789 | 328 326 | 107 186 | 44 964 |
| 2006 | 24 524 | 7 176 | 4 631 | 338 404 | 101 218 | 47 501 |
| 2007 | 24 745 | 8 581 | 4 162 | 347 069 | 114 278 | 48 879 |
| 2008 | 28 678 | 10 129 | 3 722 | 355 529 | 111 223 | 51 336 |
| 2009 | 35 400 | 13 412 | 4 055 | 372 022 | 122 267 | 53 955 |
| 2010 | 43 964 | 15 191 | 4 673 | 399 156 | 123 829 | 57 307 |
| 2011 | 61 886 | 24 236 | 5 586 | 416 797 | 127 992 | 59 497 |
| 2012 | 74 132 | 24 921 | 7 354 | 428 141 | 132 837 | 63 918 |
| 2013 | 79 052 | 20 281 | 8 402 | 445 893 | 134 901 | 70 689 |

**(b)** Postgraduate diplomas/certificate programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2004 | 12 205 | 4 844 | 4 544 | 8 527 | 4 453 | 3 821 |
| 2005 | 6 129 | 3 018 | 2 837 | 8 037 | 4 402 | 3 721 |
| 2006 | 5 360 | 2 292 | 2 557 | 7 700 | 4 249 | 3 558 |
| 2007 | 5 181 | 2 369 | 2 251 | 8 713 | 4 432 | 3 732 |
| 2008 | 5 964 | 2 678 | 2 437 | 10 188 | 5 556 | 4 176 |
| 2009 | 6 751 | 3 142 | 2 898 | 12 352 | 7 426 | 5 238 |
| 2010 | 8 513 | 3 641 | 3 612 | 12 913 | 6 745 | 5 462 |
| 2011 | 12 151 | 4 711 | 4 954 | 12 388 | 6 274 | 5 327 |
| 2012 | 12 748 | 4 817 | 5 799 | 17 856 | 10 295 | 7 176 |
| 2013 | 15 075 | 6 222 | 7 253 | 19 863 | 9 791 | 7 488 |

NOTES: Figures represent the estimated numbers of total headcount enrolments, first-time enrolments (FTEN), and graduations for (a) undergraduate ITE and non-ITE undergraduate degree programmes and (b) postgraduate ITE and non-ITE postgraduate diploma/certificate programmes.

**Table A.4:** Estimated average annual growth (%) in total headcount enrolments, FTEN, and graduations for ITE and non-ITE programmes by programme level (2004 - 2013)

**(a)** Undergraduate degree programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2000 - 2004 | −0.2 | −2.1 | −1.5 | 4.5* | 2.6 | 2.0 |
| 2004 - 2008 | 1.4 | 3.1 | −10.3*** | 2.6*** | 1.7* | 5.1*** |
| 2008 - 2013 | 24.4*** | 18.0** | 18.8*** | 4.7*** | 3.6** | 6.3*** |
| 2004 - 2013 | 15.8*** | 14.9*** | 4.6 | 3.9*** | 3.2*** | 5.5*** |

**(b)** Postgraduate diploma/certificate programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **Enrolments** | **FTEN** | **Graduations** | **Enrolments** | **FTEN** | **Graduations** |
| 2000 - 2004 | 20.9*** | 19.3* | 28.1*** | 5.0 | −1.6 | 8.7** |
| 2004 - 2008 | −14.8 | −13.3 | −13.7 | 4.5 | 4.6 | 1.8 |
| 2008 - 2013 | 21.8*** | 17.9*** | 25.1*** | 13.4*** | 11.3** | 11.6*** |
| 2004 - 2013 | 8.0 | 6.6 | 8.9 | 10.8*** | 10.5*** | 8.9*** |

Figures represent the percentage average annual growth rates in total headcount enrolments, FTEN, and graduations for (a) undergraduate ITE and non-ITE undergraduate degree programmes and (b) postgraduate ITE and non-ITE postgraduate diploma/certificate programmes over the indicated periods and were estimated using the least-squares methodology described in Appendix C. *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.5:** FTEN in ITE and non-ITE programmes at Unisa and other HEIs (2004 - 2013)

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Year** | **ALL HEIs** | **Contact HEIs** | **Unisa** | **ALL HEIs** | **Contact HEIs** | **Unisa** |
| 2004 | 13 229 | 11 602 | 1 627 | 109 879 | 82 979 | 26 900 |
| 2005 | 12 258 | 10 317 | 1 941 | 111 588 | 83 581 | 28 007 |
| 2006 | 9 469 | 7 082 | 2 387 | 105 466 | 74 632 | 30 835 |
| 2007 | 10 950 | 7 895 | 3 055 | 118 710 | 81 330 | 37 380 |
| 2008 | 12 807 | 8 664 | 4 144 | 116 779 | 78 702 | 38 077 |
| 2009 | 16 553 | 10 628 | 5 925 | 129 693 | 93 534 | 36 159 |
| 2010 | 18 832 | 10 816 | 8 016 | 130 574 | 93 949 | 36 625 |
| 2011 | 28 947 | 13 300 | 15 647 | 134 266 | 94 602 | 39 664 |
| 2012 | 29 737 | 12 407 | 17 330 | 143 133 | 93 765 | 49 368 |
| 2013 | 26 503 | 14 256 | 12 248 | 144 692 | 101 612 | 43 080 |

NOTES: Figures represent the estimated number of first-time enrolments (FTEN) in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma.certificate programmes in the entire public HE system, at contact HEIs, and at Unisa.

**Table A.6:** Estimated average annual growth rates in FTEN in ITE and non-ITE programmes for all HEIs, contact HEIs, and Unisa (2004 - 2013)

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Period** | **ALL HEIs** | **Contact HEIs** | **Unisa** | **ALL HEIs** | **Contact HEIs** | **Unisa** |
| 2000 - 2004 | 3.1 | −0.1 | 30.2* | 2.4 | −0.1 | 12.3** |
| 2004 - 2008 | −1.8 | −8.2 | 26.2*** | 1.9* | −1.3 | 10.3*** |
| 2008 - 2013 | 18.1** | 9.5*** | 30.5** | 4.1** | 3.8* | 4.8 |
| 2004 - 2013 | 12.8** | 4.6 | 32.3*** | 3.6*** | 2.7** | 5.8*** |

Figures represent the percentage average annual growth rates in FTEN in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma/certificate programmes for the entire public HE system, contact HEIs, and Unisa over the indicated periods and were estimated using the least-squares methodology described in Appendix C. *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.7:** FTEN in undergraduate and postgraduate ITE programmes at Unisa and other (contact) HEIs (2004 - 2013)

| | *Contact HEIs* | | *Unisa* | | *Unisa share (%)* | |
|---|---|---|---|---|---|---|
| **Year** | **UG ITE** | **PG ITE** | **UG ITE** | **PG ITE** | **UG ITE** | **PG ITE** |
| 2004 | 7 155 | 4 447 | 1 230 | 397 | 14.7 | 8.2 |
| 2005 | 7 757 | 2 560 | 1 483 | 458 | 16.0 | 15.2 |
| 2006 | 5 354 | 1 728 | 1 823 | 564 | 25.4 | 24.6 |
| 2007 | 6 093 | 1 802 | 2 488 | 567 | 29.0 | 23.9 |
| 2008 | 6 757 | 1 906 | 3 372 | 772 | 33.3 | 28.8 |
| 2009 | 8 579 | 2 049 | 4 832 | 1 093 | 36.0 | 34.8 |
| 2010 | 8 260 | 2 556 | 6 931 | 1 085 | 45.6 | 29.8 |
| 2011 | 10 287 | 3 013 | 13 949 | 1 698 | 57.6 | 36.0 |
| 2012 | 9 582 | 2 826 | 15 339 | 1 991 | 61.6 | 41.3 |
| 2013 | 10 880 | 3 376 | 9 402 | 2 846 | 46.4 | 45.7 |

NOTES: Figures represent the estimated number of first-time enrolments (FTEN) in undergraduate and postgraduate ITE programmes at contact HEIs and at Unisa as well as Unisa's share of all annual FTEN in undergraduate and postgraduate ITE FTEN in the public HE system. UG: undergraduate; PG: postgraduate.

**Table A.8:** Estimated average annual growth rates in FTEN in ITE and non-ITE undergraduate and postgraduate programmes including and excluding Unisa (2004 - 2013)

**(a)** Undergraduate degree programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Period** | **ALL HEIs** | **Contact HEIs** | **Unisa** | **ALL HEIs** | **Contact HEIs** | **Unisa** |
| 2000 - 2004 | −2.1 | −6.0 | 35.3* | 2.6 | 0.0 | 12.5** |
| 2004 - 2008 | 3.1 | −3.5 | 28.8*** | 1.7* | −1.6* | 10.1*** |
| 2008 - 2013 | 18.0** | 8.7** | 30.4* | 3.6** | 3.9* | 3.1 |
| 2006 - 2013 | 20.0*** | 10.6*** | 35.0** | 3.9*** | 4.0*** | 3.6* |
| 2004 - 2013 | 14.9*** | 6.0** | 34.0*** | 3.2*** | 2.5** | 5.0** |

**(b)** Postgraduate diploma/certificate programmes

| | *ITE Programmes* | | | *Non-ITE Programmes* | | |
|---|---|---|---|---|---|---|
| **Period** | **ALL HEIs** | **Contact HEIs** | **Unisa** | **ALL HEIs** | **Contact HEIs** | **Unisa** |
| 2000 - 2004 | 19.3* | 18.4 | 19.9 | −1.6 | −1.6 | −10.6 |
| 2004 - 2008 | −13.3 | −18.5* | 16.7*** | 4.6 | 2.5 | 48.3** |
| 2008 - 2013 | 17.9*** | 12.1*** | 28.5*** | 11.3** | 2.1 | 54.3** |
| 2006 - 2013 | 15.9*** | 10.7*** | 26.8*** | 13.1*** | 7.1** | 39.0** |
| 2004 - 2013 | 6.6 | 1.3 | 24.2*** | 10.5*** | 5.8*** | 42.2** |

Figures represent the percentage average annual growth rates in FTEN in ITE and non-ITE (a) undergraduate degree and (b) postgraduate diploma/certificate programmes for the entire public HE system, contact HEIs, and Unisa over the indicated periods and were estimated using the least-squares methodology described in Appendix C. *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.9:** FTEN in ITE and non-ITE programmes with and without NSFAS awards (2004 - 2013)

| | *FTEN in ITE Programmes* | | | | *FTEN in Non-ITE Programmes* | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Without NSFAS** | **With NSFAS** | **% With NSFAS** | **Share of NSFAS[1]** | **Without NSFAS** | **With NSFAS** | **% With NSFAS** | **Share of NSFAS[1]** |
| 2004 | 10 825 | 2 404 | 18.2 | 9.8 | 87 817 | 22 062 | 20.1 | 90.2 |
| 2005 | 9 604 | 2 655 | 21.7 | 12.1 | 92 287 | 19 300 | 17.3 | 87.9 |
| 2006 | 7 518 | 1 951 | 20.6 | 11.1 | 89 868 | 15 598 | 14.8 | 88.9 |
| 2007 | 8 347 | 2 603 | 23.8 | 13.5 | 102 071 | 16 639 | 14.0 | 86.5 |
| 2008 | 9 854 | 2 953 | 23.1 | 16.7 | 102 087 | 14 692 | 12.6 | 83.3 |
| 2009 | 12 448 | 4 105 | 24.8 | 18.1 | 111 123 | 18 570 | 14.3 | 81.9 |
| 2010 | 15 148 | 3 684 | 19.6 | 18.6 | 114 478 | 16 096 | 12.3 | 81.4 |
| 2011 | 22 407 | 6 540 | 22.6 | 27.6 | 117 124 | 17 142 | 12.8 | 72.4 |
| 2012 | 22 100 | 7 637 | 25.7 | 25.2 | 120 416 | 22 717 | 15.9 | 74.8 |
| 2013 | 20 258 | 6 245 | 23.6 | 27.9 | 128 575 | 16 117 | 11.1 | 72.1 |

NOTES: Figures represent the numbers of FTEN in undergraduate and postgraduate ITE programmes and FTEN in non-ITE undergraduate degree and postgradaute diploma/certificate programmes by NSFAS recipiency. [1]Figures represent the respective ITE and non-ITE - shares of all NSFAS awards that are awarded to FTEN in undergraduate degree and postgraduate diploma/certificate programmes.

**Table A.10:** Estimated average annual growth rates in FTEN in ITE and non-ITE programmes with and without NSFAS awards (2004 - 2013)

| | *FTEN in ITE Programmes* | | | | *FTEN in Non-ITE Programmes* | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Without NSFAS** | **With NSFAS** | **% With NSFAS** | **Share of NSFAS[1]** | **Without NSFAS** | **With NSFAS** | **% With NSFAS** | **Share of NSFAS[1]** |
| 2000 - 2004 | −2.1 | 108.1*** | 101.9** | 60.4*** | −1.1 | 26.8** | 23.9*** | −2.3*** |
| 2004 - 2008 | −3.2 | 4.0 | 5.9* | 12.5*** | 4.1*** | −9.2*** | −10.8*** | −1.7** |
| 2008 - 2013 | 17.7** | 19.3** | 1.0 | 11.9*** | 4.1*** | 3.3 | −0.8 | −3.1*** |
| 2004 - 2013 | 12.2** | 15.2*** | 2.1 | 13.0*** | 4.4*** | −0.7 | −4.1* | −2.6*** |

NOTES: Figures represent the percentage average annual growth rates in FTEN in undergraduate and postgraduate ITE programmes and non-ITE undergraduate degree and postgraduate diploma/certificate programmes for studetns with and without NSFAS awards over the indicated periods as estimated using the least-squares methodology described in C. *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.11:** Projected cumulative completion rate (%) schedules in undergraduate and postgraduate ITE programmes at contact HEIs and Unisa (2014 - 2025)

| *Enrolment* | *Contact HEIs* | | *Unisa* | |
|---|---|---|---|---|
| *year* | **Undergraduate** | **Postgraduate** | **Undergraduate** | **Postgraduate** |
| 1 | 2.7 | 58.4 | 0.1 | 13.7 |
| 2 | 4.9 | 82.1 | 0.1 | 47.4 |
| 3 | 9.3 | 86.1 | 0.2 | 68.0 |
| 4 | 58.0 | 88.5 | 5.0 | 77.5 |
| 5 | 68.7 | 90.3 | 18.4 | 82.4 |
| 6 | 71.7 | 92.0 | 26.8 | 85.3 |
| 7 | 72.7 | 92.2 | 32.9 | 87.0 |
| 8 | 73.2 | 92.3 | 36.3 | 88.2 |
| 9 | 73.6 | 92.3 | 38.6 | 88.9 |
| 10 | 73.8 | 92.4 | 40.9 | 89.8 |

NOTES: Figures denote cumulative completion rates and represent the average estimated completion rates for (a) undergraduate ITE programmes at contact HEIs, (b) postgraduate ITE programmes at contact HEIs, (b) undergraduate ITE programmes at contact Unisa, and (c) postgraduate ITE programmes at Unisa, over the three most recent years of data for which completion rates over the specified time-horizons were estimable in aggregate HEMIS. For the sake of simplicity, the cumulative completion rate after 10 years is assumed to approximate the total cumulative completion rate (See Section 5 and C.2).

**Table A.12:** Projected FTEN and graduations in undergraduate and postgraduate ITE programmes (2014 - 2025)

| | *FTEN* | | | *Graduations* | | |
|---|---|---|---|---|---|---|
| **Year** | **UG** | **PG** | **All ITE** | **UG** | **PG** | **All ITE** |
| 2014 | 27 144 | 6 217 | 33 361 | 9 666 | 5 136 | 14 802 |
| 2015 | 29 734 | 6 769 | 36 502 | 10 969 | 5 582 | 16 552 |
| 2016 | 32 323 | 7 320 | 39 644 | 12 387 | 6 044 | 18 431 |
| 2017 | 34 913 | 7 872 | 42 785 | 13 209 | 6 527 | 19 736 |
| 2018 | 37 503 | 8 424 | 45 927 | 14 603 | 7 026 | 21 630 |
| 2019 | 40 092 | 8 975 | 49 068 | 15 917 | 7 523 | 23 440 |
| 2020 | 42 682 | 9 527 | 52 209 | 17 338 | 8 026 | 25 364 |
| 2021 | 45 272 | 10 079 | 55 351 | 18 611 | 8 526 | 27 137 |
| 2022 | 47 861 | 10 631 | 58 492 | 19 849 | 9 030 | 28 879 |
| 2023 | 50 451 | 11 182 | 61 633 | 21 264 | 9 528 | 30 792 |
| 2024 | 53 041 | 11 734 | 64 775 | 22 584 | 10 030 | 32 613 |
| 2025 | 55 630 | 12 286 | 67 916 | 23 903 | 10 532 | 34 434 |

NOTES: Figures represent projected numbers of FTEN and graduations in undergraduate and postgraduate ITE programmes based on the completion rate schedules in Table A.11 and the methodology described in Sections 3.4.3 and C.3.

**Table A.13:** FTEN and graduations in ITE programmes by gender (2004 - 2013)

| | *First-time enrolments (FTEN)* | | | | *Graduations* | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male (%)** | **Female (%)** | **Male** | **Female** | **Male (%)** | **Female (%)** |
| 2004 | 3 930 | 9 299 | 29.71 | 70.29 | 2 991 | 7 515 | 28.47 | 71.53 |
| 2005 | 3 699 | 8 559 | 30.18 | 69.82 | 1 917 | 5 709 | 25.14 | 74.86 |
| 2006 | 2 889 | 6 580 | 30.51 | 69.49 | 1 738 | 5 451 | 24.18 | 75.82 |
| 2007 | 3 403 | 7 547 | 31.07 | 68.93 | 1 586 | 4 826 | 24.74 | 75.26 |
| 2008 | 3 664 | 9 143 | 28.61 | 71.39 | 1 493 | 4 666 | 24.24 | 75.76 |
| 2009 | 4 600 | 11 953 | 27.79 | 72.21 | 1 764 | 5 189 | 25.37 | 74.63 |
| 2010 | 5 027 | 13 804 | 26.70 | 73.30 | 2 131 | 6 153 | 25.73 | 74.27 |
| 2011 | 7 623 | 21 324 | 26.33 | 73.67 | 2 837 | 7 703 | 26.92 | 73.08 |
| 2012 | 7 651 | 22 087 | 25.73 | 74.27 | 3 718 | 9 435 | 28.27 | 71.73 |
| 2013 | 7 685 | 18 818 | 29.00 | 71.00 | 4 253 | 11 403 | 27.16 | 72.84 |

NOTES: Figures represent the estimated numbers and shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmesand other programmes non-ITE undergraduate degree and postgraduate diploma/certificate programmes for males and females respectively.

**Table A.14:** Average annual growth in FTEN and graduations in ITE programmes by gender

| | *First-time enrolments (FTEN)* | | | | *Graduations* | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male (%)** | **Female (%)** | **Male** | **Female** | **Male (%)** | **Female (%)** |
| 2000 - 2004 | 1.32 | 3.76 | −1.68 | 0.68 | 0.46 | 11.06* | −6.57** | 3.29** |
| 2004 - 2008 | −2.21 | −1.58 | −0.46 | 0.18 | −14.61** | −10.61** | −3.32 | 1.21 |
| 2008 - 2013 | 17.51*** | 18.31** | −0.51 | 0.18 | 24.81*** | 20.36*** | 2.72** | −0.94** |
| 2004 - 2013 | 11.10** | 13.53** | −1.54* | 0.61* | 7.09 | 6.14 | 0.67 | −0.23 |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.15:** FTEN and graduations in ITE programmes by race (2004 - 2013)

| | *First-time enrolments (FTEN)* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Black** | **Coloured** | **Asian** | **White** | **Black (%)** | **Coloured (%)** | **Asian (%)** | **White (%)** |
| 2004 | 8 805 | 899 | 540 | 2 974 | 66.56 | 6.80 | 4.08 | 22.48 |
| 2005 | 8 053 | 671 | 683 | 2 847 | 65.70 | 5.48 | 5.57 | 23.22 |
| 2006 | 5 210 | 598 | 615 | 3 040 | 55.03 | 6.31 | 6.49 | 32.11 |
| 2007 | 6 057 | 811 | 596 | 3 461 | 55.32 | 7.41 | 5.44 | 31.60 |
| 2008 | 7 500 | 1 112 | 702 | 3 485 | 58.56 | 8.69 | 5.48 | 27.21 |
| 2009 | 9 910 | 1 412 | 906 | 4 320 | 59.87 | 8.53 | 5.47 | 26.10 |
| 2010 | 11 315 | 1 771 | 983 | 4 743 | 60.09 | 9.40 | 5.22 | 25.19 |
| 2011 | 20 721 | 1 826 | 1 317 | 5 055 | 71.58 | 6.31 | 4.55 | 17.46 |
| 2012 | 21 601 | 1 704 | 1 311 | 5 072 | 72.64 | 5.73 | 4.41 | 17.06 |
| 2013 | 18 245 | 1 763 | 1 541 | 4 891 | 68.84 | 6.65 | 5.82 | 18.45 |
| | *Graduations* | | | | | | | |
| 2004 | 7 528 | 462 | 215 | 2 282 | 71.66 | 4.40 | 2.05 | 21.72 |
| 2005 | 4 475 | 428 | 241 | 2 476 | 58.68 | 5.62 | 3.16 | 32.47 |
| 2006 | 3 718 | 431 | 291 | 2 738 | 51.73 | 6.00 | 4.05 | 38.09 |
| 2007 | 2 961 | 425 | 293 | 2 733 | 46.17 | 6.63 | 4.57 | 42.62 |
| 2008 | 2 635 | 482 | 378 | 2 661 | 42.79 | 7.83 | 6.14 | 43.20 |
| 2009 | 3 061 | 683 | 441 | 2 765 | 44.03 | 9.82 | 6.35 | 39.76 |
| 2010 | 3 984 | 931 | 448 | 2 911 | 48.09 | 11.24 | 5.41 | 35.14 |
| 2011 | 5 613 | 1 027 | 532 | 3 312 | 53.25 | 9.74 | 5.05 | 31.42 |
| 2012 | 7 651 | 955 | 673 | 3 828 | 58.17 | 7.26 | 5.12 | 29.10 |
| 2013 | 9 399 | 1 191 | 770 | 4 251 | 60.03 | 7.61 | 4.92 | 27.15 |

NOTES: Figures represent the estimated numbers and shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes and other programmes non-ITE undergraduate degree and postgraduate diploma/certificate programmes for the Black, Coloured, Indian/Asian, and White population groups respectively. Estimated shares of FTEN/graduations may not sum to 100 because of some missing information on the HEMIS *race* variable.

**Table A.16:** Estimated average annual growth (%) in FTEN and graduations in ITE programmes by race

**(a)** First-time enrolments (FTEN)

| | *FTEN* | | | | *Racial share of FTEN (%)* | | | |
|---|---|---|---|---|---|---|---|---|
| **Period** | **Black** | **Coloured** | **Asian** | **White** | **Black (%)** | **Coloured (%)** | **Asian (%)** | **White (%)** |
| 2000 - 2004 | −4.2 | 36.4** | 33.1** | 25.1 | −7.1 | 32.4*** | 29.1* | 21.4 |
| 2004 - 2008 | −5.9 | 6.3 | 4.0 | 5.3** | −4.2 | 8.2 | 5.8 | 7.1 |
| 2008 - 2013 | 23.5** | 8.6* | 16.5*** | 6.6* | 4.6** | −8.0** | −1.4 | −9.7** |
| 2004 - 2013 | 14.6** | 13.4** | 12.6*** | 7.7*** | 1.6 | 0.5 | −0.2 | −4.6 |

**(b)** Graduations

| | *Graduations* | | | | *Racial share of graduations (%)* | | | |
|---|---|---|---|---|---|---|---|---|
| **Period** | **Black** | **Coloured** | **Asian** | **White** | **Black (%)** | **Coloured (%)** | **Asian (%)** | **White (%)** |
| 2000 - 2004 | 4.38 | 35.13*** | 3.28 | 22.20*** | −2.92** | 25.67** | −3.95 | 13.65* |
| 2004 - 2008 | −22.22** | 0.77 | 14.15*** | 4.14* | −11.94*** | 14.09*** | 29.24*** | 17.91** |
| 2008 - 2013 | 30.99*** | 17.42** | 15.34*** | 10.35*** | 7.81*** | −3.36 | −5.08** | −9.18*** |
| 2004 - 2013 | 5.51 | 13.68*** | 15.04*** | 6.14*** | −0.82 | 6.86* | 8.14* | −0.23 |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.17:** FTEN and graduations in ITE programmes by race and gender (2004 - 2013)

**(a)** First-time enrolments (FTEN)

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2004 | 2 958 | 5 846 | 304 | 595 | 92 | 448 | 575 | 2 399 |
| 2005 | 2 814 | 5 239 | 214 | 458 | 108 | 575 | 562 | 2 285 |
| 2006 | 2 041 | 3 169 | 163 | 435 | 94 | 520 | 589 | 2 451 |
| 2007 | 2 418 | 3 639 | 215 | 596 | 84 | 512 | 677 | 2 784 |
| 2008 | 2 609 | 4 891 | 351 | 762 | 92 | 611 | 609 | 2 876 |
| 2009 | 3 360 | 6 550 | 349 | 1 063 | 125 | 781 | 764 | 3 556 |
| 2010 | 3 543 | 7 773 | 440 | 1 331 | 138 | 845 | 904 | 3 839 |
| 2011 | 6 066 | 14 655 | 448 | 1 378 | 176 | 1 142 | 927 | 4 128 |
| 2012 | 6 140 | 15 462 | 409 | 1 294 | 158 | 1 153 | 924 | 4 148 |
| 2013 | 6 170 | 12 075 | 410 | 1 353 | 231 | 1 310 | 856 | 4 035 |

**(b)** Graduations

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2004 | 2 405 | 5 123 | 167 | 296 | 41 | 174 | 373 | 1 909 |
| 2005 | 1 309 | 3 166 | 165 | 263 | 43 | 198 | 397 | 2 079 |
| 2006 | 1 132 | 2 586 | 131 | 300 | 40 | 251 | 435 | 2 304 |
| 2007 | 953 | 2 008 | 126 | 300 | 37 | 256 | 470 | 2 263 |
| 2008 | 907 | 1 728 | 121 | 362 | 52 | 326 | 412 | 2 248 |
| 2009 | 1 060 | 2 001 | 223 | 460 | 57 | 385 | 423 | 2 342 |
| 2010 | 1 319 | 2 665 | 242 | 689 | 74 | 375 | 492 | 2 419 |
| 2011 | 1 969 | 3 643 | 268 | 759 | 64 | 468 | 521 | 2 791 |
| 2012 | 2 701 | 4 950 | 262 | 693 | 99 | 574 | 636 | 3 191 |
| 2013 | 3 120 | 6 278 | 278 | 912 | 123 | 647 | 722 | 3 529 |

NOTES: Figures represent the estimated numbers of male and female first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes and other non-ITE undergraduate degree and postgraduate diploma/certificate programmes for the Black, Coloured, Indian/Asian, and White population groups respectively.

**Table A.18:** Shares of FTEN and graduations in ITE programmes by race and gender (2004 - 2013)

**(a)** Share of first-time enrolments (FTEN)

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2004 | 22.36 | 44.19 | 2.30 | 4.50 | 0.69 | 3.39 | 4.35 | 18.13 |
| 2005 | 22.96 | 42.74 | 1.74 | 3.73 | 0.88 | 4.69 | 4.58 | 18.64 |
| 2006 | 21.56 | 33.47 | 1.72 | 4.60 | 1.00 | 5.49 | 6.22 | 25.88 |
| 2007 | 22.08 | 33.23 | 1.97 | 5.44 | 0.76 | 4.68 | 6.18 | 25.42 |
| 2008 | 20.37 | 38.19 | 2.74 | 5.95 | 0.72 | 4.77 | 4.76 | 22.45 |
| 2009 | 20.30 | 39.57 | 2.11 | 6.42 | 0.75 | 4.72 | 4.61 | 21.48 |
| 2010 | 18.81 | 41.27 | 2.34 | 7.07 | 0.73 | 4.49 | 4.80 | 20.38 |
| 2011 | 20.96 | 50.63 | 1.55 | 4.76 | 0.61 | 3.94 | 3.20 | 14.26 |
| 2012 | 20.65 | 51.99 | 1.38 | 4.35 | 0.53 | 3.88 | 3.11 | 13.95 |
| 2013 | 23.28 | 45.56 | 1.55 | 5.11 | 0.87 | 4.94 | 3.23 | 15.23 |

**(b)** Share of graduations

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Year** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2004 | 22.89 | 48.76 | 1.59 | 2.82 | 0.39 | 1.66 | 3.55 | 18.17 |
| 2005 | 17.17 | 41.51 | 2.16 | 3.45 | 0.57 | 2.59 | 5.20 | 27.26 |
| 2006 | 15.75 | 35.98 | 1.83 | 4.17 | 0.56 | 3.50 | 6.05 | 32.05 |
| 2007 | 14.86 | 31.31 | 1.96 | 4.67 | 0.58 | 3.99 | 7.32 | 35.29 |
| 2008 | 14.72 | 28.06 | 1.96 | 5.87 | 0.85 | 5.29 | 6.69 | 36.51 |
| 2009 | 15.24 | 28.78 | 3.21 | 6.61 | 0.81 | 5.53 | 6.09 | 33.68 |
| 2010 | 15.92 | 32.17 | 2.93 | 8.32 | 0.89 | 4.52 | 5.94 | 29.20 |
| 2011 | 18.68 | 34.56 | 2.54 | 7.20 | 0.61 | 4.44 | 4.94 | 26.48 |
| 2012 | 20.53 | 37.64 | 1.99 | 5.27 | 0.75 | 4.36 | 4.84 | 24.26 |
| 2013 | 19.93 | 40.10 | 1.78 | 5.83 | 0.79 | 4.13 | 4.61 | 22.54 |

NOTES: Figures represent the estimated shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes for males and females from the Black, Coloured, Indian/Asian, and White population groups respectively. Estimated shares of FTEN/graduations may not sum to 100 because of some missing information on the HEMIS *gender* and/or *race* variables.

**Table A.19:** Estimated average annual growth (%) in FTEN and graduations in ITE programmes by race and gender

**(a)** First-time enrolments (FTEN)

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Period** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2000 - 2004 | −3.5 | −4.6 | 28.4** | 41.5*** | 25.1** | 35.0** | 26.2 | 24.8 |
| 2004 - 2008 | −3.9 | −7.0 | 3.0 | 7.9 | −2.5 | 5.2 | 3.1 | 5.8** |
| 2008 - 2013 | 20.9*** | 24.7** | 3.7 | 10.5* | 17.3*** | 16.3*** | 6.8 | 6.6* |
| 2004 - 2013 | 12.2** | 15.9** | 9.1* | 15.1** | 10.1** | 13.0*** | 6.5*** | 8.0*** |

**(b)** Graduations

| | *Black* | | *Coloured* | | *Asian/Indian* | | *White* | |
|---|---|---|---|---|---|---|---|---|
| **Period** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** | **Male** | **Female** |
| 2000 - 2004 | −3.5 | −4.6 | 28.4** | 41.5*** | 25.1** | 35.0** | 26.2 | 24.8 |
| 2004 - 2008 | −3.9 | −7.0 | 3.0 | 7.9 | −2.5 | 5.2 | 3.1 | 5.8** |
| 2008 - 2013 | 20.9*** | 24.7** | 3.7 | 10.5* | 17.3*** | 16.3*** | 6.8 | 6.6* |
| 2004 - 2013 | 12.2** | 15.9** | 9.1* | 15.1** | 10.1** | 13.0*** | 6.5*** | 8.0*** |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.20:** FTEN and graduations in ITE programmes by home language (2004 - 2013)

**(a)** First-time enrolments (FTEN)

| | *Languages* | | | | *African Languages* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **ALL** | **Afr** | **Eng** | **African**[1] | **Sets** | **Tshiv** | **Xits** | **Xhosa** | **Ndeb** | **Zulu** | **Sotho** | **NSotho** | **Swati** |
| 2004 | 13 229 | 2 164 | 2 625 | 8 193 | 783 | 52 | 109 | 99 | 2 304 | 3 464 | 1 022 | 226 | 133 |
| 2005 | 12 258 | 1 836 | 2 538 | 7 633 | 317 | 204 | 169 | 58 | 1 964 | 3 807 | 475 | 426 | 212 |
| 2006 | 9 469 | 1 894 | 2 627 | 4 660 | 532 | 119 | 129 | 55 | 1 082 | 1 752 | 470 | 198 | 323 |
| 2007 | 10 950 | 2 449 | 2 635 | 5 676 | 214 | 271 | 190 | 79 | 933 | 2 818 | 574 | 234 | 364 |
| 2008 | 12 807 | 2 759 | 3 132 | 6 720 | 272 | 151 | 170 | 81 | 1 173 | 3 610 | 509 | 285 | 471 |
| 2009 | 16 553 | 3 491 | 3 484 | 9 240 | 392 | 183 | 231 | 106 | 1 456 | 5 220 | 734 | 448 | 470 |
| 2010 | 18 832 | 3 984 | 3 756 | 10 682 | 548 | 200 | 263 | 111 | 1 964 | 5 874 | 842 | 377 | 504 |
| 2011 | 28 947 | 4 022 | 4 545 | 19 781 | 684 | 339 | 395 | 155 | 3 764 | 12 073 | 1 185 | 632 | 555 |
| 2012 | 29 737 | 3 842 | 4 704 | 20 466 | 863 | 427 | 452 | 220 | 2 978 | 12 994 | 1 221 | 758 | 553 |
| 2013 | 26 503 | 3 492 | 5 074 | 17 218 | 911 | 509 | 631 | 263 | 2 395 | 9 412 | 1 668 | 711 | 718 |

**(b)** Graduations

| | *Languages* | | | | *African Languages* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **ALL** | **Afr** | **Eng** | **African**[1] | **Sets** | **Tshiv** | **Xits** | **Xhosa** | **Ndeb** | **Zulu** | **Sotho** | **NSotho** | **Swati** |
| 2004 | 10 506 | 1 631 | 3 112 | 5 417 | 899 | 189 | 162 | 84 | 1 641 | 1 451 | 662 | 257 | 72 |
| 2005 | 7 626 | 1 654 | 2 274 | 3 489 | 406 | 105 | 89 | 37 | 1 012 | 1 278 | 366 | 145 | 51 |
| 2006 | 7 188 | 1 866 | 2 639 | 2 529 | 479 | 67 | 58 | 8 | 890 | 512 | 320 | 143 | 54 |
| 2007 | 6 413 | 1 827 | 2 133 | 2 294 | 139 | 63 | 38 | 10 | 745 | 913 | 248 | 89 | 49 |
| 2008 | 6 159 | 1 742 | 2 009 | 2 223 | 164 | 80 | 42 | 22 | 561 | 975 | 208 | 87 | 85 |
| 2009 | 6 953 | 2 028 | 2 080 | 2 638 | 122 | 77 | 63 | 38 | 687 | 1 070 | 291 | 109 | 181 |
| 2010 | 8 284 | 2 181 | 2 289 | 3 554 | 170 | 156 | 120 | 37 | 704 | 1 591 | 393 | 105 | 279 |
| 2011 | 10 540 | 2 557 | 2 678 | 5 020 | 207 | 241 | 192 | 62 | 926 | 2 104 | 720 | 182 | 384 |
| 2012 | 13 153 | 2 737 | 2 966 | 6 986 | 261 | 254 | 235 | 86 | 1 083 | 3 593 | 821 | 291 | 363 |
| 2013 | 15 655 | 3 048 | 3 376 | 8 730 | 422 | 345 | 317 | 95 | 1 308 | 4 358 | 921 | 471 | 493 |

NOTES: Figures represent the estimated number of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by home language. ALL: all languages; Afri: Afrikaans; Eng: English; African: All African languages; Sets: Setswana; Tshiv: Tshivenda; Xits: Xitsonga; Xhosa: isiXhosa; Ndeb: isiNdebele; Zulu: isiZulu; Sotho: seSotho; NSotho: seSotho sa Lebowa; Swati: siSwati. The figures presented in Afr, Eng, and African columns may not sum to those presented in the ALL column because of individuals who indicated that they spoke other languages or failed to indicate their home language in HEMIS.

**Table A.21:** Provincial distribution of public HEIs in South Africa and overall shares of enrolments and graduations in ITE and all programmes between 2004 and 2013

| | **ITE Programmes** | | **All Programmes** | |
|---|---|---|---|---|
| *Province/HEI* | *Enrolments (%)* | *Graduates (%)* | *Enrolments (%)* | *Graduates (%)* |
| **Eastern Cape** | **8.26** | **9.86** | **7.98** | **9.28** |
| WSU | 3.52 | 2.22 | 2.97 | 2.60 |
| NMMU | 2.80 | 4.13 | 3.01 | 3.85 |
| UFH | 1.74 | 2.69 | 1.20 | 1.42 |
| RHODES | 0.20 | 0.83 | 0.80 | 1.41 |
| **Free State** | **4.62** | **6.52** | **4.71** | **5.65** |
| UFS | 2.81 | 3.82 | 3.32 | 3.89 |
| CUT | 1.80 | 2.70 | 1.40 | 1.76 |
| **Gauteng** | **15.85** | **18.13** | **23.77** | **29.37** |
| TUT | 5.55 | 6.87 | 6.39 | 7.07 |
| UP | 5.34 | 5.90 | 6.29 | 8.75 |
| WITS | 2.86 | 2.97 | 3.26 | 4.08 |
| UJ | 2.05 | 2.25 | 5.57 | 7.31 |
| VUT | 0.05 | 0.14 | 2.26 | 2.16 |
| **KwaZulu-Natal** | **13.34** | **17.17** | **10.41** | **12.42** |
| UZ | 7.06 | 9.44 | 1.52 | 1.77 |
| UKZN | 4.90 | 6.58 | 4.85 | 5.95 |
| DUT | 1.38 | 1.15 | 2.83 | 3.56 |
| MUT | 0.00 | 0.00 | 1.21 | 1.14 |
| **Limpopo** | **1.92** | **2.76** | **3.48** | **3.76** |
| UNIVEN | 1.32 | 1.76 | 1.28 | 1.31 |
| UL | 0.60 | 1.00 | 2.19 | 2.45 |
| **Northern Cape**[1] | N/A | N/A | N/A | N/A |
| NIHE | N/A | N/A | N/A | N/A |
| **North West** | **5.76** | **8.94** | **5.87** | **8.75** |
| NWU | 5.76 | 8.94 | 5.87 | 8.75 |
| **Mpumalanga** | | | | |
| **Western Cape** | **8.49** | **14.12** | **11.38** | **15.98** |
| CPUT | 5.07 | 7.21 | 3.66 | 4.98 |
| US | 1.56 | 3.44 | 2.95 | 4.52 |
| UWC | 1.53 | 2.37 | 1.99 | 2.33 |
| UCT | 0.33 | 1.10 | 2.79 | 4.15 |
| **National** | **41.78** | **22.49** | **32.39** | **14.79** |
| UNISA | 41.78 | 22.49 | 32.39 | 14.79 |

NOTES: Figures represent estimated shares of total enrolments and graduations in undergraduate and postgraduate ITE programmes and all programmes for each province/HEI over the period 2004 - 2013. *"All programmes"* include all prediplomate, undergraduate, and postgraduate programmes offered by the public HE system. HEIs are Walter Sisulu University (WSU), Nelson Mandela Metropolitan University (NMMU), University of Fort Hare (UFH), Rhodes University (RHODES), University of the Free State (UFS), Central University of Technology (CUT), Tshwane University of Technology (TUT), University of Pretoria (UP), University of Johannesburg (UJ), Vaal University of Technology (VUT), University of Zululand (UZ), University of KwaZulu-Natal (UKZN), Durban University of Technology (DUT), Mangosuthu University of Technology (MUT), University of Venda (UNIVEN), University of Limpopo (UL), National Institute for Higher Education (NIHE), North West University (NWU), Cape Peninsula University of Technology (CPUT), Stellenbosch University (US), University of the Western Cape (UWC), University of Cape Town (UCT), University of South Africa (Unisa). [1] HEMIS does not contain any information on the National Institute for Higher Education in the Northern Cape.

**Table A.22:** FTEN and graduations in ITE programmes by HEI province (2004 - 2013)

**(a)** First-time enrolments (FTEN) and graduations

| | *First-time enrolments (FTEN)* | | | | | | | | *Graduations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** |
| 2004 | 1 627 | 1 462 | 2 035 | 1 331 | 3 879 | 1 037 | 1 742 | 116 | 837 | 1 064 | 1 164 | 914 | 1 357 | 2 023 | 3 052 | 94 |
| 2005 | 1 941 | 1 198 | 1 939 | 524 | 4 082 | 471 | 1 537 | 568 | 892 | 1 142 | 985 | 413 | 1 496 | 629 | 1 986 | 84 |
| 2006 | 2 387 | 1 133 | 1 117 | 527 | 1 445 | 465 | 2 070 | 325 | 1 029 | 1 140 | 911 | 469 | 1 190 | 809 | 1 491 | 150 |
| 2007 | 3 055 | 1 326 | 802 | 767 | 1 676 | 623 | 2 206 | 495 | 1 068 | 969 | 943 | 459 | 1 391 | 505 | 980 | 98 |
| 2008 | 4 144 | 1 698 | 1 004 | 680 | 2 107 | 753 | 2 255 | 166 | 1 253 | 1 023 | 634 | 320 | 1 269 | 545 | 1 008 | 107 |
| 2009 | 5 925 | 1 581 | 1 323 | 1 086 | 2 881 | 943 | 2 626 | 188 | 1 525 | 1 257 | 714 | 442 | 1 175 | 510 | 1 235 | 95 |
| 2010 | 8 016 | 2 116 | 1 535 | 1 107 | 1 906 | 1 244 | 2 569 | 340 | 1 721 | 1 656 | 698 | 431 | 1 382 | 622 | 1 403 | 371 |
| 2011 | 15 647 | 1 782 | 2 609 | 1 425 | 2 611 | 1 189 | 3 095 | 589 | 2 666 | 1 749 | 829 | 834 | 1 638 | 708 | 1 619 | 498 |
| 2012 | 17 330 | 1 406 | 1 862 | 1 365 | 2 685 | 1 514 | 2 983 | 592 | 3 940 | 1 457 | 1 051 | 1 017 | 2 689 | 828 | 1 725 | 446 |
| 2013 | 12 248 | 1 572 | 1 742 | 798 | 3 610 | 1 509 | 3 511 | 1 514 | 5 870 | 1 599 | 1 193 | 732 | 2 293 | 1 086 | 2 269 | 613 |

**(b)** Share of first-time enrolments (FTEN) and graduations (%)

| | *First-time enrolments (FTEN)* | | | | | | | | *Graduations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** |
| 2004 | 12.3 | 11.1 | 15.4 | 10.1 | 29.3 | 7.8 | 13.2 | 0.9 | 8.0 | 10.1 | 11.1 | 8.7 | 12.9 | 19.3 | 29.1 | 0.9 |
| 2005 | 15.8 | 9.8 | 15.8 | 4.3 | 33.3 | 3.8 | 12.5 | 4.6 | 11.7 | 15.0 | 12.9 | 5.4 | 19.6 | 8.3 | 26.0 | 1.1 |
| 2006 | 25.2 | 12.0 | 11.8 | 5.6 | 15.3 | 4.9 | 21.9 | 3.4 | 14.3 | 15.9 | 12.7 | 6.5 | 16.6 | 11.2 | 20.7 | 2.1 |
| 2007 | 27.9 | 12.1 | 7.3 | 7.0 | 15.3 | 5.7 | 20.1 | 4.5 | 16.7 | 15.1 | 14.7 | 7.2 | 21.7 | 7.9 | 15.3 | 1.5 |
| 2008 | 32.4 | 13.3 | 7.8 | 5.3 | 16.5 | 5.9 | 17.6 | 1.3 | 20.3 | 16.6 | 10.3 | 5.2 | 20.6 | 8.9 | 16.4 | 1.7 |
| 2009 | 35.8 | 9.5 | 8.0 | 6.6 | 17.4 | 5.7 | 15.9 | 1.1 | 21.9 | 18.1 | 10.3 | 6.4 | 16.9 | 7.3 | 17.8 | 1.4 |
| 2010 | 42.6 | 11.2 | 8.2 | 5.9 | 10.1 | 6.6 | 13.6 | 1.8 | 20.8 | 20.0 | 8.4 | 5.2 | 16.7 | 7.5 | 16.9 | 4.5 |
| 2011 | 54.1 | 6.2 | 9.0 | 4.9 | 9.0 | 4.1 | 10.7 | 2.0 | 25.3 | 16.6 | 7.9 | 7.9 | 15.5 | 6.7 | 15.4 | 4.7 |
| 2012 | 58.3 | 4.7 | 6.3 | 4.6 | 9.0 | 5.1 | 10.0 | 2.0 | 30.0 | 11.1 | 8.0 | 7.7 | 20.4 | 6.3 | 13.1 | 3.4 |
| 2013 | 46.2 | 5.9 | 6.6 | 3.0 | 13.6 | 5.7 | 13.2 | 5.7 | 37.5 | 10.2 | 7.6 | 4.7 | 14.6 | 6.9 | 14.5 | 3.9 |

NOTES: Figures represent the estimated numbers and shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by province of contact HEIs location. [1] Includes UNISA which, due to be a distance-education provider, is not located in any single province *per se.* . [2] Represents UNISA's share of FTEN and graduations.

**Table A.23:** Estimated average annual growth (%) in FTEN and graduations in ITE and non-ITE programmes by HEI province (2004 - 2013)

**(a)** ITE programmes

| | *First-time enrolments (FTEN)* | | | | | | | | *Graduations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** |
| 2000 - 2004 | 30.2* | 7.6* | −3.2 | 28.4 | 27.7* | 18.2 | −21.6** | −23.5 | 7.4 | 22.2*** | 40.0** | 56.3 | 10.0 | 20.4** | −4.9 | −32.6* |
| 2004 - 2008 | 26.2*** | 4.1 | −20.5** | −9.2 | −19.0* | −3.5 | 9.2** | 5.9 | 10.4*** | −2.4 | −11.8** | −18.1* | −2.1 | −24.7 | −25.3** | 4.2 |
| 2008 - 2013 | 30.5** | −2.6 | 13.1* | 5.1 | 8.3 | 14.9*** | 8.3*** | 53.7*** | 37.0*** | 8.1* | 13.7*** | 23.2** | 17.4** | 15.4** | 16.0*** | 47.8** |
| 2004 - 2013 | 32.3*** | 3.3 | 2.9 | 5.4 | 0.0 | 11.9* | 8.6*** | 16.6 | 23.1*** | 5.8** | −0.3 | 4.5 | 6.5* | −2.3 | −1.2 | 26.2*** |

**(b)** Non-ITE undergraduate degree and postgraduate diploma/certificate programmes

| | *First-time enrolments (FTEN)* | | | | | | | | *Graduations* | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA**[1] | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** |
| 2000 - 2004 | 12.3** | 5.7** | 7.6* | 3.6 | 5.9** | 19.2*** | −9.4 | 19.4** | −4.0* | 5.6*** | 0.9 | 17.6*** | 4.3*** | 2.4 | 7.8*** | −4.7 |
| 2004 - 2008 | 10.3*** | 4.2*** | 2.2 | −2.9** | −15.3** | −0.8 | 2.4 | −2.7 | 1.0 | 5.4** | 5.7** | 2.9* | 2.0* | 5.2** | 5.0*** | 17.6*** |
| 2008 - 2013 | 4.8 | 1.1 | 4.2** | 7.3** | 6.1 | 5.6 | 1.9 | 7.7* | 14.7*** | 4.4*** | 8.2*** | 7.3*** | 7.4*** | 7.7*** | 4.6*** | 1.0 |
| 2004 - 2013 | 5.8*** | 2.7*** | 3.4*** | 3.6* | 0.3 | 4.4** | 3.1*** | 3.0** | 9.9** | 4.7*** | 7.5*** | 5.2*** | 4.0** | 6.8*** | 4.3*** | 7.7** |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.24:** Shares of FTEN in ITE programmes between 2004 and 2014 by province of enrolment/HEI and sending province

| | *Province of FTEN (%)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sending Region** | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA** | **CONT.**[1] | **ALL**[2] |
| Western Cape | 86.09 | 2.66 | 1.53 | 0.03 | 2.52 | 0.22 | 0.01 | 5.65 | 13.11 | 10.10 |
| Eastern Cape | 5.00 | 79.67 | 4.33 | 0.41 | 1.37 | 0.48 | 0.04 | 4.25 | 13.34 | 9.67 |
| Northern Cape | 3.81 | 0.20 | 5.37 | 0.00 | 11.92 | 0.14 | 0.01 | 0.84 | 2.18 | 1.64 |
| Free State | 0.46 | 0.54 | 70.61 | 0.08 | 7.01 | 0.80 | 0.04 | 1.69 | 7.33 | 5.05 |
| KwaZulu-Natal | 0.84 | 12.79 | 9.04 | 95.28 | 4.31 | 10.24 | 0.13 | 55.49 | 29.54 | 40.01 |
| North West | 0.11 | 0.30 | 1.31 | 0.13 | 29.37 | 3.01 | 1.39 | 2.10 | 3.64 | 3.02 |
| Gauteng | 1.06 | 1.09 | 2.62 | 0.52 | 32.34 | 58.93 | 1.44 | 20.87 | 17.24 | 18.70 |
| Mpumalanga | 0.19 | 0.77 | 1.47 | 2.44 | 5.78 | 11.28 | 20.77 | 4.87 | 4.96 | 4.92 |
| Limpopo | 0.16 | 0.22 | 0.33 | 0.19 | 2.21 | 4.03 | 75.13 | 2.37 | 4.70 | 3.76 |
| Other/Unknown[2] | 2.28 | 1.77 | 3.38 | 0.92 | 3.15 | 10.87 | 1.04 | 1.88 | 3.96 | 3.12 |

NOTES: Figures represent the estimated numbers and shares of first-time enrolments (FTEN) in undergraduate and postgraduate ITE programmes by the provinces where various contact HEIs are located. [1] Includes all contact HEIs that offer ITE programmes. . [2] Represents the percentage of FTEN for which no postal code information is available in HEMIS. The majority of these individuals are not South African residents.

**Table A.25:** Shares of graduations in ITE programmes between 2004 and 2014 by province of graduation/HEI and sending province

| | *Province of Graduation (%)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Sending Region** | **WC** | **EC** | **FS** | **KZN** | **NW** | **GAU** | **LIM** | **UNISA** | **CONT.**[1] | **ALL**[2] |
| Western Cape | 82.6 | 2.4 | 1.0 | 0.0 | 2.0 | 0.3 | 0.0 | 8.4 | 15.7 | 14.1 |
| Eastern Cape | 6.0 | 76.0 | 4.4 | 0.5 | 3.8 | 3.3 | 0.0 | 5.2 | 12.5 | 10.8 |
| Northern Cape | 4.7 | 0.3 | 4.1 | 0.0 | 8.3 | 0.6 | 0.0 | 1.2 | 2.3 | 2.1 |
| Free State | 0.5 | 1.7 | 74.2 | 0.1 | 8.3 | 1.7 | 0.0 | 2.8 | 7.9 | 6.8 |
| KwaZulu-Natal | 1.3 | 13.3 | 3.9 | 92.6 | 6.6 | 9.0 | 0.2 | 35.3 | 25.7 | 27.8 |
| North West | 0.2 | 0.5 | 1.4 | 0.2 | 26.0 | 4.4 | 2.2 | 2.6 | 4.4 | 4.0 |
| Gauteng | 1.5 | 2.0 | 2.4 | 0.6 | 31.1 | 50.6 | 1.2 | 29.3 | 16.3 | 19.2 |
| Mpumalanga | 0.3 | 0.6 | 1.9 | 2.5 | 6.1 | 11.8 | 15.6 | 6.2 | 4.9 | 5.2 |
| Limpopo | 0.4 | 0.8 | 0.4 | 0.6 | 3.7 | 7.8 | 80.2 | 3.3 | 5.4 | 5.0 |
| Other/Unknown[2] | 2.5 | 2.5 | 6.4 | 2.9 | 4.1 | 10.6 | 0.5 | 5.8 | 4.9 | 5.1 |

NOTES: Figures represent the estimated numbers and shares of graduations in undergraduate and postgraduate ITE programmes by the provinces where various contact HEIs are located. [1] Includes all contact HEIs that offer ITE programmes.[2] Represents the percentage of FTEN for which no postal code information is available in HEMIS. The majority of these individuals are not South African residents.

**Table A.26:** FTEN and graduations in ITE programmes by sending province (2004 - 2013)

**(a)** First-time enrolments (FTEN) and graduations

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2004 | 1 456 | 2 035 | 348 | 1 232 | 4 598 | 372 | 1 892 | 408 | 221 | 929 | 1 591 | 298 | 1 014 | 2 239 | 697 | 1 686 | 584 | 665 |
| 2005 | 1 188 | 1 854 | 148 | 509 | 4 943 | 185 | 1 680 | 532 | 607 | 977 | 1 051 | 163 | 440 | 2 034 | 292 | 1 280 | 315 | 349 |
| 2006 | 1 163 | 1 017 | 126 | 483 | 2 694 | 382 | 1 953 | 619 | 412 | 1 016 | 899 | 186 | 525 | 1 537 | 423 | 1 404 | 301 | 292 |
| 2007 | 1 416 | 876 | 173 | 634 | 3 458 | 305 | 2 316 | 663 | 563 | 942 | 840 | 129 | 413 | 1 798 | 209 | 1 197 | 218 | 206 |
| 2008 | 1 704 | 1 066 | 231 | 612 | 4 674 | 416 | 2 351 | 775 | 351 | 1 025 | 664 | 103 | 341 | 1 640 | 244 | 1 341 | 266 | 153 |
| 2009 | 1 851 | 1 407 | 301 | 925 | 6 144 | 421 | 3 187 | 934 | 532 | 1 218 | 706 | 167 | 448 | 1 742 | 234 | 1 423 | 342 | 190 |
| 2010 | 2 414 | 1 843 | 326 | 1 047 | 6 887 | 623 | 3 395 | 916 | 562 | 1 614 | 748 | 163 | 449 | 2 165 | 273 | 1 601 | 428 | 381 |
| 2011 | 2 396 | 3 027 | 409 | 1 346 | 13 757 | 758 | 4 780 | 1 234 | 913 | 1 723 | 939 | 210 | 787 | 2 955 | 339 | 1 930 | 660 | 638 |
| 2012 | 2 210 | 2 308 | 459 | 1 276 | 14 300 | 995 | 5 561 | 1 271 | 989 | 1 683 | 1 178 | 233 | 962 | 4 531 | 411 | 2 334 | 762 | 752 |
| 2013 | 2 317 | 1 905 | 414 | 999 | 10 268 | 960 | 6 418 | 1 473 | 1 593 | 1 904 | 1 393 | 263 | 882 | 5 090 | 543 | 3 589 | 906 | 947 |

**(b)** Share of first-time enrolments (FTEN) and graduations (%)

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2004 | 11.0 | 15.4 | 2.6 | 9.3 | 34.8 | 2.8 | 14.3 | 3.1 | 1.7 | 8.8 | 15.1 | 2.8 | 9.7 | 21.3 | 6.6 | 16.0 | 5.6 | 6.3 |
| 2005 | 9.7 | 15.1 | 1.2 | 4.2 | 40.3 | 1.5 | 13.7 | 4.3 | 5.0 | 12.8 | 13.8 | 2.1 | 5.8 | 26.7 | 3.8 | 16.8 | 4.1 | 4.6 |
| 2006 | 12.3 | 10.7 | 1.3 | 5.1 | 28.4 | 4.0 | 20.6 | 6.5 | 4.4 | 14.1 | 12.5 | 2.6 | 7.3 | 21.4 | 5.9 | 19.5 | 4.2 | 4.1 |
| 2007 | 12.9 | 8.0 | 1.6 | 5.8 | 31.6 | 2.8 | 21.1 | 6.1 | 5.2 | 14.7 | 13.1 | 2.0 | 6.4 | 28.0 | 3.3 | 18.7 | 3.4 | 3.2 |
| 2008 | 13.3 | 8.3 | 1.8 | 4.8 | 36.5 | 3.3 | 18.4 | 6.0 | 2.7 | 16.6 | 10.8 | 1.7 | 5.5 | 26.6 | 4.0 | 21.8 | 4.3 | 2.5 |
| 2009 | 11.2 | 8.5 | 1.8 | 5.6 | 37.1 | 2.5 | 19.3 | 5.6 | 3.2 | 17.5 | 10.2 | 2.4 | 6.4 | 25.1 | 3.4 | 20.5 | 4.9 | 2.7 |
| 2010 | 12.8 | 9.8 | 1.7 | 5.6 | 36.6 | 3.3 | 18.0 | 4.9 | 3.0 | 19.5 | 9.0 | 2.0 | 5.4 | 26.1 | 3.3 | 19.3 | 5.2 | 4.6 |
| 2011 | 8.3 | 10.5 | 1.4 | 4.7 | 47.5 | 2.6 | 16.5 | 4.3 | 3.1 | 16.4 | 8.9 | 2.0 | 7.5 | 28.0 | 3.2 | 18.3 | 6.3 | 6.1 |
| 2012 | 7.4 | 7.8 | 1.5 | 4.3 | 48.1 | 3.4 | 18.7 | 4.3 | 3.3 | 12.8 | 9.0 | 1.8 | 7.3 | 34.5 | 3.1 | 17.8 | 5.8 | 5.7 |
| 2013 | 8.7 | 7.2 | 1.6 | 3.8 | 38.7 | 3.6 | 24.2 | 5.6 | 6.0 | 12.2 | 8.9 | 1.7 | 5.6 | 32.5 | 3.5 | 22.9 | 5.8 | 6.0 |

NOTES: Figures represent the estimated (a) numbers and (b) shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by students' province of permanent residence (i.e. sending region).

**Table A.27:** Estimated average annual growth (%) in FTEN and graduations in ITE programmes and non-ITE programmes by sending province

**(a)** ITE programmes

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2000 - 2004 | 23.1** | −0.5 | 7.5 | 4.3 | 21.7 | −21.3* | 1.5 | −18.1 | −22.4** | 25.0*** | 17.5*** | 36.0** | 23.1*** | 21.4 | 4.3 | 1.6 | 3.7 | 5.1 |
| 2004 - 2008 | 5.0 | −18.5* | −6.5 | −11.1 | −3.2 | 7.5 | 7.8* | 16.2*** | 8.9 | 1.6 | −17.9*** | −21.0** | −20.1* | −7.2** | −21.6* | −5.1 | −17.7 | −29.3*** |
| 2008 - 2013 | 6.1* | 15.0 | 13.4** | 11.0 | 22.7* | 22.0*** | 22.3*** | 13.5*** | 32.7*** | 12.5*** | 16.9*** | 18.5** | 24.3*** | 28.7*** | 18.4** | 20.7** | 29.2*** | 48.1*** |
| 2004 - 2013 | 8.7** | 5.5 | 11.2 | 7.3 | 16.5** | 17.0** | 16.6*** | 14.4*** | 16.8** | 9.3*** | −0.3 | 1.9 | 4.2 | 10.8* | −0.1 | 8.5* | 10.4 | 9.2 |

**(b)** Non-ITE undergraduate degree and postgraduate diploma/certificate programmes

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2000 - 2004 | 7.2*** | 5.1 | 4.4 | −3.5 | 10.9* | −5.9 | 4.9 | −9.6 | 4.4 | 4.5* | −0.2 | 4.4 | 3.6 | 7.2** | −5.5 | 7.3** | 0.0 | 0.7 |
| 2004 - 2008 | 4.1** | 3.1** | 2.3 | −1.6* | −5.8** | 4.7 | 4.6** | 2.3* | −0.5 | 6.4*** | 5.2*** | 5.8*** | 1.4 | 3.6*** | 6.7*** | 3.4*** | 7.9*** | 15.1*** |
| 2008 - 2013 | 4.2*** | 5.1** | 3.0 | 4.0* | 5.1** | 5.0* | 5.7*** | 9.0*** | 7.7** | 6.8*** | 7.8*** | 4.7** | 6.7*** | 9.9*** | 6.4*** | 7.7** | 10.1*** | 4.4*** |
| 2004 - 2013 | 4.2*** | 4.4*** | 3.1** | 2.3* | 2.3 | 5.0** | 5.2*** | 6.8*** | 3.8*** | 6.6*** | 7.1*** | 5.6*** | 4.1*** | 6.7*** | 6.0*** | 5.4*** | 9.3*** | 9.4*** |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.28:** FTEN and graduations in ITE programmes at Unisa by sending province (2004 - 2013)

**(a)** First-time enrolments (FTEN) and graduations

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2004 | 179 | 74 | 16 | 31 | 566 | 36 | 441 | 123 | 55 | 79 | 42 | 8 | 17 | 207 | 47 | 268 | 54 | 34 |
| 2005 | 149 | 67 | 22 | 48 | 662 | 61 | 540 | 172 | 92 | 78 | 33 | 12 | 24 | 209 | 31 | 299 | 55 | 48 |
| 2006 | 181 | 94 | 18 | 42 | 987 | 70 | 638 | 156 | 78 | 92 | 38 | 8 | 32 | 240 | 39 | 358 | 72 | 45 |
| 2007 | 220 | 99 | 29 | 63 | 1 397 | 68 | 777 | 205 | 64 | 95 | 67 | 15 | 37 | 252 | 47 | 336 | 68 | 49 |
| 2008 | 245 | 116 | 32 | 95 | 2 105 | 107 | 872 | 295 | 106 | 137 | 56 | 9 | 37 | 293 | 41 | 427 | 102 | 27 |
| 2009 | 364 | 239 | 57 | 124 | 2 931 | 134 | 1 258 | 430 | 175 | 152 | 52 | 17 | 44 | 416 | 39 | 457 | 119 | 47 |
| 2010 | 411 | 411 | 79 | 128 | 4 559 | 190 | 1 510 | 415 | 207 | 171 | 83 | 20 | 34 | 564 | 37 | 504 | 118 | 36 |
| 2011 | 719 | 836 | 109 | 231 | 10 140 | 254 | 2 307 | 588 | 299 | 208 | 141 | 30 | 102 | 1 008 | 61 | 685 | 168 | 91 |
| 2012 | 818 | 718 | 122 | 248 | 10 787 | 364 | 3 074 | 655 | 334 | 357 | 263 | 57 | 95 | 1 633 | 85 | 921 | 238 | 119 |
| 2013 | 800 | 419 | 125 | 209 | 5 993 | 238 | 3 674 | 484 | 307 | 386 | 301 | 69 | 162 | 2 521 | 105 | 1 841 | 296 | 190 |

**(b)** Share of first-time enrolments (FTEN) and graduations (%)

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2004 | 11.0 | 4.5 | 1.0 | 1.9 | 34.8 | 2.2 | 27.1 | 7.6 | 3.4 | 9.4 | 5.0 | 1.0 | 2.0 | 24.7 | 5.6 | 32.0 | 6.5 | 4.1 |
| 2005 | 7.7 | 3.5 | 1.1 | 2.5 | 34.1 | 3.1 | 27.8 | 8.9 | 4.7 | 8.7 | 3.7 | 1.3 | 2.7 | 23.4 | 3.4 | 33.5 | 6.2 | 5.4 |
| 2006 | 7.6 | 3.9 | 0.8 | 1.8 | 41.4 | 2.9 | 26.7 | 6.5 | 3.3 | 8.9 | 3.7 | 0.8 | 3.1 | 23.3 | 3.7 | 34.8 | 7.0 | 4.4 |
| 2007 | 7.2 | 3.2 | 0.9 | 2.1 | 45.7 | 2.2 | 25.4 | 6.7 | 2.1 | 8.9 | 6.3 | 1.4 | 3.5 | 23.6 | 4.4 | 31.5 | 6.4 | 4.6 |
| 2008 | 5.9 | 2.8 | 0.8 | 2.3 | 50.8 | 2.6 | 21.0 | 7.1 | 2.6 | 10.9 | 4.5 | 0.7 | 3.0 | 23.4 | 3.3 | 34.1 | 8.1 | 2.2 |
| 2009 | 6.1 | 4.0 | 1.0 | 2.1 | 49.5 | 2.3 | 21.2 | 7.3 | 2.9 | 10.0 | 3.4 | 1.1 | 2.9 | 27.2 | 2.5 | 29.9 | 7.8 | 3.0 |
| 2010 | 5.1 | 5.1 | 1.0 | 1.6 | 56.9 | 2.4 | 18.8 | 5.2 | 2.6 | 9.9 | 4.8 | 1.2 | 2.0 | 32.8 | 2.2 | 29.3 | 6.9 | 2.1 |
| 2011 | 4.6 | 5.3 | 0.7 | 1.5 | 64.8 | 1.6 | 14.7 | 3.8 | 1.9 | 7.8 | 5.3 | 1.1 | 3.8 | 37.8 | 2.3 | 25.7 | 6.3 | 3.4 |
| 2012 | 4.7 | 4.1 | 0.7 | 1.4 | 62.2 | 2.1 | 17.7 | 3.8 | 1.9 | 9.1 | 6.7 | 1.4 | 2.4 | 41.4 | 2.2 | 23.4 | 6.0 | 3.0 |
| 2013 | 6.5 | 3.4 | 1.0 | 1.7 | 48.9 | 1.9 | 30.0 | 4.0 | 2.5 | 6.6 | 5.1 | 1.2 | 2.8 | 42.9 | 1.8 | 31.4 | 5.0 | 3.2 |

NOTES: Figures represent the estimated (a) numbers and (b) shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by students' province of permanent residence (i.e. the sending region) for Unisa.

**Table A.29:** Estimated average annual growth (%) in FTEN and graduations in ITE and non-ITE programmes at Unisa by sending province

**(a)** ITE programmes

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2000 - 2004 | 178.6*** | 91.7** | 65.2 | 76.2 | 213.7* | 81.5 | 137.1** | 73.6 | 84.4 | 93.8 | 43.5 | 5.9 | 14.2 | 53.7 | 79.8 | 113.4 | 60.9 | 23.2 |
| 2004 - 2008 | 10.7* | 13.7** | 18.1*** | 28.6*** | 40.1*** | 25.8** | 18.9*** | 21.2*** | 10.0 | 13.9* | 13.7 | 4.7 | 22.0** | 9.2*** | 1.6 | 11.1*** | 16.0** | −4.3 |
| 2008 - 2013 | 29.0*** | 34.8 | 31.0** | 20.8** | 32.8* | 23.1* | 34.2*** | 12.4 | 24.4** | 25.5*** | 48.3*** | 50.1*** | 36.1*** | 55.5*** | 24.2** | 32.0** | 24.8*** | 47.1*** |
| 2004 - 2013 | 23.3*** | 33.9*** | 29.8*** | 27.1*** | 40.7*** | 26.9*** | 27.5*** | 20.5*** | 23.8*** | 20.6*** | 27.0*** | 26.2*** | 24.1*** | 32.8*** | 10.1* | 19.8** | 21.1*** | 16.3** |

**(b)** Non-ITE undergraduate degree and postgraduate diploma/certificate programmes

| | *First-time enrolments (FTEN)* | | | | | | | | | *Graduations* | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** | **WC** | **EC** | **NC** | **FS** | **KZN** | **NW** | **GAU** | **MPU** | **LIM** |
| 2000 - 2004 | 83.6*** | 56.8** | 88.6** | 70.4** | 134.5** | 87.0** | 105.9*** | 88.0** | 89.4* | 61.1** | 29.1 | 36.9 | 29.9 | 57.4 | 38.1 | 44.2 | 47.7 | 50.3 |
| 2004 - 2008 | 6.5*** | 14.3*** | 7.6*** | 9.4*** | 4.8 | 11.0*** | 11.5*** | 8.8** | 4.3* | 6.3* | −2.4 | −1.3 | −9.0* | 0.3 | −6.7 | 3.1 | −3.1 | −6.9 |
| 2008 - 2013 | 4.5* | 9.7* | 5.0* | 6.0* | 1.3 | 5.3 | 9.1** | 5.6 | 3.0 | 10.6*** | 17.5*** | 14.3*** | 9.7*** | 15.6*** | 6.3** | 20.0** | 12.0*** | 11.4** |
| 2004 - 2013 | 5.0*** | 12.5*** | 6.5*** | 7.3*** | 2.3 | 8.3** | 8.6*** | 7.0** | 1.8 | 10.1*** | 9.0** | 8.8** | 3.1 | 11.5** | 2.8 | 13.2** | 7.9** | 5.6* |

NOTES: Figures represent the percentage average annual growth rates in the dependent variables over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.30:** FTEN and graduations in ITE programmes by age cohort (2004 - 2013)

**(a)** First-time enrolments (FTEN) and graduations

| | *First-time enrolments (FTEN)* | | | | | | | *Graduations* | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **ALL** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** | **ALL** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** |
| 2004 | 13 229 | 2 530 | 2 851 | 1 605 | 1 979 | 1 764 | 2 476 | 10 506 | 4 | 2 139 | 1 413 | 2 292 | 2 266 | 2 388 |
| 2005 | 12 258 | 2 807 | 3 503 | 1 643 | 1 445 | 1 259 | 1 596 | 7 626 | 5 | 2 285 | 958 | 1 253 | 1 326 | 1 795 |
| 2006 | 9 469 | 2 837 | 2 990 | 1 605 | 835 | 573 | 628 | 7 188 | 3 | 2 883 | 1 144 | 882 | 962 | 1 314 |
| 2007 | 10 950 | 3 769 | 3 325 | 1 430 | 1 048 | 701 | 678 | 6 413 | 7 | 2 994 | 1 006 | 751 | 702 | 953 |
| 2008 | 12 807 | 4 124 | 3 702 | 1 634 | 1 194 | 1 054 | 1 098 | 6 159 | 9 | 3 210 | 1 060 | 685 | 556 | 637 |
| 2009 | 16 553 | 5 502 | 4 669 | 2 382 | 1 532 | 1 161 | 1 307 | 6 953 | 12 | 3 395 | 1 327 | 672 | 627 | 921 |
| 2010 | 18 832 | 5 614 | 5 308 | 3 065 | 1 955 | 1 336 | 1 554 | 8 284 | 15 | 4 058 | 1 703 | 868 | 684 | 956 |
| 2011 | 28 947 | 7 058 | 8 344 | 5 982 | 3 364 | 2 191 | 2 009 | 10 540 | 17 | 5 047 | 2 475 | 1 057 | 777 | 1 167 |
| 2012 | 29 737 | 7 316 | 7 919 | 6 300 | 3 551 | 2 401 | 2 250 | 13 153 | 34 | 6 142 | 3 367 | 1 421 | 966 | 1 223 |
| 2013 | 26 503 | 8 331 | 7 923 | 4 340 | 2 507 | 1 714 | 1 687 | 15 655 | 35 | 6 851 | 4 131 | 1 919 | 1 236 | 1 484 |

**(b)** Share of first-time enrolments (FTEN) and graduations (%)

| | *First-time enrolments (FTEN)* | | | | | | *Graduations* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** |
| 2004 | 19.1 | 21.6 | 12.1 | 15.0 | 13.3 | 18.7 | 0.0 | 20.4 | 13.4 | 21.8 | 21.6 | 22.7 |
| 2005 | 22.9 | 28.6 | 13.4 | 11.8 | 10.3 | 13.0 | 0.1 | 30.0 | 12.6 | 16.4 | 17.4 | 23.5 |
| 2006 | 30.0 | 31.6 | 17.0 | 8.8 | 6.1 | 6.6 | 0.0 | 40.1 | 15.9 | 12.3 | 13.4 | 18.3 |
| 2007 | 34.4 | 30.4 | 13.1 | 9.6 | 6.4 | 6.2 | 0.1 | 46.7 | 15.7 | 11.7 | 10.9 | 14.9 |
| 2008 | 32.2 | 28.9 | 12.8 | 9.3 | 8.2 | 8.6 | 0.2 | 52.1 | 17.2 | 11.1 | 9.0 | 10.4 |
| 2009 | 33.2 | 28.2 | 14.4 | 9.3 | 7.0 | 7.9 | 0.2 | 48.8 | 19.1 | 9.7 | 9.0 | 13.2 |
| 2010 | 29.8 | 28.2 | 16.3 | 10.4 | 7.1 | 8.3 | 0.2 | 49.0 | 20.6 | 10.5 | 8.3 | 11.5 |
| 2011 | 24.4 | 28.8 | 20.7 | 11.6 | 7.6 | 6.9 | 0.2 | 47.9 | 23.5 | 10.0 | 7.4 | 11.1 |
| 2012 | 24.6 | 26.6 | 21.2 | 11.9 | 8.1 | 7.6 | 0.3 | 46.7 | 25.6 | 10.8 | 7.3 | 9.3 |
| 2013 | 31.4 | 29.9 | 16.4 | 9.5 | 6.5 | 6.4 | 0.2 | 43.8 | 26.4 | 12.3 | 7.9 | 9.5 |

NOTES: Figures represent the estimated (a) numbers and (b) shares of first-time enrolments (FTEN) and graduations in undergraduate and postgraduate ITE programmes by age cohort.

**Table A.31:** Estimated average annual growth (%) in FTEN and graduations in ITE programmes by age cohort

**(a)** ITE programmes

| | *First-time enrolments (FTEN)* | | | | | | *Graduations* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Period** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** |
| 2000 - 2004 | 60.3* | 31.6*** | −2.9 | −11.1 | −8.7 | −6.3 | 7.0 | 19.6* | −1.5 | 1.3 | 10.6* | 10.2** |
| 2004 - 2008 | 13.6*** | 4.8 | −1.0 | −12.5 | −14.9 | −22.0 | 23.7** | 11.4*** | −5.1 | −25.4** | −29.2*** | −27.9*** |
| 2008 - 2013 | 14.0*** | 18.2** | 27.4* | 21.3* | 15.7* | 12.2* | 32.7*** | 18.0*** | 32.9*** | 24.2*** | 16.7*** | 16.3*** |
| 2004 - 2013 | 15.3*** | 14.0*** | 18.2** | 11.2 | 8.2 | 4.6 | 30.9*** | 13.7*** | 15.7** | 0.4 | −5.1 | −4.3 |

**(b)** Non-ITE undergraduate degree and postgraduate diploma/certificate programmes

| | *First-time enrolments (FTEN)* | | | | | | *Graduations* | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Period** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** | **<20** | **20-24** | **25-29** | **30-34** | **35-39** | **40+** |
| 2000 - 2004 | 3.8 | −0.1 | 0.3 | 4.9 | 3.4 | 4.9 | 4.7** | 5.3** | −2.5 | −2.3* | −2.7 | 1.2 |
| 2004 - 2008 | 1.7 | 1.2 | 1.3 | 5.0 | 4.1 | 2.8 | 3.1** | 6.4*** | 3.4** | −0.2 | 0.2 | 2.7* |
| 2008 - 2013 | 1.7 | 3.8*** | 7.7** | 6.9** | 9.7*** | 10.3*** | −0.3 | 5.8*** | 9.9*** | 8.9*** | 9.0*** | 8.8*** |
| 2004 - 2013 | 2.6*** | 2.9*** | 4.7** | 6.5*** | 7.8*** | 7.6** | 0.7 | 5.6*** | 6.9*** | 5.7** | 6.3** | 7.4*** |

NOTES: Figures represent the percentage average annual growth rates in FTEN and graduations for each age cohort over the indicated periods and were estimated using the least-squares methodology described in Appendix C. * Significant at the 10% level ** Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.32:** Enrolments, FTEN, and Graduates for all *Education* and *Non-Education* qualifications 2004 - 2013

| *Race:* | *Black* | | | *Coloured* | | | *Asian/Indian* | | | *White* | | | *All* | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Year** | **M** | **F** | **ALL** | **M** | **F** | **ALL** | **M** | **F** | **ALL** | **M** | **F** | **ALL** | **M** | **F** | **ALL** |
| 2004 | 2 958 | 5 846 | 8 805 | 304 | 595 | 899 | 92 | 448 | 540 | 575 | 2 399 | 2 974 | 3 930 | 9 299 | 13 229 |
| 2005 | 2 814 | 5 239 | 8 053 | 214 | 458 | 671 | 108 | 575 | 683 | 562 | 2 285 | 2 847 | 3 699 | 8 559 | 12 258 |
| 2006 | 2 041 | 3 169 | 5 210 | 163 | 435 | 598 | 94 | 520 | 615 | 589 | 2 451 | 3 040 | 2 889 | 6 580 | 9 469 |
| 2007 | 2 418 | 3 639 | 6 057 | 215 | 596 | 811 | 84 | 512 | 596 | 677 | 2 784 | 3 461 | 3 403 | 7 547 | 10 950 |
| 2008 | 2 609 | 4 891 | 7 500 | 351 | 762 | 1 112 | 92 | 611 | 702 | 609 | 2 876 | 3 485 | 3 664 | 9 143 | 12 807 |
| 2009 | 3 360 | 6 550 | 9 910 | 349 | 1 063 | 1 412 | 125 | 781 | 906 | 764 | 3 556 | 4 320 | 4 600 | 11 953 | 16 553 |
| 2010 | 3 543 | 7 773 | 11 315 | 440 | 1 331 | 1 771 | 138 | 845 | 983 | 904 | 3 839 | 4 743 | 5 027 | 13 804 | 18 832 |
| 2011 | 6 066 | 14 655 | 20 721 | 448 | 1 378 | 1 826 | 176 | 1 142 | 1 317 | 927 | 4 128 | 5 055 | 7 623 | 21 324 | 28 947 |
| 2012 | 6 140 | 15 462 | 21 601 | 409 | 1 294 | 1 704 | 158 | 1 153 | 1 311 | 924 | 4 148 | 5 072 | 7 651 | 22 087 | 29 737 |
| 2013 | 6 170 | 12 075 | 18 245 | 410 | 1 353 | 1 763 | 231 | 1 310 | 1 541 | 856 | 4 035 | 4 891 | 7 685 | 18 818 | 26 503 |

NOTES: Figures represent the estimated number total enrolments, first-time enrolments (FTEN), and graduates for *Education Qualifications* and *Non-Education Qualifications* respectively.

**Table A.33:** Cumulative completion rates (CCR) (%) for various ITE programme cohorts (2004 - 2013)

**(a)** Undergraduate ITE programmes

| | *Cumulative Completion Rate (%) for each ITE cohort* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Time**[1] | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| 1 | 5.4 | 6.6 | 4.5 | 0.7 | 1.5 | 0.6 | 0.8 | 1.7 | 0.4 | 0.2 |
| 2 | 8.9 | 8.8 | 7.1 | 1.9 | 3.4 | 1.4 | 1.5 | 3.4 | 0.8 | — |
| 3 | 12.2 | 15.7 | 10.4 | 4.4 | 6.0 | 3.2 | 3.1 | 6.1 | — | — |
| 4 | 29.7 | 37.4 | 31.0 | 32.0 | 32.5 | 33.1 | 25.4 | — | — | — |
| 5 | 33.2 | 43.1 | 35.7 | 38.9 | 40.7 | 45.5 | — | — | — | — |
| 6 | 34.9 | 45.4 | 37.8 | 43.0 | 44.6 | — | — | — | — | — |
| 7 | 35.7 | 46.8 | 39.0 | 45.7 | — | — | — | — | — | — |
| 8 | 36.2 | 47.6 | 40.1 | — | — | — | — | — | — | — |
| 9 | 36.6 | 48.3 | — | — | — | — | — | — | — | — |
| 10 | 37.0 | — | — | — | — | — | — | — | — | — |

**(b)** Postgraduate ITE programmes

| | *Cumulative Completion Rate (%) for each ITE cohort* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Time**[1] | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** |
| 1 | 29.3 | 32.5 | 34.7 | 31.7 | 31.5 | 30.3 | 31.0 | 32.0 | 39.3 | 31.7 |
| 2 | 41.0 | 49.9 | 53.2 | 55.0 | 58.1 | 57.1 | 58.3 | 60.0 | 71.3 | — |
| 3 | 44.3 | 55.6 | 61.2 | 63.6 | 64.9 | 70.2 | 71.1 | 75.3 | — | — |
| 4 | 45.6 | 57.8 | 65.7 | 67.9 | 70.1 | 75.4 | 78.8 | — | — | — |
| 5 | 46.3 | 59.5 | 68.7 | 70.7 | 72.6 | 78.9 | — | — | — | — |
| 6 | 46.7 | 60.4 | 72.4 | 72.6 | 74.4 | — | — | — | — | — |
| 7 | 46.9 | 61.1 | 73.1 | 74.0 | — | — | — | — | — | — |
| 8 | 47.2 | 61.6 | 74.0 | — | — | — | — | — | — | — |
| 9 | 47.3 | 62.1 | — | — | — | — | — | — | — | — |
| 10 | 47.5 | — | — | — | — | — | — | — | — | — |

NOTES: [1]Number of years following cohort's commencement ($t = 1$ in commencement year). Figures represent the estimated cumulative completion rates (CCR) for various undergraduate and postgraduate ITE programme commencement cohorts.

**Table A.34:** Estimated % of ITE programme completers who graduate within $t$ years (2004 - 2013)

**(a)** Undergraduate ITE programmes

| | *Estimated % of total completers for each ITE cohort* | | | | | | | | | | **Weighted** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time**[1] | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **Average**[1] |
| 1 | 14.5 | 13.3 | 10.4 | 1.4 | 3.0 | 1.0 | 1.8 | 3.5 | 0.7 | 0.5 | 3.5 |
| 2 | 23.9 | 17.8 | 16.3 | 3.6 | 6.5 | 2.5 | 3.5 | 7.0 | 1.7 | — | 6.6 |
| 3 | 32.5 | 31.7 | 24.1 | 8.4 | 11.5 | 5.6 | 7.3 | 12.5 | — | — | 12.0 |
| 4 | 79.5 | 75.3 | 71.7 | 60.6 | 62.0 | 58.2 | 60.8 | — | — | — | 63.3 |
| 5 | 88.9 | 86.8 | 82.4 | 73.8 | 77.7 | 80.0 | — | — | — | — | 78.8 |
| 6 | 93.3 | 91.5 | 87.3 | 81.5 | 85.2 | — | — | — | — | — | 84.9 |
| 7 | 95.5 | 94.2 | 90.1 | 86.7 | — | — | — | — | — | — | 88.0 |
| 8 | 96.7 | 95.9 | 92.7 | — | — | — | — | — | — | — | 91.6 |
| 9 | 97.9 | 97.4 | — | — | — | — | — | — | — | — | 95.9 |
| 10 | 98.8 | — | — | — | — | — | — | — | — | — | 97.5 |

**(b)** Postgraduate ITE programmes

| | *Estimated % of total completers for each ITE cohort* | | | | | | | | | | **Weighted** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Time**[1] | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** | **2012** | **2013** | **Average**[1] |
| 1 | 61.6 | 51.8 | 45.8 | 41.4 | 40.8 | 36.0 | 35.5 | 35.8 | 41.5 | 37.8 | 42.5 |
| 2 | 86.0 | 79.7 | 70.2 | 71.7 | 75.4 | 68.0 | 66.8 | 67.0 | 75.2 | — | 73.0 |
| 3 | 93.0 | 88.7 | 80.8 | 83.1 | 84.1 | 83.7 | 81.5 | 84.1 | — | — | 85.1 |
| 4 | 95.7 | 92.2 | 86.7 | 88.7 | 90.9 | 89.8 | 90.2 | — | — | — | 90.8 |
| 5 | 97.1 | 94.9 | 90.7 | 92.3 | 94.2 | 94.0 | — | — | — | — | 93.9 |
| 6 | 98.0 | 96.3 | 95.6 | 94.8 | 96.5 | — | — | — | — | — | 96.1 |
| 7 | 98.5 | 97.4 | 96.5 | 96.6 | — | — | — | — | — | — | 96.9 |
| 8 | 99.0 | 98.3 | 97.6 | — | — | — | — | — | — | — | 98.2 |
| 9 | 99.3 | 99.1 | — | — | — | — | — | — | — | — | 98.9 |
| 10 | 99.7 | — | — | — | — | — | — | — | — | — | 99.3 |

NOTES: [1]Number of years following cohort's commencement (i.e. the enrolment horizon). Figures represent the estimated percentage of all ultimate completers in a cohort who graduate within a certain number of years after commencing with their programmes. In other words, each cell presents the estimated CCR for the year and cohort in question as a percentage of the estimated total CCR for that cohort. Missing cells (CCRs) are imputed using log-linear least-squared regressions on the existing data.

**Table A.35:** 5-year CCRs (%) for undergraduate ITE programmes (2004 - 2009)

| | *Commencement ITE cohort* | | | | | |
|---|---|---|---|---|---|---|
| **Group** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** |
| All HEIs | 33.2 | 43.1 | 35.7 | 38.9 | 40.7 | 45.5 |
| Unisa | 16.2 | 17.2 | 13.1 | 13.4 | 14.6 | 21.6 |
| Contact HEIs | 35.7 | 49.5 | 41.4 | 48.6 | 51.8 | 59.1 |
| | *Gender* | | | | | |
| Male | 27.2 | 33.8 | 28.3 | 33.7 | 37.9 | 39.5 |
| Female | 35.6 | 46.6 | 38.5 | 41.1 | 41.8 | 47.7 |
| | *Race* | | | | | |
| Black | 26.7 | 38.5 | 31.3 | 35.8 | 37.5 | 42.6 |
| Coloured | 39.5 | 40.5 | 29.1 | 34.5 | 34.0 | 43.0 |
| Indian | 25.4 | 31.5 | 34.7 | 38.5 | 43.4 | 45.0 |
| White | 49.1 | 53.2 | 46.5 | 45.8 | 49.7 | 54.2 |
| | *Home Language* | | | | | |
| Afrikaans | 60.4 | 55.9 | 56.5 | 54.1 | 57.5 | 55.2 |
| English | 34.7 | 37.5 | 37.7 | 40.4 | 47.2 | 48.8 |
| African | 47.8 | 39.2 | 31.0 | 34.6 | 35.1 | 43.0 |
| | *Province of enrolment (Contact HEIs)* | | | | | |
| WC | 66.3 | 60.0 | 40.3 | 43.6 | 39.7 | 63.8 |
| EC | 40.5 | 66.4 | 31.8 | 61.7 | 70.4 | 62.5 |
| FS | 39.6 | 49.7 | 62.5 | 54.9 | 64.7 | 62.1 |
| KZN | 34.3 | 46.0 | 37.5 | 57.1 | 66.3 | 66.3 |
| NW | 82.2 | 73.9 | 75.2 | 63.0 | 62.6 | 61.9 |
| GAU | 21.5 | 39.7 | 44.7 | 36.7 | 35.6 | 46.8 |
| LIM | 4.3 | 11.4 | 31.9 | 55.6 | 54.8 | 67.9 |
| | *Age cohort at commencement* | | | | | |
| <20 | 47.3 | 50.6 | 45.3 | 46.6 | 48.2 | 54.8 |
| 21 - 24 | 31.1 | 38.7 | 30.8 | 34.6 | 39.1 | 44.1 |
| 25 - 29 | 30.5 | 28.1 | 24.1 | 32.0 | 34.0 | 36.8 |
| 30 - 34 | 25.6 | 38.7 | 30.3 | 32.5 | 30.5 | 35.9 |
| 25 - 39 | 24.1 | 45.1 | 34.0 | 32.1 | 33.4 | 37.0 |
| 40+ | 25.9 | 43.9 | 34.5 | 27.0 | 28.5 | 31.2 |

NOTES: Figures represent the estimated percentage of undergraduate ITE students who complete their programmes within 5 years of commencement. All completion rates reported are thus cumulative completion rates (CCRs). The 2004 and 2009 cohorts respectively represent the first and the last groups of students for whom 5-year CCRs can be estimated using the 2004 - 2013 aggregate HEMIS data.

**Table A.36:** 3-year CCRs (%) for postgraduate ITE programmes (2004 - 2011)

| | *Commencement ITE cohort* | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| **Group** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** | **2011** |
| All HEIs | 44.3 | 55.6 | 61.2 | 63.6 | 64.9 | 70.2 | 71.1 | 75.3 |
| Unisa | 56.2 | 52.4 | 52.1 | 53.4 | 51.8 | 61.4 | 60.8 | 71.1 |
| Contact HEIs | 42.1 | 56.9 | 66.7 | 71.2 | 74.6 | 77.7 | 81.9 | 80.5 |
| | *Gender* | | | | | | | |
| Male | 39.8 | 49.4 | 53.2 | 54.5 | 58.1 | 62.2 | 62.9 | 69.7 |
| Female | 46.2 | 58.7 | 65.3 | 68.0 | 67.7 | 73.8 | 74.9 | 78.4 |
| | *Race* | | | | | | | |
| Black | 32.9 | 39.9 | 53.3 | 51.3 | 53.1 | 60.9 | 64.3 | 71.3 |
| Coloured | 64.5 | 68.4 | 59.3 | 77.5 | 72.7 | 82.1 | 79.6 | 75.8 |
| Indian | 69.0 | 61.5 | 61.9 | 61.6 | 68.4 | 71.0 | 71.6 | 78.6 |
| White | 72.9 | 76.0 | 71.2 | 74.2 | 74.0 | 79.1 | 80.2 | 84.7 |
| | *Home Language* | | | | | | | |
| Afrikaans | 72.8 | 74.0 | 67.0 | 69.0 | 58.1 | 71.7 | 72.8 | 83.8 |
| English | 59.2 | 63.5 | 60.1 | 59.9 | 65.5 | 63.6 | 68.2 | 79.0 |
| African | 32.8 | 39.1 | 46.4 | 42.9 | 43.6 | 59.3 | 58.3 | 69.6 |
| | *Province of enrolment (Contact HEIs)* | | | | | | | |
| WC | 74.5 | 78.0 | 79.2 | 77.6 | 70.5 | 83.2 | 83.1 | 86.6 |
| EC | 71.4 | 80.8 | 81.1 | 84.1 | 88.7 | 85.1 | 86.6 | 86.6 |
| FS | 33.4 | 52.0 | 33.3 | 60.2 | 74.4 | 75.5 | 77.4 | 62.4 |
| KZN | 52.8 | 46.2 | 76.3 | 76.3 | 77.0 | 62.9 | 80.4 | 78.4 |
| NW | 26.0 | 73.1 | 67.5 | 60.6 | 78.7 | 79.9 | 74.9 | 81.9 |
| GAU | 71.5 | 38.5 | 75.4 | 70.3 | 76.2 | 79.9 | 78.9 | 78.0 |
| LIM | 66.7 | 31.2 | 88.5 | 44.8 | 62.5 | 82.2 | 89.5 | 92.9 |
| | *Age cohort at commencement* | | | | | | | |
| <20 | 12.9 | 28.9 | 7.2 | 16.7 | — | 78.9 | — | — |
| 21 - 24 | 79.1 | 79.9 | 74.3 | 79.5 | 78.3 | 82.3 | 83.0 | 85.4 |
| 25 - 29 | 49.8 | 57.2 | 61.4 | 62.3 | 61.3 | 66.4 | 69.0 | 75.9 |
| 30 - 34 | 37.0 | 47.8 | 57.0 | 53.8 | 55.7 | 62.8 | 65.6 | 66.5 |
| 25 - 39 | 39.6 | 43.2 | 53.8 | 54.8 | 59.6 | 62.9 | 60.5 | 68.6 |
| 40+ | 33.8 | 41.7 | 51.5 | 56.5 | 59.7 | 67.7 | 66.5 | 66.6 |

NOTES: Figures represent the estimated percentage of postgraduate ITE students who complete their programmes within 3 years of commencement. All completion rates reported are thus cumulative completion rates (CCRs). The 2004 and 2011 cohorts respectively represent the first and the last groups of students for whom 3-year CCRs can be estimated using the 2004 - 2013 aggregate HEMIS data.

**Table A.37:** Disaggregated CCRs (%) for ITE programmes (2004 - 2013)

| | *4-year Bachelor's degrees*[1] | | | *Postgraduate diplomas/certificates*[2] | | | |
|---|---|---|---|---|---|---|---|
| **Group** | **4-year CCR** | **5-year CCR** | **6-year CCR** | **1-year CCR** | **2-year CCR** | **3-year CCR** | **4-year CCR** |
| All HEIs | 32.3 | 38.1 | 40.9 | 31.3 | 52.3 | 60.4 | 64.6 |
| Unisa | 7.4 | 14.7 | 21.3 | 11.8 | 38.4 | 56.3 | 65.7 |
| Other HEIs | 39.3 | 44.6 | 46.3 | 42.4 | 60.2 | 62.8 | 64.1 |
| | *Gender* | | | *Gender* | | | |
| Male | 26.2 | 32.0 | 34.4 | 27.8 | 46.1 | 53.4 | 57.6 |
| Female | 34.7 | 40.4 | 43.4 | 32.9 | 55.2 | 63.7 | 67.9 |
| | *Race* | | | *Race* | | | |
| Black | 28.5 | 33.4 | 35.7 | 24.3 | 39.8 | 48.4 | 53.5 |
| Coloured | 30.3 | 35.3 | 37.3 | 22.5 | 69.9 | 73.7 | 75.4 |
| Indian | 27.6 | 35.1 | 40.4 | 29.1 | 56.3 | 67.0 | 71.7 |
| White | 41.6 | 48.9 | 52.5 | 46.1 | 67.1 | 75.4 | 78.9 |
| | *Home Language* | | | *Home Language* | | | |
| Afrikaans | 50.7 | 56.9 | 60.1 | 40.3 | 65.9 | 69.4 | 76.5 |
| English | 38.4 | 40.1 | 43.8 | 39.6 | 57.9 | 62.9 | 69.3 |
| African | 31.5 | 35.9 | 35.8 | 25.2 | 38.1 | 48.1 | 60.5 |
| | *Province of enrolment* | | | *Province of enrolment* | | | |
| WC | 43.2 | 47.3 | 48.6 | 36.3 | 75.8 | 78.0 | 78.8 |
| EC | 47.9 | 50.7 | 51.6 | 73.3 | 81.4 | 83.1 | 83.8 |
| FS | 38.0 | 51.4 | 55.5 | 33.5 | 39.5 | 42.4 | 44.4 |
| KZN | 40.9 | 45.7 | 47.4 | 46.4 | 59.6 | 63.4 | 65.0 |
| NW | 61.5 | 70.3 | 73.3 | 36.9 | 44.6 | 47.1 | 48.1 |
| GAU | 29.0 | 34.2 | 35.8 | 51.7 | 65.8 | 68.0 | 69.7 |
| LIM | 23.4 | 32.5 | 35.2 | 39.5 | 55.8 | 57.9 | 59.9 |
| | *Age at commencement* | | | *Age at commencement* | | | |
| <20 | 39.9 | 47.5 | 50.3 | 4.5 | 8.2 | 12.8 | 24.4 |
| 21 - 24 | 28.5 | 34.8 | 38.2 | 56.8 | 72.9 | 79.7 | 83.0 |
| 25 - 29 | 24.7 | 29.9 | 33.1 | 30.1 | 50.5 | 61.6 | 66.9 |
| 30 - 34 | 26.7 | 30.6 | 33.8 | 22.9 | 42.2 | 51.3 | 56.2 |
| 25 - 39 | 29.3 | 32.3 | 34.3 | 20.5 | 43.1 | 50.8 | 55.2 |
| 40+ | 30.3 | 31.7 | 33.0 | 16.2 | 44.9 | 51.1 | 54.3 |

NOTES: [1]Figures represent the estimated weighted average cumulative percentage of undergraduate ITE students from the 2004 - 2008 cohorts who had completed their programmes within 4, 5, or 6 years after commencement. The 2004 and 2008 undergraduate ITE cohorts respectively represent the first and the last groups of students for whom 6-year CCRs can be estimated using the 2004 - 2013 aggregate HEMIS data. [2]Figures represent the estimated weighted average cumulative percentage of postgraduate ITE students from the 2004 - 2010 cohorts who had completed their programmes within 1,2,3, and 4 years after commencement. The 2004 and 2010 postgraduate ITE cohorts respectively represent the first and the last groups of students for whom 4-year CCRs can be estimated using the 2004 - 2013 aggregate HEMIS data.

**Table A.38:** Estimated absolute ITE programme CR differentials (percentage point difference)

| | *UG ITE Programmes*[1] | | | *PG ITE Programmes*[2] | | |
|---|---|---|---|---|---|---|
| | **CCR (4)** | **CCR (5)** | **CCR (6)** | **CCR (2)** | **CCR (3)** | **CCR (4)**[6] |
| Unisa | −53.1*** | −49.7*** | −47.4*** | −33.8*** | −20.0*** | −11.1** |
| Female | 8.5*** | 8.1*** | 5.7*** | 5.8*** | 7.5*** | 9.0*** |
| Coloured | 0.4 | 1.2 | 5.8 | 9.1*** | 0.8 | 8.6 |
| Asian | 3.9** | 7.6** | 9.5*** | 12.6*** | 10.2*** | 13.5*** |
| White | 11.3*** | 16.5*** | 17.9*** | 11.3*** | 14.1*** | 19.7*** |
| Afrikaans | 7.2*** | 4.3 | 9.2** | 8.8*** | 2.7 | −7.4* |
| English | 6.8*** | 4.4 | 8.6*** | 5.7*** | 1.1 | −8.2** |
| <20 | −1.7* | 1.6 | 6.3*** | −15.4 | −16.9 | −25.2** |
| 25-29 | 3.3*** | 1.2 | 0.3 | −7.4*** | −6.0*** | −7.0*** |
| 30-34 | 4.6*** | 2.6* | 4.2** | −14.2*** | −14.0*** | −13.5*** |
| 35-39 | 4.3*** | 3.4* | 1.5 | −15.5*** | −15.5*** | −15.4*** |
| 40+ | 4.8*** | 0.2 | −0.8 | −16.3*** | −19.9*** | −20.9*** |
| Observations[3] | 7 489 | 3 647 | 1 804 | 6 452 | 2 394 | 1 271 |
| Adjusted $R^2$ | 0.57 | 0.55 | 0.58 | 0.41 | 0.35 | 0.34 |

NOTES: [1]Columns respectively show estimation results using 4-year, 5-year, and 6-year CCRs among all 2004 - 2010, 2004 - 2009, and 2004 - 2008 undergraduate ITE cohorts. [2]Columns respectively show estimation results using 2-year, 3-year, and 4-year CCRs among the 2004 - 2013, 2004-2012, and 2004-2011 postgraduate ITE cohorts. [3]Each observation included in the regression(s) corresponds to a distinct ITE cohort as constituted by unique combinations of the following time-invariant variables in aggregate HEMIS: *gender*, *race*, *HEI type*, *qualification type*, *home language*, *age at commencement*, and *year of program commencement*. All regressions are estimated using weighted least squares with weights equal to the size of the respective cohorts in terms of total initial enrolment in the commencement year. Regressions include additional controls for the *commencement year*, *qualification type*, and *HEI* (not shown). Estimates represent the percentage point differences relative to the respective reference categories. Reference categories are: *Institution type* (Contact HEIs); *Race* (Black); *Home language* (African languages); *Gender* (Male); *HEI type (traditional universities); Age cohort at commencement* (20 - 24). *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

**Table A.39:** Estimated relative ITE programme CR differentials (% difference)

| | *UG ITE Programmes* | | | *PG ITE Programmes* | | |
|---|---|---|---|---|---|---|
| | **CCR (4)** | **CCR (5)** | **CCR (6)** | **CCR (2)** | **CCR (3)** | **CCR (4)**[6] |
| Unisa | −91.0*** | −75.4*** | −71.9*** | −44.0*** | −27.5*** | −16.1** |
| Female | 26.8*** | 20.1*** | 13.9*** | 11.6*** | 14.1*** | 15.7*** |
| Coloured | 7.6 | 8.2 | 25.6** | 16.1*** | 0.9 | 15.0 |
| Asian | 24.2*** | 28.0*** | 47.1*** | 23.4*** | 16.9*** | 25.2*** |
| White | 45.3*** | 54.9*** | 75.6*** | 20.3*** | 24.0*** | 37.3*** |
| Afrikaans | 17.2*** | 3.7 | 11.3 | 19.0*** | 4.8 | −12.8* |
| English | 19.3*** | 8.3 | 17.1** | 14.5*** | 3.3 | −13.1** |
| <20 | −6.8*** | −0.1 | 9.6** | −21.7 | −26.9 | −40.0 |
| 25-29 | 8.7** | −1.2 | −9.5 | −10.0*** | −8.2*** | −8.9*** |
| 30-34 | 13.6*** | 0.8 | 0.7 | −22.4*** | −20.5*** | −18.2*** |
| 35-39 | 14.5*** | 4.3 | −10.1 | −24.4*** | −22.6*** | −20.5*** |
| 40+ | 16.1*** | −7.9 | −20.1* | −25.0*** | −29.0*** | −28.2*** |
| Observations[3] | 7 489 | 3 647 | 1 804 | 6 452 | 2 394 | 1 271 |
| Log-likelihood | −569 993 | −345 453 | −174 553 | −272 572 | −117 457 | −62 518 |

NOTES: [1]Columns respectively show estimation results using 4-year, 5-year, and 6-year CCRs among all 2004 - 2010, 2004 - 2009, and 2004 - 2008 undergraduate ITE cohorts. [2]Columns respectively show estimation results using 2-year, 3-year, and 4-year CCRs among the 2004 - 2013, 2004-2012, and 2004-2011 postgraduate ITE cohorts. [3]Each observation included in the regression(s) corresponds to a distinct ITE cohort as constituted by unique combinations of the following time-invariant variables in aggregate HEMIS: *gender*, *race*, *HEI type*, *qualification type*, *home language*, *age at commencement*, and *year of program commencement*. All regressions are estimated using weighted poisson regression (see Cameron and Trivedi (2009, pp. 558 - 562)) with weights equal to the size of the respective cohorts in terms of total initial enrolment in the commencement year. Regressions include additional controls for the *commencement year*, *qualification type,* and *HEI type* (not shown). All coefficients represent estimated percentage differences relative to the respective reference categories. Reference categories are: *Institution type* (Contact HEIs); *Race* (Black); *Home language* (African languages); *Gender* (Male); *HEI type (traditional universities); Age cohort at commencement* (20 - 24). *Significant at the 10% level **Significant at the 5% level *** Significant at the 1% level. Significance levels are based on robust standard errors.

# B Variable Definitions, Classifications, and supplementary tables

## B.1 Variable/group definitions

### B.1.1 First-time enrolments (FTEN)

A large part of the focus in this paper is on the number of individuals who enter teacher training programmes at HEIs for the first time. While some of these individuals will have been new entrants to the public HE system at the time of registration, others may previously have been registered for other undergraduate or postgraduate academic programmes at university. In this paper, first-time enrolments (FTEN) thus include all individuals enrolling in specific academic programmes for the first time, regardless of whether or not they are first-time entrants to the public HE system. This has important practical implications, as it implies that FTEN must include what HEMIS defines as *first-time entering students* and as *entering students*.[85] DOE (2014, GLOSSARY) defines these two groups of students as follows:

> "A *first-time entering undergraduate or prediplomate student* is (a) effectively registered in the collection period for an undergraduate or prediplomate course and (b) in the past has not been effectively registered in any higher education course at the institution or any other higher education institution. A *first-time entering postgraduate or postdiplomate* student is (a) effectively registered in the collection period for a postgraduate or postdiploma course and (b) in the past has not been effectively registered for a postgraduate or postdiploma course at the institution or at any other higher education institution."
>
> "An *entering undergraduate or prediplomate student* is (a) effectively registered in the reporting period for an undergraduate qualification, (b) has been effectively registered at some time in the past at the institution for some higher education course, but (c) is now effectively registered for a qualification which he/she has not followed at any time in the past at the institution. An *entering postgraduate or postdiplomate student* is (a) effectively registered in the reporting period for a postgraduate degree or postgraduate diploma or postdiploma diploma, (b) has been effectively registered at some time in the past at the institution for some higher education course, but (b) is following a qualification for which he/she has not been effectively registered at any time in the past at the institution."

### B.1.2 *Year of attendance* and *qualification commencement year (QCY)*[86]

The HEDA version of HEMIS includes information on each student's *year of attendance* (HEMIS element number 572). This derived variable is calculated as the calendar year in which a student is enrolled for

[85] Some students who transfer between HEIs may be entering new programmes at the institutions to which they transfer. However, as it is not possible to distinguish between such students and those who transfer and continue with programmes for which they were previously enrolled in the aggregate HEMIS data, the category of *transfer students* is excluded from the definition of FTEN in this paper.

[86] See http://41.72.139.116/Valpac_Help/Ded_001_010.htm#E009

a qualification, minus the year in which they commenced the qualification at the HEI, plus 1. The presence of both the *year of attendance* and the *calendar year* in which a student is enrolled for a qualification means that it is possible to derive the original qualification commencement year (QCY) as:

$$\text{QCY}_{i,q,h} = \text{Current Year}_{i,q,h} - \text{Attendance Year}_{i,q,h} + 1$$

for each individual $i$, studying towards qualification $q$ at HEI $h$. The QCY variable thus reflects the year in which an individual first commenced the qualification towards which they are presently studying at the current HEI. In other words, the QCY is individual, qualification, and institution specific. This means that there is at least one distinct group of students for whom the recorded QCY may not equate to the year in which they first started studying towards a qualification: transfer students. If a student commenced with a qualification at one HEI and, after at least one year of studies, transferred to another HEI and continued studying towards the same qualification, their recorded QCY in the records of the new HEI will not be their recorded QCY in the records of the original HEI even if the course credits they acquired at the original HEI were transferred to the new HEI.

### B.1.3 Identifying cohorts using the *qualification commencement year* variable

Ignoring the possibility of data reporting and/or capturing errors, the following variable fields in aggregate HEMIS should be invariant over time within each commencement cohort: *commencement year*, *age at commencement*, *gender*, *race/population group*, *home language*, *HEI*, *province of enrolment*, *qualification type*, and *broad field of study (cesm1)*. Other variable fields, including *entrance category*, *residential postal code*, and *NSFAS recipient-status*, may change over time and thus cannot be used when identifying cohorts. Ultimately, cohorts are constituted by each unique combination of the variables in the aforementioned set of time-invariant fields.

### B.1.4 Sending region

HEIs capture students' permanent residential addresses when they formally register for academic programmes. To ensure that these addresses reflect where students originally come from, HEMIS explicitly requires that the permanent residential address submitted by HEIs may not be the same as the student's semester or term address (DOE, 2014, DATA ELEMENTS 011 TO 020). The postal codes associated with students' permanent residential addresses is available in aggregate HEMIS and can thus be used to determine the provinces where students come from (i.e. their sending regions).

Table B.1 show that, between 2004 and 2013, residential postal codes were available for approximately 97% of FTEN and 95% of graduations in ITE programmes. The majority of the missing postal code information was for individuals who were either not South African citizens (and therefore had no permanent residents), or individuals whose permanent residences were outside of South Africa.

**Table B.1:** Availability of permanent residential postal code information for ITE FTEN and graduates (2004 - 2013)

| | *% of ITE (2004 - 2013)* | |
|---|---|---|
| | **FTEN** | **Graduations** |
| SA resident (Postal code) | 96.91 | 94.95 |
| SA resident (No postal code) | 1.38 | 1.14 |
| Non-SA resident (No postal code) | 1.71 | 3.90 |

## B.2 Classification tables

**Table B.2:** HEMIS qualification type scheme (1999 - 2004)

| **Universities** | | **Technikons** | |
|---|---|---|---|
| Code | Description | Code | Description |
| 01 | Undergraduate Diploma or Certificate | 21 | National Certificate |
| 02 | General Academic First Bachelor's Degree | 22 | National Higher Certificate |
| 03 | Professional First Bachelor's Degree | 23 | National Diploma |
| 04 | Post-graduate Diploma or Certificate | 24 | Post-diploma Diploma |
| 05 | Post-graduate Bachelor's Degree | 25 | National Higher Diploma |
| 06 | Honours Degree | 26 | Baccalaureus Technologiae Degree |
| 07 | Masters Degree | 27 | Master's Diploma in Technology |
| 08 | Doctoral Degree | 28 | Magister Technologiae Degree |
| | | 29 | Laureatus in Technology |
| | | 30 | Doctor Technologiae Degree |

SOURCE: (DOE, 2014, DATA ELEMENTS 001 TO 010)

**Table B.3:** HEMIS qualification type scheme (2004 - 2008)

| **Universities** | | **Universities of Technology** | |
|---|---|---|---|
| Code | Description | Code | Description |
| 01 | Undergraduate Diploma or Certificate (3 yrs) | 21 | National Certificate |
| 11 | Undergraduate Diploma or Certificate (1 or 2 years) | 22 | National Higher Certificate |
| 02 | General Academic First Bachelor's Degree | 23 | National Diploma |
| 03 | Professional First Bachelor's Degree (4 years or more) | 24 | Post-diploma Diploma |
| 33 | Professional First Bachelor's Degree (3 years) | 25 | National Higher Diploma |
| 04 | Post-graduate Diploma or Certificate | 26 | Baccalaureus Technologiae Degree |
| 05 | Post-graduate Bachelor's Degree | 27 | Master's Diploma in Technology |
| 06 | Honours Degree | 28 | Magister Technologiae Degree |
| 07 | Masters Degree | 29 | Laureatus in Technology |
| 08 | Doctoral Degree | 30 | Doctor Technologiae Degree |

SOURCE: (DOE, 2014, DATA ELEMENTS 001 TO 010)

**Table B.4:** HEMIS qualification type scheme (2009 - )

| All HEIs | |
|---|---|
| Code | Description |
| 41 | Higher Certificate |
| 42 | Advanced Certificate |
| 43 | Diploma |
| 44 | Advanced Diploma |
| 45 | Bachelor's Degree (360) |
| 46 | Bachelor's Degree (480) |
| 47 | Postgraduate Diploma |
| 48 | Bachelor Honours Degree |
| 49 | Master's Degree |
| 50 | Doctoral Degree |

SOURCE: (DOE, 2014, DATA ELEMENTS 001 TO 010)

**Table B.5:** Potential classification of various TEQs under the HEMIS qualification type scheme

| *HEMIS qualification type* | *Teacher Education Qualification(s)* |
|---|---|
| 01 Undergraduate Diploma or Certificate (3 yrs) | National Professional Diploma in Education (NPDE)<br>Further Diploma in Education (FDE)<br>Higher Diploma in Education (HDE)<br>Advanced Certificate in Education (ACE)<br>National Diploma in Education (NDE) |
| 11 Undergraduate Diploma or Certificate (1 or 2 yrs) | Advanced Certificate in Education (ACE)<br>National Professional Diploma in Education (NPDE)<br>Higher Diploma in Education (HDE) |
| 03 Professional First Bachelor's Degree (4 yrs or more) | Bachelor of Education (BEd) |
| 04 Post-graduate Diploma or Certificate | Postgraduate Certificate in Education (PGCE)<br>Further Diploma in Education (FDE)<br>Higher Diploma in Education (HDE)<br>Advanced Certificate in Education (ACE) |
| 05 Post-graduate Bachelor's Degree | Bachelor of Education (BEd) |
| 21 National Certificate | Advanced Certificate in Education (ACE) |
| 22 National Higher Certificate | Advanced Certificate in Education (ACE)<br>National Diploma in Education (NDE) |
| 23 National Diploma | National Professional Diploma in Education (NPDE)<br>National Diploma in Education (NDE)<br>Advanced Certificate in Education (ACE) |
| 24 Post-diploma Diploma | National Professional Diploma in Education (NPDE)<br>Advanced Certificate in Education (ACE)<br>Higher Diploma in Education (HDE) |
| 25 National Higher Diploma | Advanced Certificate in Education (ACE)<br>National Higher Diploma in Education (NHDE)<br>Postgraduate Certificate in Education (PGCE) |

| | |
|---|---|
| | Bachelor of Education Honours (BEdHons) |
| 26 Baccalaureus Technologiae Degree | Baccalaureus Technologiae in Education (BTech)<br>Bachelor of Education Honours (BEd)<br>Bachelor of Education Honours (BEdHons) |
| 42 Advanced Certificate | Advanced Certificate in Education (ACE) |
| 43 Diploma | National Professional Diploma in Education (NPDE) |
| 45 Bachelor's Degree (360 credits) | Bachelor of Education (BEd) |
| 46 Bachelor's Degree (480 credits) | Bachelor of Education (BEd) |
| 47 Postgraduate Diploma | Postgraduate Certificate in Education (PGCE) |

SOURCE: DOE (2008)

**Table B.6:** Classification of Educational Subject Matter (CESM) codes and descriptions (2000 - 2009)

| | |
|---|---|
| *07.01* | *FOUNDATIONS OF EDUCATION* |
| 07.01 01 | Educational Theory |
| 07.01 02 | Cultural Foundations |
| 07.01 99 | Other Foundations of Education (Specify) |
| *07.02* | *EDUCATIONAL ADMINISTRATION* |
| 07.02 01 | Principles and Theories of Educational Administration |
| 07.02 02 | Educational Facilities and Material |
| 07.02 03 | Educational Finance |
| 07.02 04 | Educational Leadership |
| 07.02 05 | Educational Management |
| 07.02 06 | Educational Orfanisation and Control |
| 07.02 07 | Educational Personnel and Staffing |
| 07.02 08 | Educational Planning |
| 07.02 99 | Other Educational Administration (Specify) |
| *07.03* | *SYSTEMS OF EDUCATION* |
| (7.03 01 | Pre-primary Education Systems |
| 07.03 02 | Primary Education Systems |
| 07.03 03 | Secondary Education Systems |
| 07.03 04 | Tertiary Education Systems |
| 07.03 05 | Vocational-Technical Education Systems |
| 07.03 06 | Private Education Systems |
| 07.03 07 | Adult-Continuing Education Systems |
| 07.03 99 | Other Systems of Education (Specify) |
| *07.04* | *TEACHING - SUBJECT MATTER* |
| 07.04 01 | Agriculture and Renewable Natural Resources |
| 07.04 02 | Architecture and Environmental Design |
| 07.04 03 | Arts, Visual and Performing |
| 07.04 04 | Business |
| 07.04 05 | Communication |
| 07.04 06 | Computer Science and Data Processing |
| 07.04 07 | Education |
| 07.04 08 | Engineering and Engineering Technology |
| 07.04 09 | Health Care and Health Sciences |
| 07.04 10 | Home Economics |
| 07.04 11 | Industrial Arts, Trades and Technology |
| 07.04 12 | Language, Linguistics, and Literature |
| 07.04 13 | Law |
| 07.04 14 | Libraries and Museums |
| 07.04 15 | Life Sciences and Physical Sciences |
| 07.04 16 | Mathematical Sciences |
| 07.04 17 | Military Sciences |
| 07.04 18 | Philosophy, Religion, and Theology |
| 07.04 19 | Physical Education, Health Education and Leisure |
| 07.04 20 | Psychology |
| 07.04 21 | Public Administration and Social Services |

| | |
|---|---|
| 07.04 22 | Social Sciences and Social Studies |
| 07.04 99 | Other Teaching - Subject Matter (Specify) |
| *07.05* | *TEACHING - PROGRAMMES* |
| 07.05 01 | Agricultural Occupations |
| 07.05 02 | Career Education |
| 07.05 03 | Co-operative Education |
| 07.05 04 | Distributive Education |
| 07.05 05 | Health Occupations |
| 07.O5 06 | Home Economics Occupations |
| 07.05 07 | Office Occupations |
| 07.05 08 | Technical Education |
| 07.05 09 | Trade and Industrial Occupations |
| 07.05 10 | Reading and Language Arts Programmes |
| 07.05 11 | Bilingual Education Programmes |
| 07.05 12 | Extra-curricular Programmes |
| 07.05 13 | Driver Education Programmes |
| 07.05 99 | Other Teaching - Programmes (Specify) |
| *07.06* | *TEACHER TRAINING* |
| *07.07* | *COUNSELLING AND GUIDANCE* |
| 07.07 01 | Principles and Theories of Counselling and Guidance |
| 07.07 02 | Academic Counselling and Guidance |
| 07.07 03 | Career Information and Counselling |
| 07.07 04 | Clinical Experience |
| 07.07 O5 | Counselling Services |
| 07.07 06 | Group Processes and Procedures |
| 07.07 07 | Organisation and Administration of Counselling and Guidance |
| 07.07 08 | Professional Development |
| 07.07 99 | Other Counselling and Guidance (Specify) |
| *07.08* | *SPECIAL EDUCATION PROGRAMMES* |
| 07.08 01 | General Study of Special Education Programmes |
| 07.08 02 | Autistically Handicapped |
| 07.08 03 | Emotionally Handicapped |
| 07.08 04 | Gifted and Talented |
| 07.08 05 | Aurally Handicapped |
| 07.08 06 | Crippled |
| 07.08 07 | Epileptic |
| 07.08 08 | Multiple Physically Handicapped |
| 07.08 09 | Neurologically Handicapped |
| 07.08 10 | Visually Handicapped |
| 07.08 11 | Mentally Handicapped |
| 07.08 12 | Speech Handicapped |
| 07.08 99 | Other Special Education Programmes (Specify) |
| *07.09* | *COMMUNITY SERVICE* |
| 07.09 01 | Communication |
| 07.09 02 | Community Relations |

| | |
|---|---|
| 07.09 03 | Community Facilities and Activities |
| 07.09 99 | Other Community Service (Specify) |
| *07.10* | *EDUCATIONAL DEVELOPMENT* |
| 07.10 01 | Experimentation and Innovation |
| 07.10 02 | Staff Development |
| 07.10 99 | Other Educational Development (Specify) |
| *07.11* | *EDUCATIONAL EVALUATION AND RESEARCH* |
| 07.11 01 | Planning and Design |
| 07.11 02 | Methodology |
| 07.11 03 | Educational Measurement |
| 07.11 99 | Other Educational Evaluation and Research (Specify) |
| *07.12* | *EDUCATIONAL TECHNOLOGY AND MEDIA* |
| 07.12 01 | Instructional Systems Design |
| 07.12 02 | Educational Media and Materials Production |
| 07.12 03 | Television Applications to Education |
| 07.12 99 | Other Educational Technology and Media (Specify) |
| *07.99* | *OTHER EDUCATION (SPECIFY)* |

SOURCE: Erens *et al.* (1982, pp. 34 - 36)

**Table B.7:** Classification of Educational Subject Matter (CESM) codes and descriptions (2010 - 2014)

| | |
|---|---|
| *07.01* | *EDUCATION, GENERAL* |
| 07.01 01 | Education, General |
| 07.01 02 | Academic Literacy |
| 07.01 99 | Education, General: Other |
| *07.02* | *CURRICULUM AND INSTRUCTION* |
| 07.02 01 | Curriculum and Instruction |
| *07.03* | *EDUCATIONAL MANAGEMENT AND LEADERSHIP* |
| 07.03 01 | Educational Leadership and Management, General |
| 07.03 02 | Management of Special Education |
| 07.03 03 | Adult Education and Training Management |
| 07.03 04 | Educational, Instructional and Curriculum Supervision |
| 07.03 05 | Higher Education/Higher Education Management |
| 07.03 06 | Early Childhood Development and Primary School Management |
| 07.03 07 | Secondary School Management |
| 07.03 08 | Middle Management and Educational System Administration |
| 07.03 99 | Educational Management and Leadership, Other |
| *07.04* | *EDUCATIONAL/INSTRUCTIONAL MEDIA DESIGN* |
| 07.04 01 | Educational/Instructional Media Design |
| *07.05* | *EDUCATIONAL ASSESSMENT, EVALUATION AND RESEARCH* |
| 07.05 01 | Educational Evaluation and Research |
| 07.05 02 | Educational Statistics and Research Methods |
| 07.05 03 | Educational Assessment, Testing and Measurement |

| | |
|---|---|
| 07.05 99 | Educational Assessment, Evaluation and Research, Other |
| *07.06* | *INTERNATIONAL AND COMPARATIVE EDUCATION* |
| 07.06 01 | International and Comparative Education |
| *07.07* | *SOCIAL AND PHILOSOPHICAL FOUNDATIONS OF EDUCATION* |
| 07.07 01 | Social and Philosophical Foundations of Education |
| *07.08* | *SPECIAL NEEDS EDUCATION* |
| 07.08 01 | Special Needs Education, General |
| 07.08 02 | Education/Teaching of Individuals with Hearing Impairments/Deafness |
| 07.08 03 | Education/Teaching of the Gifted and Talented |
| 07.08 04 | Education/Teaching of Individuals with Emotional Disturbances |
| 07.08 05 | Education/Teaching of Individuals with Mental Disabilities |
| 07.08 06 | Education/Teaching of Individuals with Multiple Disabilities |
| 07.08 07 | Education/Teaching of Individuals with Physical Health Impairments |
| 07.08 08 | Education/Teaching of Individuals with Vision Impairments (including Blindness) |
| 07.08 09 | Education/Teaching of Individuals with Specific Learning Disabilities |
| 07.08 10 | Education/Teaching of Individuals with Speech or Language Impairments |
| 07.08 11 | Education/Teaching of Individuals with Autism |
| 07.08 99 | Special Needs Education, Other |
| *07.09* | *COUNSELLOR EDUCATION AND GUIDANCE SERVICES* |
| 07.09 01 | Counsellor Education and Guidance Services, General |
| *07.10* | *TEACHING EDUCATION AND PROFESSIONAL DEVELOPMENT, SPECIFIC LEVELS AND METHODS* |
| 07.10 01 | Adult Education and Training |
| 07.10 02 | Early Childhood Development and General Education and Training |
| 07.10 03 | Further Education and Training |
| 07.10 04 | Teacher Education: Multiple Levels |
| 07.10 99 | Teacher Education and Professional Development, Specific Levels and Methods, Other |
| *07.11* | *TEACHER EDUCATION AND PROFESSIONAL DEVELOPMENT, SPECIFIC SUBJECT AREAS, EARLY CHILDHOOD DEVELOPMENT (ECD) AND GENERAL EDUCATION AND TRAINING (GET)* |
| 07.11 01 | Languages: Afrikaans (Grades R-9) - ECD and GET |
| 07.11 02 | Languages: English (Grades R-9) - ECD and GET |
| 07.11 03 | Languages: IsiNdebele (Grades R-9) - ECD and GET |
| 07.11 04 | Languages: IsiXhosa (Grades R-9) - ECD and GET |
| 07.11 05 | Languages: IsiZulu (Grades R-9) - ECD and GET |
| 07.11 06 | Languages: Sepedi (Grades R-9) - ECD and GET |
| 07.11 07 | Languages: Sesotho (Grades R-9) - ECD and GET |
| 07.11 08 | Languages: Setswana (Grades R-9) - ECD and GET |
| 07.11 09 | Languages: Siswati (Grades R-9) - ECD and GET |
| 07.11 10 | Languages: Tshivenda (Grades R-9) - ECD and GET |
| 07.11 11 | Languages: Xitsonga (Grades R-9) - ECD and GET |
| 07.11 12 | Mathematics - ECD and GET |
| 07.11 13 | Natural Sciences - ECD and GET |
| 07.11 14 | Social Sciences - ECD and GET |
| 07.11 15 | Arts and Culture - ECD and GET |
| 07.11 16 | Life Orientation - ECD and GET |
| 07.11 17 | Economic and Management Sciences - ECD and GET |

| | |
|---|---|
| 07.11 18 | Physical Education - ECD and GET |
| 07.11 19 | Technology - ECD AND GET |
| 07.11 99 | Teacher Education and Professional Development, Specific Subject Areas, Early Childhood Development and General Education and Training, Other |
| *07.12* | *TEACHER EDUCATION AND PROFESSIONAL DEVELOPMENT, SPECIFIC SUBJECT AREAS,FURTHER EDUCATION AND TRAINING (FET)* |
| 07.12 01 | FET: Accounting |
| 07.12 02 | FET: Agricultural Management Practices |
| 07.12 03 | FET: Agricultural Sciences |
| 07.12 04 | FET: Agricultural Technology |
| 07.12 05 | FET: Business Sciences |
| 07.12 06 | FET: Civil Technology |
| 07.12 07 | FET: Computer Applications Technology |
| 07.12 08 | FET: Consumer Studies |
| 07.12 09 | FET: Dance Studies |
| 07.12 10 | FET: Design |
| 07.12 11 | FET: Dramatic Arts |
| 07.12 12 | FET: Economics |
| 07.12 13 | FET: Electrical Technology |
| 07.12 14 | FET: Engineering Graphics and Design |
| 07.12 15 | FET: Geography |
| 07.12 16 | FET: History |
| 07.12 17 | FET: Hospitality Studies |
| 07.12 18 | FET: Information Technology |
| 07.12 19 | FET: Languages: Afrikaans |
| 07.12 20 | FET: Languages: English |
| 07.12 21 | FET: Languages: IsiNdebele |
| 07.12 22 | FET: Languages: IsiXhosa |
| 07.12 23 | FET: Languages: IsiZulu |
| 07.12 24 | FET: Languages: Sepedi |
| 07.12 25 | FET: Languages: Sesotho |
| 07.12 26 | FET: Languages: Setswana |
| 07.12 27 | FET: Languages: Siswati |
| 07.12 28 | FET: Languages: Tshivenda |
| 07.12 29 | FET: Languages: Xitsonga |
| 07.12 30 | FET: Life Orientation |
| 07.12 31 | FET: Life Sciences |
| 07.12 32 | FET: Mathematical Literacy |
| 07.12 33 | FET: Mathematics |
| 07.12 34 | FET: Mechanical Technology |
| 07.12 35 | FET: Music |
| 07.12 36 | FET: Physical Science |
| 07.12 37 | FET: Religious Studies |
| 07.12 38 | FET: Tourism |
| 07.12 39 | FET: Visual Arts |
| 07.12 40 | FET: Physical Education |

| | |
|---|---|
| 07.12 99 | Teacher Education and Professional Development, Specific Subject Areas, Further Education and Training, Other |
| *07.99* | *EDUCATION, OTHER* |

SOURCE: DOE (2008, pp. 14 - 16)

## B.3 CESM and fractional counts

Tables B.8 and B.9 provide a hypothetical illustration of how the classification of specific HE qualifications under the CESM scheme gives rise to fractional counts and how the structure of the aggregate HEMIS data differs from the unit-record structure of original HEMIS. The table shows data for 6 hypothetical students, 3 of whom are enrolled for TEQ programmes. Only one of these students graduates with a TEQ in the period under consideration. However, the aggregate HEMIS data contains no identifiable information on the unit-records. The only available information with which to identify TEQs comes from the CESM1 field. To estimate the number of enrolments and graduates in TEQs from the aggregate HEMIS data, one therefore sums all of the fractional counts associated with a CESM1 value of 07 (Education):

$$\begin{aligned} \text{Estimated Enrolments}_{TEQ} &= 0.5 + 0.\dot{3} + 1 + 0.5 + 0.5 = 2.8\dot{3} < \text{Actual Enrolments}_{TEQ} \\ \text{Estimated Graduates}_{TEQ} &= 0 + 0.\dot{3} + 1 + 0.5 + 0 = 1.8\dot{3} > \text{Actual Graduates}_{TEQ} \end{aligned}$$

In the present hypothetical example, this approach underestimates the number of enrolments in TEQ programmes and overestimates the number of TEQ graduates. While these discrepancies may seem trivial, it is worth noting that only 6 unit-records are being considered here. For the period 2004 - 2013, each year of HEMIS data comtains between 740 000 and 980 000 such unit-records. Estimates of TEQ numbers that are based on the factional counts associate with a CESM1 value of o7 (Education) are thus likely to be subject to errors and should be seen as indicative rather than definitive.

**Table B.8:** Hypothetical example of Qualification names and CESM classifications in original HEMIS

| | | *CESM2 category of specialisation* [1] | | | | **Qualification** [2] |
|---|---|---|---|---|---|---|
| **Student** | **Qualification Name** | **1st area** | **2nd area** | **3rd area** | **4th area** | **Requirement** |
| 1 | Bachelor of Education (BEd) | 0704 | 1301 | - | - | N |
| 2 | Bachelor of Commerce (BComm) | 0407 | 1201 | 0706 | - | F |
| 3 | Post Graduate Certificate in Education (PGCE) | 0712 | - | - | - | F |
| 4 | Bachelor of Arts (BA) | 1806 | 0709 | - | - | F |
| 5 | Bachelor of Education (BEd) | 0712 | 1501 | - | - | N |

NOTES: [1]HEIs indicate field(s) of specialisation using CESM2 codes (or CESM3 codes after 2010). The full set of CESM2 codes can be seen in DOE (2008) (Also see DOE (2014, Method of counting students - Fractional CESMs)). [2]The *Qualification Requirement* field indicates whether or not a student has fulfilled the requirements of a qualification (i.e. whether or not they graduate). The code "F" indicates that the requirements of the qualification have been fulfilled and the student will be receiving the indicated qualification whereas a code of "N" indicates either that the requirements of the qualification have not been fulfilled or that the requirements of the qualification have been fulfilled but the student is deferring taking the award in order to undertake additional courses (DOE, 2014, DATA ELEMENTS 021 TO 030).

**Table B.9:** Hypothetical example of CESM classifications and fractional counts for the same unit-records in aggregate HEMIS

| *Original HEMIS information not included in Aggregate HEMIS* | | *Information included in Aggregate HEMIS* | | | |
|---|---|---|---|---|---|
| **Student** | **Qualification Name** | **CESM1** | **CESM1 Description** | **Headcount Enrolments** | **Graduates** |
| 1 | Bachelor of Education (BEd) | 07 | Education | 0.5 | 0 |
| 1 | Bachelor of Education (BEd) | 13 | Life Sciences | 0.5 | 0 |
| 2 | Bachelor of Commerce (BComm) | 04 | Business, Economics, and Manag... | $0.\dot{3}$ | $0.\dot{3}$ |
| 2 | Bachelor of Commerce (BComm) | 12 | Law | $0.\dot{3}$ | $0.\dot{3}$ |
| 2 | Bachelor of Commerce (BComm) | 07 | Education | $0.\dot{3}$ | $0.\dot{3}$ |
| 3 | Post Graduate Certificate in Education (PGCE) | 07 | Education | 1 | 1 |
| 4 | Bachelor of Arts (BA) | 18 | Psychology | 0.5 | 0.5 |
| 4 | Bachelor of Arts (BA) | 07 | Education | 0.5 | 0.5 |
| 5 | Bachelor of Education (BEd) | 07 | Education | 0.5 | 0 |
| 5 | Bachelor of Education (BEd) | 15 | Mathematics and Statistics | 0.5 | 0 |

NOTES: [1]Information is not available in aggregate HEMIS and is only included here to illustrate how single student unit-records with more than one CESM2 category of specialisation are effectively split into multiple entries (with fractional counts) in aggregate HEMIS.

## B.4 How accurate are the HEMIS-based estimates of TEQ enrolments at UNISA?

Finding reliable and comprehensive information on enrolments in TEQ programmes at specific HEIs in South Africa is difficult. Publicly available information tends to be both fragmented and lacking in detail and is rarely reported in a manner that enables comparison of figures from different sources.

Van Zyl and Barnes (2012*b*)'s institutional profile of UNISA for the years 2007 to 2011 is one of very few publicly available reports that can potentially be used to partly assess the accuracy of aggregate HEMIS-based estimates of TEQ enrolments and graduations at UNISA. Crucically, the version of HEMIS on which their analysis is based contains information on the colleges/faculties where UNISA students were enrolled and, as such, could be used to obtain estimates of the annual number of students that were enrolled in UNISA's College of Education (CEDU).[87] As explained in Section 2, this information is not available in aggregate HEMIS.

Table B.10 compares the estimates of the total enrolments in education programmes (CESM1 = 7) at UNISA based on aggregate HEMIS with the reported numbers of total enrolments in UNISA's CEDU as presented in (Van Zyl and Barnes, 2012*b*, p. 6) for the period 2007 - 2011. The discrepancies between the two sets of estimates vary in magnitude over the years, ranging in absolute value from less than 1% to more than 5%

It is important to note that the aggregate HEMIS-based estimates of the yearly overall number of enrolments by level of study match the figures presented in (Van Zyl and Barnes, 2012*b*, p. 7). Any differences between the HEMIS-based estimates of total enrolment within UNISA's CEDU and the figures reported by (Van Zyl and Barnes, 2012*b*, p. 6) must thus be attributable to the fractional counts that arise from the way in which UNISA officials classify qualifications under the CESM scheme when reporting to HEMIS. Put differently, the table illustrates that CESM information in aggregate HEMIS does not allow perfect identification of individuals who were enrolled in UNISA's CEDU and, consequently, of individuals who enrolled in TEQ programmes. This highlights the fact that the estimates for UNISA and other HEIs presented in this paper should be taken as indicative rather than definitive.

**Table B.10:** Total enrolments in UNISA College of Education (CEDU) 2006 - 2011

| Year | HEMIS estimates[1] | UNISA figures[2] | Difference (%)[3] |
|---|---|---|---|
| 2006 | 25 117 | 24 590 | 2.14 |
| 2007 | 25 553 | 24 566 | 2.95 |
| 2008 | 34 634 | 33 974 | 1.25 |
| 2009 | 43 823 | 43 323 | −1.56 |
| 2010 | 46 939 | 49 393 | −5.19 |
| 2011 | 64 551 | 64 790 | 0.37 |

NOTES: [1]Sum of fractional counts for which CESM1 = 7 (Education) at UNISA based on aggregate HEMIS. [2] Figures extracted from final auditied HEMIS data submitted to DHET by UNISA which contains enrolment information by college (Van Zyl and Barnes, 2012*b*, p. 6). Figures for 2006 from [3] Difference between aggregate HEMIS estimates and Van Zyl and Barnes (2012*a*, p. 6) figures, expressed as a percentage of the latter.

[87] It should be noted that there are some internal inconsistencies in the figures reported by Van Zyl and Barnes (2012*a*). For example, the enrolment figures for UNISA's CEDU reported on page 4 of the report are generally somewhat higher than those reported on page 6.

# C Methodology

## C.1 Calculating growth rates[88]

### C.1.1 Total growth

Total growth is calculated via the standard formula as

$$\%\Delta Y_{t-0} = \frac{(Y_t - Y_0)}{Y_0} \times \frac{100}{1}$$

where $\%\Delta Y_{t-0}$ is the percentage change in the dependent variable, $Y$, between periods 0 and $t$, and $Y_t$ and $Y_0$ are the values taken by $Y$ at the end of periods $t$ and 0, respectively, for all $t > 0$.

### C.1.2 Average annual growth rate

There are several way of calculating the average growth rate of a series over a particular period. The approach used throughout this paper is to estimate the average annual least-squares growth rate by fitting a simple linear regression trend line to the logarithmic value of the dependent variable over the period in question. This approach is based on the compound growth fomula:

$$Y_t = Y_0 (1 + r)^t \tag{C.1}$$

where $r$ is the compound growth rate and $Y_t$ and $Y_0$ are the values of the dependent variable, $Y$, at the end of periods $t$ and 0, respectively, for all $t > 0$. Taking logs of this expression yields

$$\ln Y_t \quad = \quad \ln Y_0 + t \ln (1 + r) \tag{C.2}$$

Letting $\alpha = \ln Y_0$ and $\beta = \ln (1 + r)$ and including an additive contemporaneous error term, $\varepsilon_t$, expression (C.2) reduces to an estimable function

$$\ln Y_t = \alpha + \beta t + \varepsilon_t \tag{C.3}$$

Estimating this equation via ordinary least squares will yield an estimate of the compound growth rate that can be expressed as

$$\left(e^{\hat{\beta}} - 1\right) \times \frac{100}{1} \quad = \quad \frac{Y_t - Y_0}{Y_0} \times \frac{100}{1} = \%\Delta Y \tag{C.4}$$

Since least-squares growth rates consider all of the data points in a series, they are less sensitive to the endpoints chosen than standard compound growth rate formulas that consider only the starting point and end point of a data series (Pritchett, 2000, p. 5).

[88] See Gujarati (2003, pp. 178 - 181)

## C.2 Estimating completion rates

### C.2.1 Defining marginal and cumulative completion rates

The marginal completion rate (MCR) for any programme commencement cohort, $c$, in year $t$ is equal to the percentage of individuals from cohort $c$ who successfully complete their programmes in year $t$. The cumulative completion rate (CCR) for any programme commencement cohort, $c$, in year $t$ is equal to the cumulative percentage of all individuals from cohort $c$ who have successfully completed their programmes between the commencement year and the end of year $t$.

### C.2.2 Formally defining MCR, CCR, AMCR, ACCR, and TACCR

The marginal completion rate in year $t$ for any commencement cohort $c$, $\forall\ c \leq t$, is calculated as

$$MCR_{c,t} = \frac{G_{c,t}}{N_{c,t=c}} \times \frac{100}{1}$$

where $G_{c,t}$ is the number of graduations for commencement cohort $c$ in year $t$ and $N_{c,t=c}$ is the total enrolment for (i.e. the size of) cohort $c$ in year $t = c$ (i.e. the total initial enrolment in the commencement year).

The cumulative completion rate (CCR) after $T$ years for any commencement cohort $c$, where $c \leq T$, is simply the sum of all the respective MCRs for the cohort up to that point and is calculated as

$$\begin{aligned} CCR_{c,T} &= \sum_{t=1}^{T} MCR_{c,t} \\ &= \frac{1}{N_{c,t=c}} \sum_{t=1}^{T} G_{c,t} \times \frac{100}{1} \end{aligned}$$

The total cumulative completion rate (TCCR) for any commencement cohort, $c$, is the CCR for the year beyond which no further individuals from the cohort complete their programmes,i.e.

$$TCCR = CCR_{c,T} \quad \text{iff} \quad MCR_{c,r} = 0\ \forall\ r > T$$

In some instances, it may be useful to estimate the average CRs for two or more cohorts. The average marginal completion rate (AMCR) in year $t$ for any group of commencement cohorts in the set $[c, C]$, $c \leq C \leq t$, is calculated as

$$AMCR_{C,t} = \sum_{c=1}^{C} MCR_{c,t} \cdot W_c$$

where the cohort weight,$W_c$, is equal to the size of cohort $c$ expressed as a proportion of the initial total enrolment for all cohorts $c \in C$ such that

$$W_c = \frac{N_{c,t=c}}{\sum_{c=1}^{C} N_{c,t=c}} \ni \sum_{c=1}^{C} W_c = 1$$

The average cumulative completion rate (ACCR) after $T$ years for any set of cohorts, $[c, C]$, where $c \leq C \leq T$, is simply the sum of all the respective AMCRs for those cohorts up to that point and is calculated as

$$\begin{aligned} ACCR_{C,T} &= \sum_{t=1}^{T} AMCR_{c,t} \\ &= \sum_{t=1}^{T} \sum_{c=1}^{C} MCR_{c,t} \cdot W_c \end{aligned}$$

Lastly, the total average cumulative completion rate (TACCR) for any set of cohorts, $[c, C]$, $c \leq C \leq T$, is the ACCR for the year beyond which no further individuals from the cohort complete their programmes,i.e.

$$TACCR = ACCR_{c,T} \quad \text{iff} \quad AMCR_{c,r} = 0 \; \forall \; r > T$$

## C.3 Projecting ITE graduate numbers

### C.3.1 Estimating the number of graduates in any year based on FTEN and marginal completion rates (MCR)

| Time | Year | $t-\tau$ | $t-4$ | $t-3$ | $t-2$ | $t-1$ | $t$ |
|---|---|---|---|---|---|---|---|
| 6 | $t-\tau$ | $G_{t-\tau,1}$ | | | | | |
| 5 | $t-4$ | $G_{t-\tau,2}$ | $G_{t-4,1}$ | | | | |
| 4 | $t-3$ | $G_{t-\tau,3}$ | $G_{t-4,2}$ | $G_{t-3,1}$ | | | |
| 3 | $t-2$ | $G_{t-\tau,4}$ | $G_{t-4,3}$ | $G_{t-3,2}$ | $G_{t-2,1}$ | | |
| 2 | $t-1$ | $G_{t-\tau,5}$ | $G_{t-4,4}$ | $G_{t-3,3}$ | $G_{t-2,2}$ | $G_{t-1,1}$ | |
| 1 | $t$ | $G_{t-\tau,6}$ | $G_{t-4,5}$ | $G_{t-3,4}$ | $G_{t-2,3}$ | $G_{t-1,2}$ | $G_{t,1}$ |

The number of students who graduate in year $t$ is given by the sum of all graduations for each of the commencement cohorts, $c \in [t-\tau, t]$, who are still enrolled in year $t$:

$$\begin{aligned} G_t &= G_{t,1} + G_{t-1,2} + \ldots + G_{t-\tau,\tau+1} \\ &= \sum_{i=1}^{\tau+1} G_{t+1-i,i} \end{aligned} \tag{C.5}$$

where $G_{c,t-c+1}$ is the number of graduations for commencement cohort $c$ after $t-c+1$ years and $t-\tau$ denotes the oldest commencement cohort still enrolled in year $t$, $\tau \geq 0$. As explained above, the number of individuals from any given commencement cohort, $c$, who graduate in year $t$ is a function of the number of FTEN in the cohort commencement year and the cohort-specific marginal completion rate after $t-c+1$ years:

$$G_{c,t} = MCR_{c,t-c+1} \cdot N_c$$

where $N_c$ is the total enrolment for cohort $c$ in year $c$ (i.e. the total initial enrolment in the commencement year) which, in principal, should be equal to the number of FTEN among cohort $c$ in year $c$. The expression can thus be rewritten as

$$G_{c,t} = MCR_{c,t-c+1} \cdot FTEN_c \tag{C.6}$$

Substituting equation (C.6) into (C.12) yields

$$\begin{aligned} G_t &= MCR_{t,1} \cdot FTEN_t + MCR_{t-1,2} \cdot FTEN_{t-2} + \ldots + MCR_{t-\tau,\tau+1} \cdot FTEN_{t-\tau} \\ &= \sum_{i=1}^{\tau+1} MCR_{t+1-i,i} \cdot FTEN_{t+1-i} \end{aligned} \tag{C.7}$$

### C.3.2 Projecting ITE graduations

Given equation (C.14) , it is possible to estimate the number of graduates in any year if two sets of quantities are known: (1) the numbers of FTEN for all commencement cohorts who are still enrolled and (2) the marginal completion rate schedules for all of the commencement cohorts who are still enrolled.

The number of graduations in year $t+1$, for example, can be expressed as

$$\begin{aligned} G_{t+1} &= MCR_{t+1,1} \cdot FTEN_{t+1} + MCR_{t,2} \cdot FTEN_t + \ldots + MCR_{t-\tau,\tau} \cdot FTEN_{t-\tau} \\ &= \sum_{i=-1}^{\tau} MCR_{t-i,t+1} \cdot FTEN_{t-i} \end{aligned} \tag{C.8}$$

This expression contains two sets of unknown quantities: the number of FTEN in year $t+1$ and the MCRs for commencement cohorts $t-\tau$ to $t+1$. However, by making two assumptions, these quantities can be estimated.

**Assumption 1:** FTEN changes linearly over time such that FTEN in year $t+1$ can be approximated by FTEN in year $t$ plus some constant

$$\hat{FTEN}_{t+1} = FTEN_t + r \tag{C.9}$$

$$\therefore \hat{FTEN}_{t+i} = FTEN_t + ir \;\forall\; i \geq 0 \tag{C.10}$$

where $r$ is some estimable constant (via least-squares estimation)

**Assumption 2:** The marginal completion rates schedule is constant across commencement cohorts such that

$$MCR_{t+1,i} = MCR_{t,i} = \ldots = MCR_{t-\tau,i} = MCR_i \;\forall\; i \geq t-\tau \tag{C.11}$$

Using (C.9) and (C.11), equation (C.8) reduces to an estimable quantity:

$$\begin{aligned}\hat{G}_{t+1} &= MCR_1 \cdot \hat{FTEN}_{t+1} + MCR_2 \cdot FTEN_t + \ldots + MCR_\tau \cdot FTEN_{t-\tau} \\ &= MCR_1 \cdot (FTEN_t + r) + MCR_2 \cdot (FTEN_{t-1} + r) + \ldots + MCR_\tau \cdot (FTEN_{t-\tau-1} + r) \\ &= \sum_{i=-1}^{\tau} MCR_i \cdot (FTEN_{t-i-1} + r)\end{aligned}$$

The number of students who graduate in year $t$ is given by the sum of all graduations for each of the commencement cohorts who are still enrolled in year $t$:

$$\begin{aligned}G_t &= G_{t,t} + G_{t-1,t} + \ldots + G_{t-\tau,t} \\ &= \sum_{i=0}^{\tau} G_{t-i,t}\end{aligned} \tag{C.12}$$

where $G_{c,t}$ is the number of graduations for commencement cohort $c$ in year $t$ and $t-\tau$ denotes the oldest commencement cohort still enrolled in year $t$, $\tau \geq 0$. As explained above, the number of individuals from any given commencement cohort, $c$, who graduate in year $t$ is a function of the number of FTEN in the cohort commencement year and the cohort-specific marginal completion rate after $t-c+1$ years:

$$G_{c,t} = MCR_{c,t-c+1} \cdot N_c$$

where $N_c$ is the total enrolment for cohort $c$ in year $c$ (i.e. the total initial enrolment in the commencement year) which, in principal, should be equal to the number of FTEN among cohort $c$ in year $c$. The expression can thus be rewritten as

$$G_{c,t} = MCR_{c,t-c+1} \cdot FTEN_c \tag{C.13}$$

Substituting equation (C.13) into (C.12) yields

$$\begin{aligned}G_t &= MCR_{t,1} \cdot FTEN_t + MCR_{t-1,2} \cdot FTEN_{t-1} + \ldots + MCR_{t-\tau,\tau} \cdot FTEN_{t-\tau} \\ &= \sum_{i=0}^{\tau} MCR_{t-i,t-(t-i)+1} \cdot FTEN_{t-i}\end{aligned} \tag{C.14}$$

### C.3.3 Projecting ITE graduations

Given equation (C.14) , it is possible to estimate the number of graduates in any year if two sets of quantities are known: (1) the numbers of FTEN for all commencement cohorts who are still enrolled and (2) the marginal completion rate schedules for all of the commencement cohorts who are still enrolled.

The number of graduations in year $t+1$, for example, can be expressed as

$$\begin{aligned} G_{t+1} &= MCR_{t+1,1} \cdot FTEN_{t+1} + MCR_{t,2} \cdot FTEN_t + \ldots + MCR_{t-\tau,\tau} \cdot FTEN_{t-\tau} \\ &= \sum_{i=-1}^{\tau} MCR_{t-i,t+1} \cdot FTEN_{t-i} \end{aligned} \tag{C.15}$$

This expression contains two sets of unknown quantities: the number of FTEN in year $t+1$ and the MCRs for commencement cohorts $t-\tau$ to $t+1$. However, by making two assumptions, these quantities can be estimated.

**Assumption 1:** FTEN changes linearly over time such that FTEN in year $t+1$ can be approximated by FTEN in year $t$ plus some constant

$$\hat{FTEN}_{t+1} = FTEN_t + r \tag{C.16}$$

$$\therefore \hat{FTEN}_{t+i} = FTEN_t + ir \;\forall\; i \geq 0 \tag{C.17}$$

where $r$ is some estimable constant (via least-squares estimation)

**Assumption 2:** The marginal completion rates schedule is constant across commencement cohorts such that

$$MCR_{t+1,i} = MCR_{t,i} = \ldots = MCR_{t-\tau,i} = MCR_i \;\forall\; i \geq t-\tau \tag{C.18}$$

Using (C.16) and (C.18), equation (C.15) reduces to an estimable quantity:

$$\begin{aligned} \hat{G}_{t+1} &= MCR_1 \cdot \hat{FTEN}_{t+1} + MCR_2 \cdot FTEN_t + \ldots + MCR_\tau \cdot FTEN_{t-\tau} \\ &= MCR_1 \cdot (FTEN_t + r) + MCR_2 \cdot (FTEN_{t-1} + r) + \ldots + MCR_\tau \cdot (FTEN_{t-\tau-1} + r) \\ &= \sum_{i=-1}^{\tau} MCR_i \cdot (FTEN_{t-i-1} + r) \end{aligned}$$