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Stellenbosch Economic Working Papers: 24/09

KEYWORDS: UNEMPLOYMENT, PARTICIPATION, FEMINISATION OF LABOUR FORCE, EDUCATION POLICY, BIRTH COHORT PANELS, AGE-PERIOD-COHORT DECOMPOSITIONS
JEL: C4, J1, J2, J3

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

Determining the Causes of the Rising South African Unemployment Rate: An Age, Period and Generational Analysis

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ABSTRACT

This paper takes advantage of the wealth of cross-sectional household surveys conducted after South Africa's political transition, in order to gain insights into the causes of the acceleration in the already high unemployment rate. A synthetic panel dataset is constructed to decompose unemployment and other labour market outcomes into cyclical, generational and life-cycle effects. This dynamic view isolates which groups are at risk across the period and allows a more nuanced understanding of the long-run and short-run impacts. Our results indicate that the higher unemployment rates faced by the young are predominantly due to the disadvantage of entering the labour market more recently, rather than being attributable to their age. We furthermore isolate what has driven this long-run increase in labour market participation. In particular, higher educational attainment and household formation decisions across generations fuel labour supply among the more recent entrants. We find some correspondence between the cyclical variation in unemployment and the business cycle. This suggests that jobless growth is not a relevant feature of the South African labour market. This paper confirms many of the causes of unemployment that are postulated in the literature. The dynamic nature of this study has furthermore allowed the separation of short-run and long-run aspects of unemployment. The decomposition approach adopted here has uncovered the linkages between the schooling system and the labour market across all generations, but, in particular, has isolated why the youngest generations have exhibited such distinct risks. The surge in labour supply amongst most recent generations (those aged 20 in 1995) can be explained by rapid exit rates from the education system resulting from over-age enrolment policies enacted in the post-apartheid period. This has pushed individuals into the labour market prematurely and without the adequate skills to be absorbed into the workplace. The importance of the generational aspects of unemployment relative to life cycle and business cycle impacts suggests that policies should address the structural issues affecting each of these birth cohorts, rather than focussing on age groups per se.

Keywords: Unemployment, Participation, Feminisation of Labour Force, Education Policy, Birth Cohort Panels, Age-Period-Cohort Decompositions
JEL codes: C4, J1, J2, J3

Note: This paper is also available as ERSA Working Paper 158.

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1 Introduction

Since the political transition in 1994, South Africa has witnessed the acceleration of its already high unemployment rate. Rising unemployment is a source of considerable concern to both policymakers and labour market participants. However, in the absence of panel data, the dynamic aspects of this phenomenon remain largely unexplored at the microeconomic level. To understand the underlying forces at play, to explain adequately how South Africa reached a persistently high level of unemployment and to establish which factors have caused unemployment to grow further still, a long-term perspective ought to be adopted. Indeed, it is necessary to uncover why different groups' labour market experiences diverge in light of political, demographic and policy changes that have shaped the broader economy over time.

South Africa's racially divided past impacted most facets of life, including the labour market and the education system. These imbalances have been tackled on the policy front, in order to equalise opportunities relating to labour market entry and access to similar education for all population groups. However, these policies have not had the desired impact. Indeed, while educational attainment is gradually converging across racial groups for the most recent birth cohorts, the previously disadvantaged remain the most severely affected by rising unemployment. The consensus of the recent literature pins the reasons for a rise in unemployment to large numbers of new entrants in the face of relatively slower absorption. While the reasons for these particular trends have been explored extensively in a comparative static sense, a truly dynamic perspective should colour the forces that have driven the surge in unemployment. The role of changing household composition and higher educational attainment explain why participation rates of previously marginalised groups have converged on so-called insiders in the long run. However, the most recent additional surge in unemployment and participation is not entirely accounted for by these factors.

The rise in unemployment, corresponding with a robust economic upswing since 1999, has elicited allegations of "jobless growth" amongst policy makers and labour unions. On the other hand, many commentators argue that tighter labour legislation to protect the interests of the marginalised have had unintended impacts on the willingness of firms to absorb more labour (IMF, 2009: 14). However, employment growth has not been insubstantial during this upswing. Nevertheless, recent labour market entrants are still more vulnerable to unemployment. Given the strong potential for persistence and labour market scarring for entrants, this trend is concerning for the long-term prospects of this particular generation.

Indeed, previous studies have emphasised the strong age dimension to the increases in both unemployment and participation over time. However, cross section data does not distinguish effectively the impacts experienced by various generations at different stages in the life cycle (by implication, also in different periods). Following generations (different groups of individuals born in the same year) across time offers a long-run perspective on the labour market. The approach allows us to compare groups at similar points in their working lives, but that started their careers in different political, demographic and socioeconomic environments. Furthermore, the analysis of short-run fluctuations is enabled by the time dimension, so that the labour responses to the business cycle can be established for different population groups.

The approach followed here allows us to distinguish between the short-run and long-run factors, and establishes which are more important. Given the absence of nationally representative panel data for

the period of interest, this paper constructs a synthetic panel to identify the pure age, time and birth cohort correlates of unemployment, participation, employment and wages. By following the mean characteristics of groups of individuals born in the same year from a pre-specified sub-population, the cohort panel methodology used in this study is suited ideally to tease out more information regarding the causes of the recent increase in unemployment. In particular, we decompose unemployment into business cycle, generational and life cycle impacts by the Deaton (1997) methodology. This method entails using a zero restriction on the time coefficients to identify the model: the benefit is that they can be interpreted as business cycle variation, however other restrictions could yield different results. The analysis of other labour market indicators disentangles the picture further, suggesting which racial groups and generations entered the labour market faster than they were absorbed.

This paper confirms many of the explanations for rising unemployment offered in the growing literature, but offers a nuanced view to understand the additional risks experienced by the most recent generations of labour market entrants. It is tempting to assume that these generations entered the labour market in greater numbers as a result of high expectations under the new political dispensation. However, alternative causes are exposed here. In particular, post-apartheid school enrolment policies are explored. Learners that were too old for their grade were removed from the mainstream public education system, with the intention of transition into adult education alternatives. However, this policy had the impact of pushing young (predominantly black) individuals into the labour market without the relevant skills, rather than continuing with necessary training that is required for eventual absorption into the workplace. This paper illustrates the concerning impact that this policy had on the youngest cohorts of entrants.

The rest of the study is structured as follows. Section 2 briefly reviews the literature that pertains to the post-transition labour market. Section 3 outlines the methodological and data issues encountered in extracting a long-term view from the microdata. Furthermore, a theoretical outline of the interlinkages between groups' labour market experiences places the empirical approach in context. Section 4 uses a decomposition proposed by Deaton (1997) to apportion a rising unemployment rate to the separate impacts of i) the business cycle, ii) the usual life-cycle variation in unemployment probability experienced by all workers, and iii) the difference in labour market prospects between workers from different generations. This analysis is then extended to further uncover the observable trends. Firstly, the groupings are refined to follow more homogenous groups that are known to have different labour market experiences over the period. Separate race and gender analyses are conducted to achieve this richer picture. Secondly, the same decomposition is applied to the participation and employment rates, on one hand, and to wages on the other, to isolate the role of both long-term and short-term supply and demand factors, as well as potential rigidities in explaining rising unemployment. Finally, in section 5, controls are included to determine the extent to which changes in the participation rate were caused by changes in the observable characteristics of the labour force over time. Section 6 concludes the study.

2 The Post-Apartheid South African Labour Market

2.1 Rising unemployment

South Africa currently has one of the highest unemployment rates internationally. This is the culmination of a long-term, yet steady, rise in unemployment that started as early as the 1970s (Seeking and Natrass 2006), but which has rapidly accelerated in the post-apartheid period. Given the aggravation of this already concerning trend, policymakers and researchers have re-focussed their attention on explaining the evolution of the labour market in the post-1994 period. Higher economic growth compared to the previous decade, greater levels of educational attainment and the reversal of discriminatory policies all created the expectation that labour market prospects would have improved over this period for the majority of the population. Instead, the ranks of the unemployed have grown, which has prompted allegations that the economy had entered a period of "jobless growth". However, these assertions required deeper understanding and verification. Labour market analysis has been facilitated greatly by the introduction of Statistics South Africa's (Stats SA) large sample household-level surveys on an annual basis since 1993, at a bi-annual frequency from 2000 to 2007 and quarterly since 2008. In particular, the correlates, levels and trends in unemployment can now be established with greater certainty. The importance of the questions at hand, combined with the supply of better data, has resulted in a burgeoning literature studying the post-transition South African labour market. However, many of these studies have only been able to offer a comparative-static view of the developments over this period.

Many recent studies focussing on the post-apartheid era (Banerjee et al. (2006), Burger and Woolard (2005), Branson and Wittenberg (2007)) have emphasised the role of the rapid increase in labour market participation in driving unemployment upwards, rather than the demand for labour, which remained comparatively stable over the same period. This then removes the focus from a "jobless growth" scenario, but begs the question of which factors initiated an exodus into a perhaps saturated labour market. Casale and Posel (2002) explore the gender aspect of the increase in participation, and find that the 1995-1999 period has been characterised by a "feminisation" of the labour force. This was driven by rapid entry amongst previously inactive women, particularly among the black cohort. They explore a number of hypotheses in explaining this trend, and conclude that it was attributable mainly to higher levels of educational attainment, a decline in the proportion of married women, and a decrease in the share of women who live in households with employed men. Ntuli (2007) uses a decomposition approach to study the same phenomenon, and finds that the increase in participation is attributable completely to a change in the behavioural responses of women, as opposed to changes in their individual characteristics. More specifically, the increase in participation is shown to correspond to the changing *responses* of African women to levels of education (apart from the increase in attainment among this group) and higher rates of entry at similar ages to previous generations. This suggests that women expected a higher return to their productive characteristics over this period. Age is known to play an important role in the labour market and this result is therefore consistent with studies that find that the current youth cohort has borne the brunt of the unemployment increase (Mlatsheni & Rospabe 2002).This is difficult to

explain, given the higher levels of education attained on average by more recent labour market entrants.

While educational attainment explains the rise in labour supply, the literature has been relatively silent regarding the role of the educational *policy* environment in explaining this massive shift into the labour market. Shortly after the political transition, the Department of Education proposed a new strategy to reduce the large numbers of over-age learners in schools (Republic of South Africa, 1995, par 33). Learners that were more than two years older than the normal age for their grade were subsequently restricted from attending that grade for another year (WCED, 2003). This was pursued in an attempt to lighten the burden of high repetition rates in schools, particularly in the context of high pupil-teacher ratios in disadvantaged schools. Indeed, Guluza & Hoadley (1998: 6) highlight that South African youths tend to stay in school for long periods beyond their normal age (as opposed to having a situation with a large "out of school" youth cohort) which has severe financial implications for the education system. While this policy intended to normalise the age profile of learners in schools, it may have pushed many younger individuals into the labour market earlier than would otherwise have been the case in the past. Given that South Africa's constitution guarantees all learners a basic level of education, the implementation of this policy has been intricate. The intention was for this group rather to be absorbed into alternative Further Education and Training (FET) colleges outside of the schooling system, where they would gain appropriate skills to be able to enter the labour market (Republic of South Africa, 1995, par 36). This measure was imposed to maintain the basic right to education as enshrined in the constitution. However, Guluza & Hoadley (1998) suggest that by the time the over-age policy was put forward, the "FET alternative" was inaccessible, both in terms of remoteness and travelling costs, so that better-located schools remained a more suitable alternative for many of these individuals. By 2003, Asmal (2003) suggested that the uptake of learners into the Further Education and Training (FET) system still did not meet the authorities' objectives: not only were numbers low, but the quality of the education on offer in FET colleges remained in question. A dilemma arose, so that while it was necessary to introduce the over-age policy to improve the functioning of usual schools, the alternatives were not suitable to absorb over-aged learners. The result is that the Department of Education had, by 1998, not yet implemented officially the over-age policy that was allowed by the South African Schools Act (Guluza & Hadley, 1998). Nevertheless, a shift in focus towards normalising the age profile was clearly a policy prerogative, even if not formalised. By 2003, however, individual provinces had already adopted these directives, as the FET system was promoted (WCED, 2003).

Due to the higher repetition rates in historically black schools, this policy should by implication have affected black learners (both men and women) more directly than white learners. Burger and Van der Berg (2007) show that although there were still some over-aged learners in the school system, their numbers decreased sharply between 1996 and 2003. The 21% decline in matric candidates between 1997 and 2003 is also an indication that the reach of this directive was indeed extensive (Burger & Van Der Berg, 2007).

Figure A1 in the appendix compares the proportion of relevant age cohorts that are still enrolled in any form of education from 1995 to 2007. For all ages above 18 (the normal school-leaving age), enrolment rates have declined, though the full effect is only noticable at the turn of the century. This is because the over-age policy was not prescribed immediately after its proposal. Nevertheless, it is

evident that schools progressively stopped admitting or retaining over-aged learners in their schools. These figures conceal movements between the school and FET systems. Figures A2 and A3 disentangle these flows for 1999 to 2007 (the period for which these data are available). It is evident that much of the decline in net enrolment is a result of a reduction in the proportion of the 20-27 age cohorts still in school in later years. These large flows out of the schooling system are not matched by similar increases in (non-university) college enrolments, though mild improvements are evident. As a result, large under-educated groups from younger generations have exited the schooling system, but not entered the FET sector as was hoped. This leaves a large cohort of individuals that would by the historical trend have remained in school, but which has now been forced into the labour market without the education required to attain success in the workplace. As discussed below, low skill attainment by this group hinders absorption in a skills-biased economy. Evidently these impacts may explain partially why the brunt of recent unemployment growth has affected the youngest generations most severely.

Coupled with the increases in the size of the labour force, the relatively slow post-transition growth in employment opportunities contributed to the increase in unemployment. Usually this situation has been ascribed to changes in the structure of production and skill-biased technological change (Banerjee et al. (2007), Bhorat and Hodge (1999)). Consequently, demand for unskilled or semi-skilled workers (who are in abundant supply) decreased, whilst demand for highly skilled workers (for whom the unemployment rate was already low) increased.

Alternatively, the cause for the slow growth in employment could be ascribed to the enactment of tighter labour market legislation which endowed trade unions with greater bargaining power and increased the coverage of minimum wages. Lewis (2001) studies wage trends since the 1970s and concludes that unskilled and semi-skilled workers have been "priced out" of the market due to the process of wage compression: this has increased their wages relative to those of more skilled workers. However, studies that have considered wage trends in the post-apartheid era (Burger and Yu (2007), Woolard and Woolard (2004), Banerjee et al. (2006)) all conclude that the increase in unemployment coincided with a decrease in the real wages of unskilled and semi-skilled workers. It therefore seems unlikely that wage increases could have contributed to the rising unemployment rate. However, Banerjee et al. (2006: 4) still believe that the labour market was characterised by "institutional constraints that kept wages from declining as much as they might have [in the face of a large surplus of unskilled workers]."

2.2 Towards a dynamic view of the South African labour market

Most studies of South African labour market trends follow a comparative static approach by comparing outcomes across two cross sections. This is a result of the infancy of panel data in this country. By following this approach, many of the underlying dynamics of the labour market are ignored. To bridge this gap in the absence of the appropriate data, many studies have followed cohorts over time, rather than individuals. Groups of individuals born in the same year are likely to share many attributes that can affect their labour market experiences: they are likely to have received a similar quality of education, to have faced the same economic opportunities when they first chose to invest in education and similarly at the time of labour market entry. Further, these "generations" may have been instilled with similar norms and perceptions regarding issues such as the perceived trade-off between household and market production, and particularly gender roles. If there is a strong cohort-specific component to these and other unobservable characteristics, then

the labour market outcomes for a specific birth cohort (a group of individuals born in the same year) may differ systematically from those of cohorts born earlier or later. These effects may be picked up erroneously in age or time effects in studies that do not control for these cohort-specific differences. Regarding the potential importance of cohort-specific effects, Burger and Woolard (2005) find that, although the unemployment rate has risen across all age groups between 1995 and 2002, the unemployment rate for any birth cohort remained remarkably stable over this period. This suggests that no group of individuals suffered an increase in its probability of being unemployed over time. Rather, recent entrants had a much higher probability of being unemployed from the outset, which persisted throughout their working lives. Together, this explains the typical convex age-unemployment profile observed in cross sections. Birth cohort panels are ideally suited to disentangle the changes that occur over time, over the life cycle or across birth cohorts.

To the best of the authors' knowledge, Grün (2003) undertook the first study to analyse South African labour market dynamics using cohort-level household survey data. She specifically implemented the decomposition proposed by Deaton (1997) that is also used in this study. Her analysis traced the average log of hourly wages for different South African birth cohorts and population groups, and found that those birth cohorts born earlier receive lower average earnings even after controlling for the life-cycle pattern of wages.

Branson and Wittenberg (2007) exploit birth-cohort variation in the repeated cross sections, but focus on the change in the unemployment rate. They start by comparing the age profiles of the employment and the non-participation rates for African men and women across the different October Household Survey (OHS) and Labour Force Survey (LFS) datasets. They observe an exceptionally large increase in the participation rates of women between the 1998 OHS and the September 2000 LFS. The study then proceeds to compare the unemployment, non-participation and employment rates for different birth cohorts across the survey years from 1995 to 2005. Their results show that younger cohorts of Africans entered the labour market sooner than their older counterparts, but that their age-employment profiles remained similar to those of older generations. This scenario is consistent with the faster exit rates of learners from the school system, though their study does not explore this aspect. The combined result is a higher unemployment rate for more recent labour market entrants, who are absorbed into the labour market only at ages typical for all generations. Their semi-parametric analysis stops short of identifying the parts of these birth-cohort level changes that can be attributed to time, age and generational effects, or of controlling for the differences in average values of observable characteristics of the different birth cohorts.

The current analysis addresses some of these outstanding questions, and ventures to explain more of these observations by parametric methods that control for other factors, following Deaton (1997). By isolating the pure age, cohort and time effects, decomposition results also provide a unique perspective on a number of labour market questions, such as the responsiveness of employment growth to fluctuations in aggregate demand, or how changes in labour demand and supply affected individuals from successive birth cohorts across the different races and genders. The isolation of these effects provides vital information regarding the potential causes of labour market trends. Is the increase in unemployment driven by a move along the lifecycle profile, or is it rather a problem that will afflict younger generations throughout their working lives? The answer to this question entails different policy approaches in addressing unemployment.

3 Methodology and data

3.1 Past methods

The increased scrutiny of South African labour market data has revealed a number of shortcomings that restrict the ability of such studies to draw causal inferences regarding the determinants of unemployment. Firstly, problems regarding data quality complicate the comparability of successive cross-sections. Secondly, even with the highest quality cross-sectional data, the importance of unobserved individual-level characteristics in determining labour market outcomes raises endogeneity concerns. In this regard, the lack of a nationally representative labour market panel dataset spanning the late 1990s – the period during which unemployment rose most rapidly – is particularly problematic.

The KwaZulu Natal Income Dynamics Study (KIDS) is a panel of individuals that spans the period of interest, but samples from only one province and from two of South Africa's four population groups. As a result, it cannot claim to be representative of the labour market as a whole. On the other hand, the Labour Force Survey panel dataset is more representative of the national labour market, but has only been released as a panel for a period that covers the two-and-a-half years between March 2001 and September 2003. This dataset therefore does not provide information for the period marked by the sudden unemployment increase. This leaves only the series of independently sampled cross-sectional October Household Surveys, supplemented by the subsequent Labour Force Surveys to understand labour market dynamics in the period of interest.

Much of the literature has therefore settled for comparative static analysis, by contrasting the 1995 OHS as the earliest reliable post-apartheid cross section with some point later in time (for example Oosthuizen & Bhorat 2005, Casale and Posel 2005, Kingdon and Knight 2005). Differences in questionnaire design and sampling methodology, as well as the inconsistent derivation of labour market measures across surveys, complicate direct comparisons of these surveys. However, taking a longer-term perspective by constructing birth-cohort panels mitigates some of these concerns. Using all of the available survey rounds, rather than just two end-points, also makes it easier to identify the effects of survey-specific measurement or sampling errors by introducing time dummies for each of the cross sections.

3.2 Birth-Cohort Panel Estimators

Using all of the Stats SA cross-sectional datasets to construct a birth-cohort panel allows us to study many of the dynamic features underlying the increase in unemployment. By following the mean characteristics of groups of individuals born in the same year from a pre-specified sub-population (they may or may not be the same individuals in different surveys), it is possible to trace life-cycle effects, in addition to the impact of business-cycle fluctuations and longer-term structural trends on labour market outcomes. Following groups instead of individuals has merits and drawbacks. The pseudo-panel approach allows a dynamic picture of the labour market to unfold, which is not otherwise possible from a set of cross sections. Unlike individual-level panel data this methodology does not, however, follow the same individuals over time, but rather analyses the dynamics of "look alikes" (to use Deaton's (1985: 110) terminology). As with individual panels, it is possible to control for much of the unobserved heterogeneity that plague typical labour market studies. Whereas attrition bias is a concern with individual-level panel data, this issue is of little concern when using

cohort-level panel data. This is because a set of individuals who meet the grouping criteria appear in each survey, despite the effects of migration, non-response and the dissolution of households.

A panel of semi-aggregated data allows for a richer analysis than either cross-sectional comparisons or pure time series data can offer: it is possible to lend a dynamic perspective to the investigation, yet maintain a breakdown of the composition of the variables under consideration across different sections of the population. Deaton (1997: 117) applauds the use of cohort data for providing a meeting point between disaggregated microeconomic information and the macroeconomic movement in variables. These properties are exploited in this paper, by "disentangling the generational from life-cycle components" (Deaton 1997: 117), which is not possible in either the cross-section or time series domains. At the same time, partial aggregation across groups does not eliminate the possibility of determining the correlates of variables under analysis. This methodology does not, however, provide an instrument to study individual transitions from one state to another (such as moving from the discouraged worker status to being an active searcher or finding employment), as is the case with pure panel data. The cohort-level aggregation required for constructing cohort panels also entails discarding much of the individual-specific variation in the variables of interest, which implies a loss of estimator accuracy relative to those obtained from an individual panel dataset.

If the data generating process for some labour market outcome, y_{it}, can be accurately characterised by the two-way fixed effects model at an individual level, then for a typical individual i observed at period t, the following will hold:

$$y_{it} = \boldsymbol{x}_{it}\boldsymbol{\beta} + \mu_i + \tau_t + v_{it} \text{ for } i = 1, \dots, N \text{ , } t = 1, \dots, T \qquad [3.1]$$

where $\boldsymbol{x}_{it}$ is a vector of observable characteristics, μ_i and τ_t represent the effect of person-specific and time-specific unobservables repsectively, and v_{it} captures the remaining unobservable factors that can vary over both time and individuals. The two-way fixed effects estimator (which is arrived at by including individual and time dummy variables in a pooled OLS regression) provides consistent estimates of the model coefficients, $\boldsymbol{\beta}$, as $N \to \boldsymbol{\infty}$, as long as $E(\boldsymbol{x}_{it}' v_{it}) = \boldsymbol{0}$.

However, since we are not using an individual-level panel dataset, we have to consider the cohort equivalent of the above data generating process. Taking population means for those individuals in cohort $C(i) = c$ yields:

$$y_{ct}^{*} = \boldsymbol{x}_{ct}^{*}\boldsymbol{\beta} + \mu_{ct}^{*} + \tau_t + v_{ct}^{*} \text{ for } c = 1, \dots, C \text{ , } t = 1, \dots, T \qquad [3.2]$$

where $y_{ct}^{*} = E[y_{it} | C(i) = c]$, and similarly for $\boldsymbol{x}_{ct}^{*}$, μ_c^{*}, v_{ct}^{*}. Estimating equation (3.2) with cohort-level data differs from the individual-level estimation of equation (3.1) in a number of ways. Firstly, whereas the regressors and dependent variable in (3.1) are perfectly observed (assuming these variables are measured without error), we cannot observe the population means of the variables in (3.2) but use the sample means instead, as follows:

$$\bar{y}_{ct} = \bar{\boldsymbol{x}}_{ct}\boldsymbol{\beta} + \bar{\mu}_{ct} + \tau_t + \bar{v}_{ct} \text{ for } c = 1, \dots, C \text{ , } t = 1, \dots, T \qquad [3.3]$$

where $\bar{y}_{ct} = \frac{1}{N_{ct}} \sum_{i=1}^{N} y_{it} \mathbf{1}(C(i) = c)$, $\mathbf{1}(.)$ is the indicator function, $N_{ct} = \sum_{i=1}^{N} \mathbf{1}(C(i) = c)$, and $\bar{x}_{ct}$, $\bar{\mu}_{ct}$ and $\bar{v}_{ct}$ are defined analogous to $\bar{y}_{ct}$. The two-way fixed effects estimator of (3.3) (that is, using an OLS regression including both birth cohort and time dummies as explanatory variables) only provide consistent estimates of $\boldsymbol{\beta}$ as $C \to \infty, N_{ct} \to \infty$ if $E(\bar{x}'_{ct} \bar{v}_{ct}) = 0$, which is implied by the identifying assumption for the individual fixed effects estimators and the assumption of independent sampling. However, using sample rather than population means amounts to the introduction of measurement error, which automatically leads to attenuation bias in the fixed effects estimate of $\boldsymbol{\beta}$. Some of the estimators that have been proposed to address this shortcoming are discussed below. However, it bears noting that this problem is circumvented if each cohort is constructed with a large number of individuals in each period, so that the sample average of the regressors provide sufficiently accurate estimates for the population means by invoking the law of large numbers. Whereas the consistency of the individual fixed effects estimator requires that N tends to infinity, the cohort estimator now also requires that N_{ct} tend to infinity for these reasons.

A second issue that arises from estimating (3.3) rather than (3.1) is that, whereas individual fixed effects are time invariant by definition, the cohort sample average of these effects is unlikely to share the same property (Baltagi, 2005: 193): since the cohort sample consists of (quite possibly) different individuals in adjacent periods, the sample average of the individual fixed effects, $\bar{\mu}_{ct}$, may vary over time. This problem is similar to the measurement error problem referred to above, and ceases to matter as $N_{ct} \to \infty$. More problematically, the population means of the cohort fixed effects, μ^{*}_{ct}, need not be time invariant since large non-random groups of individuals can always enter and exit from the cohort through mass immigration, emigration or death. We assume that entry and exit is random, in which case the expected value of the cohort fixed effects will also be time invariant. This assumption is less heroic than the assumption of random attrition in individual level panels, since individuals who non-randomly migrate within South Africa are likely to attrit from an individual panel but remain in the sampling frame of a birth-cohort panel. A third difference between the individual and cohort-level panel data estimators is that much of the variation in the regressors is discarded: whereas the individual-level fixed effects estimator considers all of the variation in $\boldsymbol{x}_{it}$, the cohort regression only exploits the variation in $\boldsymbol{x}^{*}_{ct}$, which is strictly smaller for all cohorts. If much of the variation in the regressors occurs within rather than across cohorts, then the coefficient estimates from the cohort panel become inefficient relative to those obtained from an individual-level fixed effects regression. The cost of controlling for time-invariant heterogeneity when individual panel data is unavailable is therefore a potentially substantial reduction in estimator efficiency. The groups that are followed here are chosen to be as homogenous as possible, so that differences occur *across* cohorts as opposed *within* cohorts. Particularly, the large labour market differences across race and gender prompt separate groupings of our unit of observation along these dimensions.

A number of authors have proposed estimators that explicitly address the attenuation bias that arises from using sample means of groups rather than population means. Deaton's (1985) seminal work proposed an adjusted fixed effects estimator, which scales each cohort by the square root of its constituent size and adjusts for the covariance structure of the means. Inoue (2005) addresses this issue, along with efficiency and inferential concerns, by way of a GMM estimator, which also

accounts for cohort size in each period in the weighting matrix. These estimators are more complicated to implement, and may not result in considerable consistency gains. In practise, applied researchers often choose to ignore measurement error issues: it has been shown that with 100 or more observations within each cohort, bias is minimal and adjustments can be safely ignored (Verbeek and Nijman, 1992). In order for the standard fixed effects estimators to be applied to birth-cohort data, it is therefore important to construct cohorts so that each contains a sufficient number of underlying observations. Since the attenuation bias tends towards zero as the number of observations per cohort grows to infinity, we face a trade-off between the benefit of additional degrees of freedom in our cohort-level regression analysis (by increasing the number of cohorts, each with fewer members) against mitigating the errors-in-variables problem by choosing larger, but fewer cohorts.

3.3 Age Period Cohort Decompositions of labour market status

One of the benefits of cohort data, as mentioned above, is that it enables the researcher to discern between life-cycle, generational and cyclical macroeconomic components of the dependent variable of interest. Deaton (1997: 123-127) outlines how a simple least squares dummy variable regression can feasibly decompose dependent variables into these respective elements. Time dummies are included to capture time-specific shocks or sampling error in a specific period, τ_t, whereas the inclusion of birth-year dummies provides estimates of the unobservable "generational fixed effects" for the various cohorts, $\bar{\mu}_c$. The third set of dummies represents age and isolates the typical life-cycle pattern of the dependent variable. This entails estimating the following model

$$\bar{y}_{ct} = a_k + \bar{\mu}_c + \tau_t + \bar{v}_{ct} \text{ for } c = 1, \dots, C \text{ , } t = 1, \dots, T \qquad [3.4]$$

where a_k is the age effect (common to all cohorts and time periods) associated with the age k of cohort c in year t. In practise this decomposition poses an identification problem; since a person's age is the difference between the current year and their birth year, these three variables are perfectly multicollinear. One way to circumcvent this problem is to perform a simple transformation on the year dummies, so that the time effects are restricted to be orthogonal to time itself (Deaton, 1997: 126). This restriction is intuitively appealing if the time effects are considered to represent business cycle effects, since short-run fluctuations in aggregate demand are often considered to average to zero in the long-run. In the regression analysis below, one age and one cohort dummy are omitted as reference groups, while a set of $T - 2$ new time dummies (omitting the first two years) are created by the proposed transformation:

$$\tau_t^* = \tau_t - [(t-1)\tau_2 - (t-2)\tau_1] \qquad t = 3, \dots, T$$

The time effects for the first and second years can be recovered subsequently by way of the zero restriction.

This decomposition methodology has been applied to compare racial and gender differentials in South African wages, though only with OHS data (Grün, 2004). In this paper, we apply the same technique to South African unemployment, participation and employment rates, as well as the log of real hourly wages. In section 5 we also move beyond the simple decomposition by controlling for a set of observable characteristics in an attempt to better isolate the sources of the massive labour

market shifts. It is important to note that the decomposition technique employed here ignores interactions between the separate components, but provides more clarity than cross-section evidence is able to.

Figure 1 compares the unemployment rate of two cross sections (October 1995 and September 2007) for individuals of different ages. This picture suggests that the age-unemployment profile has remained largely unchanged, but that labour market circumstances have deteriorated uniformly for all age groups. It also clearly demonstrates the strong age dimension of unemployment. It is not clear however, whether this shift is attributable to generational differences between the two cohorts, or due to changes that occurred over time. Pseudo-panel decompositions fill this gap in a more credible manner. Results reported below suggest a flatter age profile for younger individuals compared to the cross-section evidence, with more importance accorded to cohort changes in explaining the recent increase in unemployment among the young.

Figure 1: Unemployment rate, by age, OHS 1995 and LFS 2007b

Most of the individual labour market outcomes that we consider in sections 4 and 5 (labour market participation, employment and unemployment) are binary variables so that the sample means of the dependent variables, $\bar{y}_{ct}$, represent the respective rates of each variable for the relevant cohorts. The decomposition analysis in section 4 estimates model (3.4) and therefore merely traces out the life cycle, business cycle and birth-cohort effects for each of these variables. Since we do not control for any observable characteristics other than age in the first regressions, the resulting coefficient estimates reflect the time, life cycle or cohort-specific variation of the dependent variable, without regard for the causes of these trends. The first set of analyses is therefore largely descriptive in nature. In section 5 a range of observable characteristics are introduced as controls, to narrow down the factors that could have caused the observed trends.

3.4 A model to interpret the components of the decompositions

In an oversimplified textbook model of the labour market (with search costs), wages adjust to shifts in labour supply and demand, so that the only unemployment in equilibrium is frictional. Although labour supply and demand cannot be observed directly, shifts in these curves presumably affect the labour force participation and employment rates respectively. In determining whether a simultaneous increase in both participation and employment was caused by an exogenous increase in labour supply or demand, it may be instructive to also observe the change in wages: an increase in wages suggests that labour demand increased, whereas a decrease in wages implies an increase in labour supply.

This model becomes more complex if we allow for wage rigidities and adjustment costs. If wages are not responsive to changes in the unemployment rate, then these initial changes can persist, and possibly even become permanent. Additionally, if the costs of adjusting the size of the workforce are substantial, then absorption is less responsive to changes in the actual demand for labour. The presence of frictions, wage rigidities or adjustment costs can mean that an individual's employment status or wage rate may reflect not just current labour market conditions, but the conditions that have prevailed throughout the individual's working life. In this case the cost of any adverse shifts in the demand for labour will be borne disproportionately by the more recent labour market entrants. This is important for the interpretation of our decomposition results, since long-term time trends may be reflected as cohort effects.

The unemployment rate for any cohort depends on the participation decisions of its members, as well as the employment decisions made by firms. In fact, the unemployment rate ($\bar{u}_{ct}$) of cohort c in period t can be expressed in terms of the cohort employment ($\bar{e}_{ct}$) and participation ($\bar{p}_{ct}$) rates:

$$\bar{u}_{ct} = 1 - \frac{\bar{e}_{ct}}{\bar{p}_{ct}}$$

Increases in the unemployment rate within a cohort is the direct result of a decrease in its employment rate, an increase in its labour force participation rate, or a combination of the two. Although labour supply and demand can shift for a number of reasons, such shifts also imply different changes in the participation and employment rates, as well as wages. Furthermore, the effects of the different determinants of labour supply and demand are unlikely to vary uniformly across all of the dimensions of the data (age, time, birth cohorts, race and gender). By applying the decomposition methodology discussed in section 3.1 to the participation rate, the employment rate and hourly wages, for each of the race and gender combinations, it may be possible to identify more accurately why labour demand and supply changed in the period under consideration.

We will now discuss some of the most likely shifts in labour demand and supply over the period under consideration, and how these shifts are expected to induce variation across time, age, birth cohorts, race and gender, in order to facilitate the interpretation of our decomposition results in sections 4 and 5.

3.4.1 Expected Wage Age, Cohort and Year Trends

Wages are assumed to be a function of the marginal revenue product of workers (which should increase in aggregate demand and decrease in labour supply), as well as the characteristics of wage

setting institutions. According to equation (3.4) the average log hourly wage rate for cohort c in period t can be represented as

$$\bar{w}_{ct} = a_k^w + \bar{\mu}_c^w + \tau_t^w + \bar{v}_{ct}^w \text{ for } c = 1, \ldots, C \text{ , } t = 1, \ldots, T \quad [3.5]$$

where a_k^w, $\bar{\mu}_c^w$ and τ_t^w now represent the wage age, cohort and time effects, $\bar{v}_{ct}^w$ is the remaining error term, and the w superscripts are used to distinguish these effects from their counterparts for other labour market outcomes.

Although this study only considers formal sector workers in calculating the average cohort wage, it is still possible that the improved capturing of low-income employment activities over the OHS years may induce an artificial downward trend in wages over the 1995 to 2000 period. Wages are also expected to respond to the changes in aggregate demand, and the magnitude of the wage-time effects can therefore be used to gauge the extent of wage rigidity over the business cycle. The South African Reserve Bank identified the third quarter of 1999[3] as the start of an upswing phase in the South African economy (SARB, 2006: S159). We therefore expect decreases in wages between 1995 and 1999, and increases between 1999 and 2007 (though lags might appear).

According to Mincer's (1962) seminal study of on-the-job training, the productivity of workers is expected to be concave in labour market experience, which should be reflected in our estimates of the wage-age profile. If experience and education are complementary in production then the productivity of those with lower levels of education may start to decline earlier in their working lives. Furthermore, the age differentials in wages reflect any mismatches in supply and demand that occur over the life cycle, assuming that wage-setting institutions allow wages to adjust to these factors.

The wage-cohort effects are expected to capture cohort-specific differences in labour productivity, such as differences in the average quantity or quality of education. Long-run time trends in labour demand or supply may also be reflected in the cohort effects if the labour market is characterised by a high degree of wage or employment rigidities. For example, if an unexpected decrease in the demand for unskilled labour occurs, and high firing costs and downward wage rigidities preclude the firm from either adjusting wages of current unskilled employees downward or retrenching unskilled worker, then older cohorts of unskilled workers benefit from both higher wages and a higher employment probability than those who entered the labour market more recently.

3.4.2 Expected Employment Age, Cohort and Year Trends

A person is employed if she chooses to participate in the labour market, receives a satisfactory job offer (in other words a wage offer that exceeds her reservation wage) and if worker separation has not yet occurred. Given the oversupply of workers in South Africa, changes in the employment rate are considered to reflect mainly changes in the demand for labour. The probability of receiving a job offer and the offered wage are both expected to depend mainly on labour productivity and aggregate demand considerations.

[3] This period falls shortly before the period when the OHS of 1999, which is included in this analysis, was enumerated. Therefore we do not only realise a change in the economic climate but a change in survey design at the same time. Nevertheless, the period following 1999 delivers a consistent picture (such as rising wages), which suggests it is not likely that this can be attributed only to survey design.

The cohort c employment rate in period t, $\bar{e}_{ct}$, can be expressed similarly to wages in equation (3.5). Employment-year effects indicate the effect of aggregate demand fluctuations on employment, although it may also reflect any remaining differences in how employment was measured across surveys after omitting informal sector workers. This cycle is therefore indicative of whether employment was indeed responsive to economic growth, and provides evidence on whether "jobless growth" did indeed arise in the post-apartheid era. Branson and Wittenberg (2007) note that formal sector agricultural employment was over-captured in the 1995 OHS for black men, so we expect to observe these inconsistencies in our employment-year effects.

The pattern of labour productivity that is expected to induce a concave age-wage profile should also result in the employment age effects increasing rapidly early in life, and then levelling off or decreasing as workers approach retirement age. This decline should be sooner and sharper for those with lower levels of education.

The employment-cohort effects should reflect cohort-specific productivity factors (such as the average quality and quantity of education), and should be similar to the wage-cohort effects unless wage-setting institutions or large shifts in supply pull the wage-cohort members in a different direction. As with the wage-cohort effects, it is possible that long-term trends in labour demand will be reflected in the employment-cohort effects if these trends are combined with high workforce adjustment costs or wage rigidities.

3.4.3 Expected Participation Age, Cohort and Year Trends

Turning now to the participation rate decomposition, it is assumed that an individual chooses to be a labour market participant if the discounted expected utility of job search exceeds the discounted expected utility of inactivity. This decision depends primarily on the costs and benefits of job search, including the probability of receiving a job offer, the expected wage offer, the cost of looking for work and the attractiveness of opportunities outside of the labour market. The participation rate of cohort c in period t, $\bar{p}_{ct}$, can also be written as the sum of its age, cohort, time and error components as in equation (3.5) for wages.

The improved capturing of low-income activities may have also raised the participation rate over time, as many subsistence workers would have been classified as inactive rather than employed in earlier surveys. However, time effects are more likely to reflect the impact of the business cycle on participation than is the case for employment. Shifts in aggregate demand affect participation mainly via their effect on employment (as captured by the employment rate time effects), wages (represented by the wage-time effects) and non-labour market incomes. Assuming that employment, wages and non-labour market incomes all vary pro-cyclically, the participation-time effects may therefore reveal which of the "discouraged job seeker" or "added worker" hypotheses are more valid in the South African labour market.

The participation-age effects are expected to reflect firstly the life-cycle pattern in employment and wages; the returns to job search should increase rapidly early in the working life but start to decrease towards retirement age. But the desire to work need not be aligned perfectly with labour productivity, and it is possible that changes in an individual's household responsibilities (itself determined by the changing probability of being married, having children, or simply living in a

household with more dependents, amongst other things) over the life cycle, result in the participation pattern that deviates from those observed for employment and wages.

Participation-cohort effects should reflect the differences in labour productivity (and hence the returns to job search) across cohorts, but may also be affected by changing perceptions and cultural norms, that alter the psychological cost of job search. Such shifts may have increased the desirability of labour market employment relative to engaging in household production. The trend towards higher participation rates for younger cohorts is expected to be even more rapid for women, who also face the decreasing probability of being brought up according to stereotypical gender roles. The factors considered by Casale and Posel (2002) to explain the feminisation of the labour force, particularly the decreasing marriage rates and changing household composition, are all likely to be reflected in the participation-cohort effects.

Another factor that could have affected the participation decision of different cohorts is the availability of attractive outside labour market opportunities. Many young individuals choose to invest in their education rather than to enter the labour market immediately, due to the perceived benefits that accrue to this investment later in life. However, the changes in the school system described in section 2 would have restricted access of over-aged learners to the school system, and limit this choice. The affected cohorts would therefore have been more inclined to enter the labour market. As noted in section 2, black men and women are more likely to be affected by this change in education policy, which is presumably reflected in their participation-cohort effects.

3.5 Data description

Given that this paper is primarily concerned with changes in the South African unemployment rate over time, differences in measurement, sampling or data capturing may affect intertemporal comparability. The most troublesome comparability issue is the change in sample and questionnaire design that Stats SA progressively implemented in an attempt to improve data reliability. These changes are almost certain to distort the true unemployment trend when comparing the measures of unemployment across surveys. The effect of these changes is particularly evident in the improved capturing of workers engaged in low-income activities and the large fluctuations in the recording of agricultural employment (Casale & Posel, 2002). Although the determinants of informal -sector employment are of considerable importance in their own right, the problems with comparing these activities across surveys leads us to restrict our attention to formal -sector employment. For this reason we do not include informal sector workers amongst the employed in our calculation of the cohort employment and unemployment rates. It should be noted that since all informal sector workers are now counted as unemployed, our “formal sector unemployment rate” is higher than unemployment rates estimated in the conventional way (as demonstrated from the comparison in Figure 2 below). Our analysis can therefore not speak to any issues that pertain to job gains or losses in the informal economy. Furthermore, Kingdon and Knight (2006), by showing that the non-searching unemployed more closely represent discouraged work-seekers than the voluntarily unemployed, present convincing evidence that the broad definition of unemployment is a more accurate measure of the adequacy with which the economy is providing employment opportunities for the labour force in South Africa. This motivates our use of this definition of the labour force throughout this paper. In calculating the average cohort wages, we follow Burger and Yu (2006) by

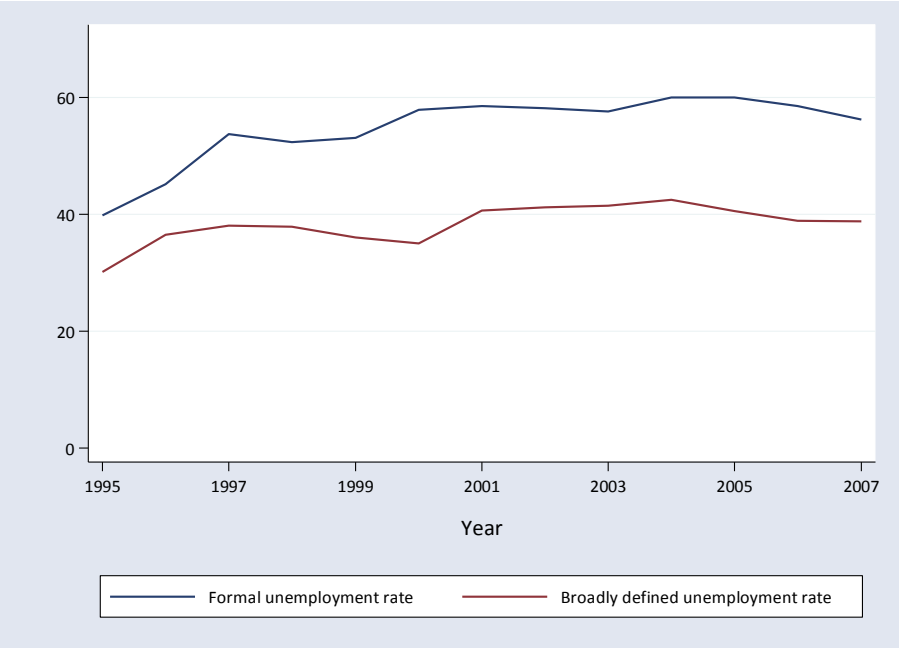
dropping informal -sector workers, the self-employed and those earning more than R1 million per year to track a consistent series.

We use the 1995 to 1999 annual October Household Surveys (OHS), as well as the September rounds of the Labour Force Surveys (LFS) from 2000 to 2007. By omitting the February-March round of the Labour Force Surveys, we eliminate potential seasonal fluctuations, and also allow the time dummies to represent business cycle effects or other survey-specific differences in measurement.

Until September 2004, the LFS datasets were released with probability weights based on the 1996 Census, but the subsequent LFS probability weights were derived from the 2001 Census. In 2005 Stats SA re-weighted all the LFSs that originally used the 1996 Census according to the 2001 Census, in order to aid comparability across surveys. We make use of these re-weighted datasets. All the OHSs remain weighted according to the 1996 Census.

In creating the cohort panel, we average variables over individuals who share the same birth year. A "birth-year" variable is constructed by subtracting an individual's age from the year in which the survey was conducted. This variable does not correspond perfectly to the actual birth year of individuals, since all individuals born between the day on which they were surveyed and 31 December will be assigned the birth year that follows their year of birth. This is unlikely to affect our analysis in any substantial way. The empirical analysis first proceeds without controls to trace pure cohort, age and year effects, before controls are introduced in section 5.

Figure 2: Unemployment rate and formal sector unemployment rate, 1995-2007



3.5.1 Control Variables

We control for the variation in levels of education across groups and generations. Since cohort employability can be affected by the distribution of education rather than just its mean, we opt for a flexible specification that allows for a differential effect of the different levels of education. The cohort sample proportions were constructed by averaging over four dummy variables that indicated whether each person had primary, incomplete secondary, complete secondary or tertiary education.

Individuals with NTC I, NTC II qualifications (or who held any post-school certificate or diploma) but have not completed Grade 12, are considered to have incomplete secondary education. Individuals who held an NTC III qualification are counted as having complete secondary education.

Furthermore, we consider the impact of different marriage rates across cohorts, the proportion of each cohort that forms their own households (this is relevant for the female decompositions), and the average number of household members that are unemployed for each of the cohorts. Each of these variables attempts to explain the long-term rise in participation, which is known to dominate the rise in unemployment.

However, much of the most recent acceleration in unemployment is controlled for by the proportion of each cohort that is economically inactive and in education. Differences in this measure across cohorts capture the impact of the over-age learner policy implemented in the post-apartheid education system.

4 Decomposition of labour market outcomes, without controls

4.1 Decomposition by birth cohort

Table 1 Cohort Structure - whole population

Group	Number of Observations after Aggregation (= #Cohorts x T)	Average Number of individuals per Cohort Observation	Minimum Number of individuals per Cohort Observation	Maximum Number of individuals per Cohort Observation	Number of Cohort observations constructed with less than 100 underlying individuals
Employment and Participation	663	1285.05	289	3593	0
Unemployment	663	788.51	26	1786	31

The empirical analysis commences by grouping individuals of all genders and races born in the same year into birth cohorts in each of the cross sections, and applying the decomposition technique suggested by Deaton (1997) to the cohort averages of the unemployment rate. Table 1 shows a summary of the constructed cohorts. Different numbers of individuals are used in the construction of the variables of interest. This is because unemployment rates only cover the economically active population, while the other variables are averaged over the entire working-age population.

In the calculation of unemployment rates, 31 cohort observations contain fewer than 100 sampled labour force participants – the acceptable threshold required to ignore sampling errors (as in section 3.2.). Since the average number of participants per cohort is 789, only a small number of cohorts potentially suffer from measurement error. The inconsistency that arises from using conventional fixed-effects estimators on grouped data is therefore unlikely to play an important role in driving the results. In order to check the robustness of the results of the conventional fixed-effects (FE) estimator, we also perform the decomposition using the GMM estimator suggested by Inoue (2005), which explicitly adjusts for differences in cohort sample sizes and should be consistent even when using smaller cohort samples. In section 4.1.1 the cohort unemployment rate is regressed on a set of age dummies representing the ages of 15 to 65, a set of birth cohort dummies for the birth years 1930 to 1992 and on 11 transformed year dummies.

4.1.1 Decomposition of unemployment rate

Figure 3 presents the decomposition of the unemployment rate into age, cohort and year effects. The set of trends in figure 3.1 depicts the unemployment rates experienced by every third birth cohort at different ages. For example, one line represents the unemployment rates for the birth cohort aged 15 in 1995 (and hence born in 1980) for all the years from 1995 to 2007. The curve directly to its right tracks the unemployment rates experienced at different ages by the group born in 1977. These two trajectories can be compared to show how the unemployment rates for these two groups differed at the same ages. The fact that most of the lines in figure 3.1 are above those directly to their right means that individuals born more recently generally experience higher unemployment rates than those born earlier. It is also worth noting that the only reason for any overlap in the curves (and hence in the unemployment experiences of individuals of different cohorts) is the decline in unemployment experienced by most cohorts in the last few years of the period covered.

Figure 3.4 reveals an 11 percentage point increase in cyclical unemployment between 1995 and 2001 – mainly the result of the 8 percentage point increase between 1995 and 1997[4] – followed by a steady decline for the remainder of the period. This suggests that there is a high degree of correspondence between the unemployment rate and the business cycle, although it appears to lag the cycle by about a year or two. The extent to which this variation is due to the changes in labour supply or demand will be studied in section 4.2.

The birth cohort effects in figure 3.3 reveal that the probability of being unemployed grew steadily for more recent labour market entrants, confirming the analysis of Branson & Wittenberg (2007). This is a troubling finding, since it predicts that – abstracting from cyclical effects – there should be sustained increases in unemployment, as cohorts with low unemployment rates exit the population of working age and are replaced by ones with high unemployment propensities. These cohort effects are more important in magnitude compared to either the unemployment time or age effects. Although these results clearly indicate the importance of the generational aspect of the increase in unemployment, it cannot tell us whether this increase was due to shifts in the demand or the supply of labour. These issues will be explored when decomposing the employment and participation rates in section 4.2.

Figure 3.2 plots the unemployment effects across the average life cycle. It can be observed that the probability of being unemployed decreases gradually until the age of 40, after which point older workers are increasingly likely to be unemployed. The benefit of using this decomposition is immediately apparent when comparing figure 3.2 with the age-unemployment profiles in figure 1. The cross-sectional age-unemployment profiles lead one to believe that the probability of being unemployed does not change much between the ages of 40 and 65, whereas the cohort panel age profiles demonstrate that these groups are more likely to face unemployment as they grow older. The misleading inference drawn from figure 1 is caused by the fact that in a cross-sectional dataset the older individuals are also members of birth cohorts that entered the labour market earlier and with a lower unemployment rate faced by their particular generation. From a cross-sectional perspective the age and cohort effects are indistinguishable.

Understanding the dynamic nature of the South African labour market, and implementing effective labour market policies, requires a careful distinction between generational and life-cycle effects. In particular, these results suggest that much of the unemployment experienced by recent labour market entrants stems from their specific experiences, and is not attributable to their youth (as compared with the early circumstances of other birth cohorts). By implication, should this cohort impact remain throughout the life cycle, persistent unemployment is likely to arise among this group, with only little relief associated with maturity. The potential for labour market scarring among the most recent labour market entrants is therefore severe (Arulampalam *et. al.*, 2000).

The results from the Inoue (2005) GMM estimator are almost identical to those obtained from the FE regression, which confirms our earlier suspicion that adjusting for cohort sizes does not provide a substantial improvement in the accuracy of our estimates.

[4] This large increase may be the result of better capturing of low-income activity.

Figure 3: Unemployment decomposition, 1995-2007

4.2 Decompositions by birth cohort, race and gender

Table 2 Cohort Structure - By race and gender

	Group	Number of Observations after aggregation by cohort (= #Cohorts x T)	Mean Number of individuals per Cohort Observation	Minimum Number of individuals per Cohort Observation	Maximum Number of individuals per Cohort Observation	Number of Cohort observations constructed with less than 100 underlying individuals
Employment and Participation	Black Male	663	449.48	66	1421	12
	Black Female	663	530.92	118	1538	0
	White Male	663	53.00	17	153	639
	White Female	663	54.67	17	169	632
Unemployment	Black Male	663	290.4087	12	696	116
	Black Female	663	298.1508	6	703	142
	White Male	663	40.66968	0	145	648
	White Female	663	30.71795	0	91	663

In this section we further disaggregate our cohorts by population group and gender. To simplify the analysis, and to avoid problems associated with small cohort sizes, the focus will fall on comparing the black and white population groups only. Table 2 highlights the construction of these cohorts in the various time periods. Since a high proportion of white cohorts now consist of fewer than the 100 observations required to ensure consistency without adjusting for cohort sizes, we should be wary of drawing strong conclusions based on these cohorts alone. However, the smaller variation of most variables *within* this population group suggests that using these small samples to represent the cohort population averages in each period could not be as problematic as might be expected. Indeed, the implementation of the GMM estimator (not shown), produces an almost identical picture to that obtained from the simpler FE estimator, so that the latter approach suffices.

4.2.1 Decomposition of unemployment rate

Figure 4 shows the decomposition of the cohort unemployment rates by population group and gender. The raw unemployment rate (figure 4.1) is generally quite low for white men and women compared to the higher rates for black men, and the even higher rates for black women[5]. Youth unemployment can be seen to be more of a problem, and persists until older ages, for black labour force participants, although white unemployment shows a sudden spike (and a high degree of volatility) at ages younger than 25.

The unemployment age effects displayed in figure 4.2 differ noticeably between the four groups. The black male age profile shows a large decrease in the unemployment rate between the ages of 15 and 35, after which it starts to increase again. This is similar to the age effects observed for the population as a whole in figure 3.2. The unemployment age effects for black female labour force participants reveal a similar pattern, although the unemployment rate is uniformly higher and less

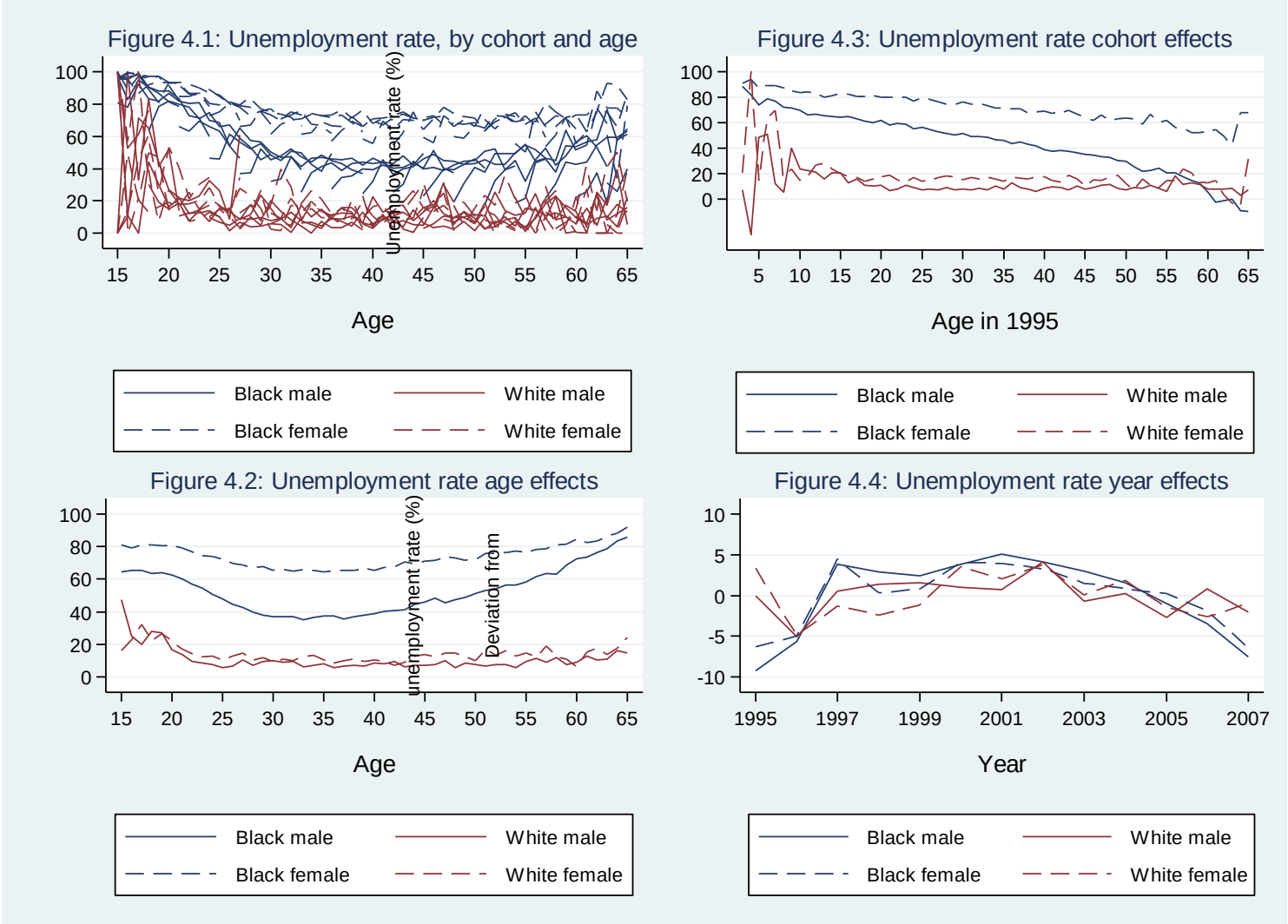
[5] These unemployment rates appear implausibly high, but are a result of the "formal sector unemployment" rate used in this analysis. Black females are most likely to be engaged in informal activity, which has been considered as "unemployed" in this analysis.

sensitive over the life cycle compared to black men. The unemployment rates are lower for white men and women throughout their working lives, and except for a decrease in unemployment between the ages of 15 and 25, appear to be largely unaffected by age.

Figure 4.3 reports the unemployment birth-cohort effects for the various groups. Black men from more recently born cohorts experienced a large increase in their likelihood of unemployment relative to older generations, compared to the slower increase for black women. Except for the sharp increase in unemployment birth-cohort effects amongst the most recent white birth cohorts – a pattern that may well reflect little more than the estimator inaccuracy driven by the small sample sizes for these cohorts – the unemployment birth-cohort effects are fairly stable across generations for white men and women.

Time effects for the different groups (displayed in figure 4.4) all show that unemployment increased in the economic downswing and decreased in the upswing. The unemployment rates for black men and women were however, far more responsive to fluctuations in aggregate demand. Downswings do not affect the white population as severely as the black population, suggesting that they are employed in more secure positions. The unemployment year effects for black men and women also show a sharp increase between 1995 and 1997, whereas this increase is absent for white men and women.

Figure 4: Unemployment decomposition, by race and gender, 1995-2007



4.2.2 Decomposition of employment, participation and wage rates

Performing the same decomposition on the other labour market outcomes allows us to shed light on the components of the increase in South African unemployment. The results of the participation, employment and wage rate decomposition are presented in Figures 5, 6 and 7 respectively.

Figure 5.1 reveals that participation is inversely U-shaped over the life cycle for all race groups and both genders, regardless of generation; the likelihood of participation increases between the ages of 15 and 25 and then starts to decrease again around the age of 50. For both race groups, participation is substantially higher for males than for females, but the high variability across age, time and demographic groups makes it difficult to identify other trends from the raw data.

The age effects from the decomposition of participation are presented in figure 5.2. The initial increase in participation rates occurs approximately three years earlier in the lifecycle of white males and females compared to their black counterparts. This can be explained by the fact that white individuals are more likely to enter the labour market while still enrolled at educational institutions and do not stay in school as long (Wittenberg, 2002). Young white individuals are therefore linked to the labour market at a much earlier stage than their black counterparts, even if only in a part-time capacity. Early linkage into the labour market is likely to reduce the probability of future unemployment (Arulampalam *et. al.*, 2000). After the age of 30 the age profiles are remarkably similar, with a gradual decline occurring around the age of 55 for all four groups.

Figure 5.3 plots the participation-cohort effects, which show that – unlike the participation pattern over the life cycle – the generational experiences of the various race and gender groups differed markedly. Amongst the oldest birth cohorts, it is clear that male participation is much higher than female participation (for both races) and that black participation is slightly lower than white participation (for both genders). Two trends are discernable from the cohort effects. Firstly, for those cohorts born before 1975 (aged 20 in 1995) the female participation rates converged on those of males for both racial groups. This occurred due to a very gradual increase in participation across more recently born male cohorts, whereas the younger female cohorts experienced a more rapid increase in participation. This reflects the feminisation of the labour market over these generations (Casale & Posel, 2002). Secondly, whereas these increases appear to level off for white men and women born after 1975, the participation rates for black men and women born between 1975 and 1982 accelerate somewhat, with some stabilisation for those born after 1982. The youngest generations of blacks for the first time have higher participation rates than their white counterparts, signifying a clear shift in labour supply decisions among this group. These groups represent labour market entrants (age 20) in the period 1995 to 2002, who are the first cohorts to be affected by the implementation of the over-aged schooling policies. Subsequent sections expose this effect more clearly.

The participation-year effects are plotted in figure 5.4, and show that participation increased between 1995 and 2000 and decreased subsequently. Similarly to the case of unemployment, the experience of the white population is less sensitive to changes in the business cycle. This stability contrasts with the greater volatility experienced particularly by black females, who are most likely to exit the labour market in upswings. These groups are most likely comprised of “added workers”.

Figure 6 reports the results of the employment rate decomposition. Figure 6.1 reveals that the probability of being employed is inversely U-shaped over the life cycle for all groups, but that these rates are generally the highest for white men, the lowest for black women and more moderate for black men and white women. The employment-age effects in figure 6.2 partly reproduce the life-cycle pattern observed in figure 6.1, but now also reveal important distinctions between the different race and gender groups. The early-life increase in employment is more rapid for white men and women than the more gradual and much more gradual increases observed for black men and women respectively. The early employment experience of the white groups therefore matches their participation profiles, suggesting that young whites enter the labour market early in response to demand for their skills. A higher peak in employment rates emerges for both white men and women compared to black men and women. Although the employment probability declines at older ages for all groups, this turning point and the rate of decline varies between the groups. Specifically, this decrease occurs earlier and more rapidly for black men than for any of the other three groups. The composite picture suggests that the initially poor employment prospects for black women do not improve much over the life cycle, while progression is distinctly possible for young white groups.

The cohort trends (figure 6.3) also show very different patterns across race and gender. White men experience a fairly stable employment-birth cohort profile, except for a slight increase across the generations born between 1930 and 1950, and a marginal decrease for those born after 1975. More recent white women entrants, on the other hand, show an increasing probability of being employed, so that the male and female employment rates converge for the white population group. Although this gender convergence can also be observed for the black population group, this occurs due to a stable black female cohort profile combined with a decreasing employment trend for more recently born black males. Therefore, while gender convergence results within both population groups, racial divergence in absorption has occurred for the youngest generations.

Finally, figure 6.4 shows the employment-year effects from the decomposition. The year effects for black men and, to a lesser degree, black women decrease greatly between 1995 and 1997 (despite *increased* capturing of low-income employment over this period), followed by a period of relative stability before starting to increase at an accelerating rate after 2004. The notion of “jobless growth” is therefore not a reality in South Africa. It is evident, however, that employment is less elastic to the cycle than participation, so that most of the cyclicality in unemployment is driven by the latter. The employment-year effects for white workers show almost no trend, as with participation.

The final decomposition is performed on the log of the real hourly wages, and presented in figure 7. Average hourly log wages are plotted in figure 7.1, and reveal that wages increase over the life cycle, and are generally higher for white males and females than for black men and women. Figure 7.2 plots the life cycle wage effects and shows that the average wage rate is a concave function of age for all groups, increasing rapidly for young workers and more gradually for older workers. Wages are higher for white men than for white women, whose wages are in turn higher than those of black men and women. The pattern of wage-cohort effects (figure 7.3) is relatively stable for all groups. More recent labour market entrants from all four groups experience a slightly higher wage relative to older cohorts. This concurs with the results of Grün (2004) using only a short series of cross sections.

The wage-year effects in figure 7.4 show that the wages of black men and women decreased sharply before 2002 and increased rapidly thereafter. White wages reveal a similar time pattern, albeit with much less variation. Wages are, however, more closely related to the business cycle than employment, though with a lag. In the short run, therefore, the economy adjusted via changes in the wage structure, while in the long run adjustments in employment appear more important. It is evident that wages have remained fairly rigid across generations, with differences between the races persisting to the youngest generations. The surplus of black labour of the most recent generations has not been accommodated by a decline in wages, but rather by falling employment rates.

Figure 5: Participation decomposition, by race and gender, 1995-2007

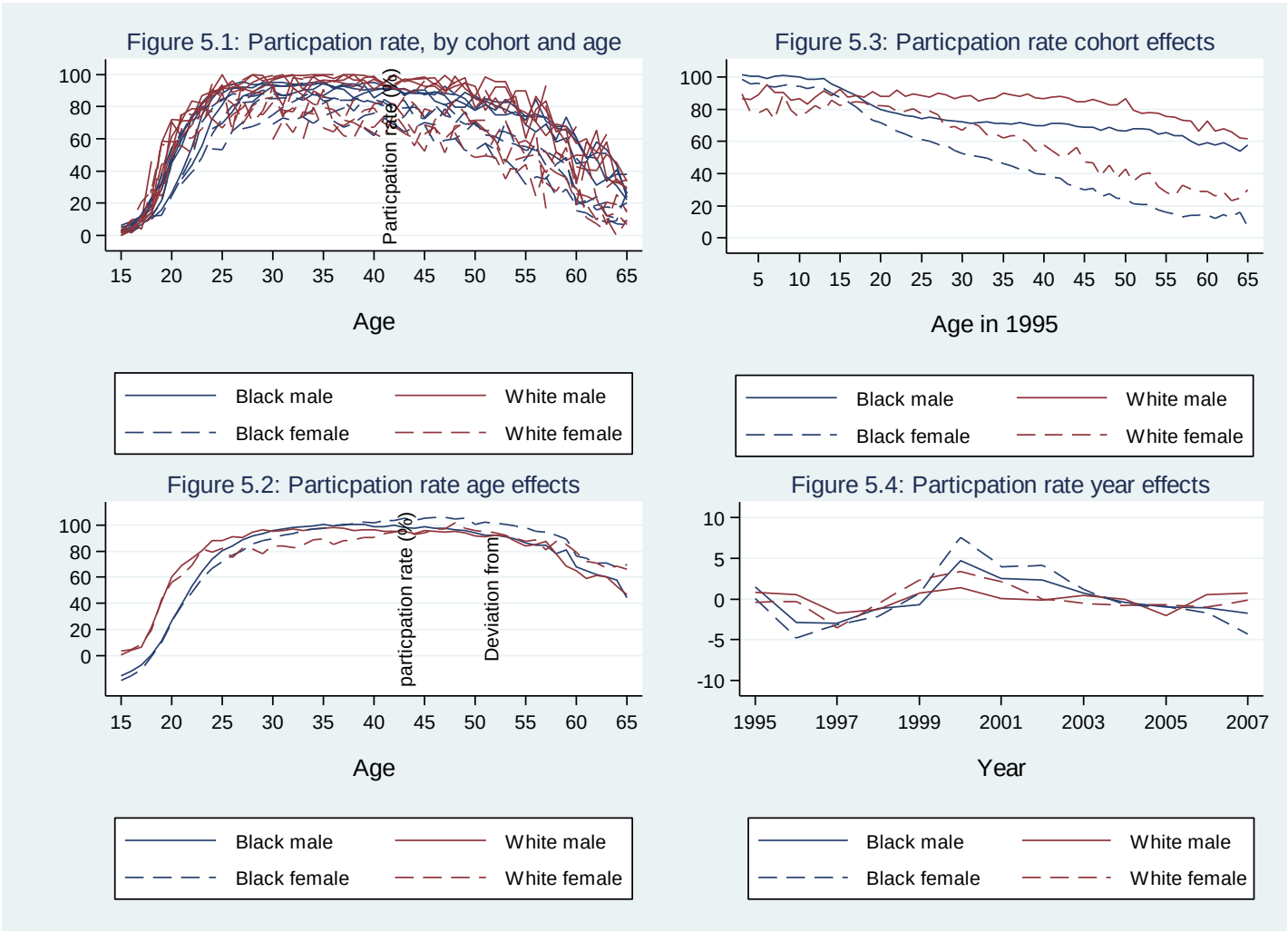


Figure 6: Employment rate, by race and gender, 1995-2007

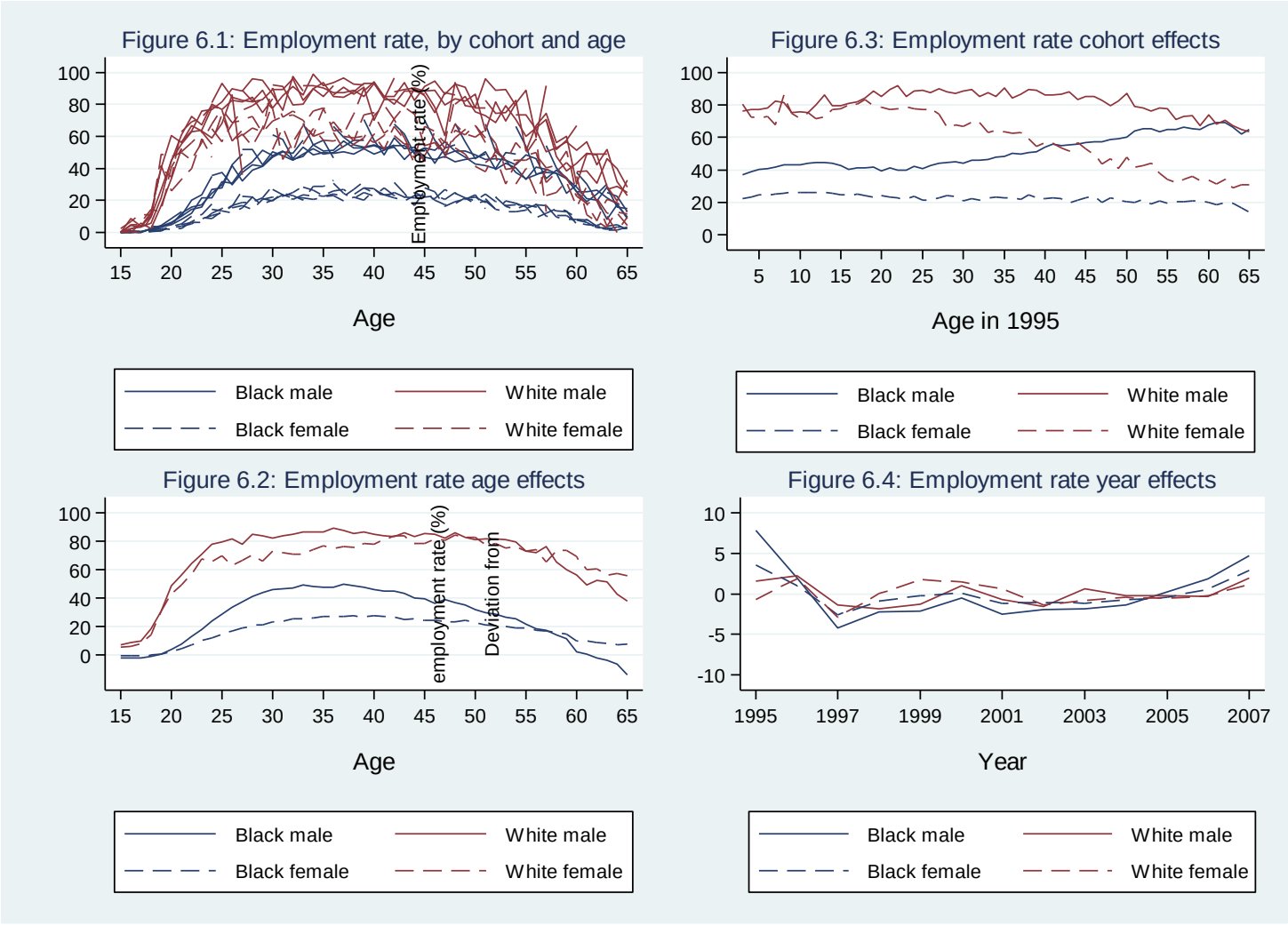
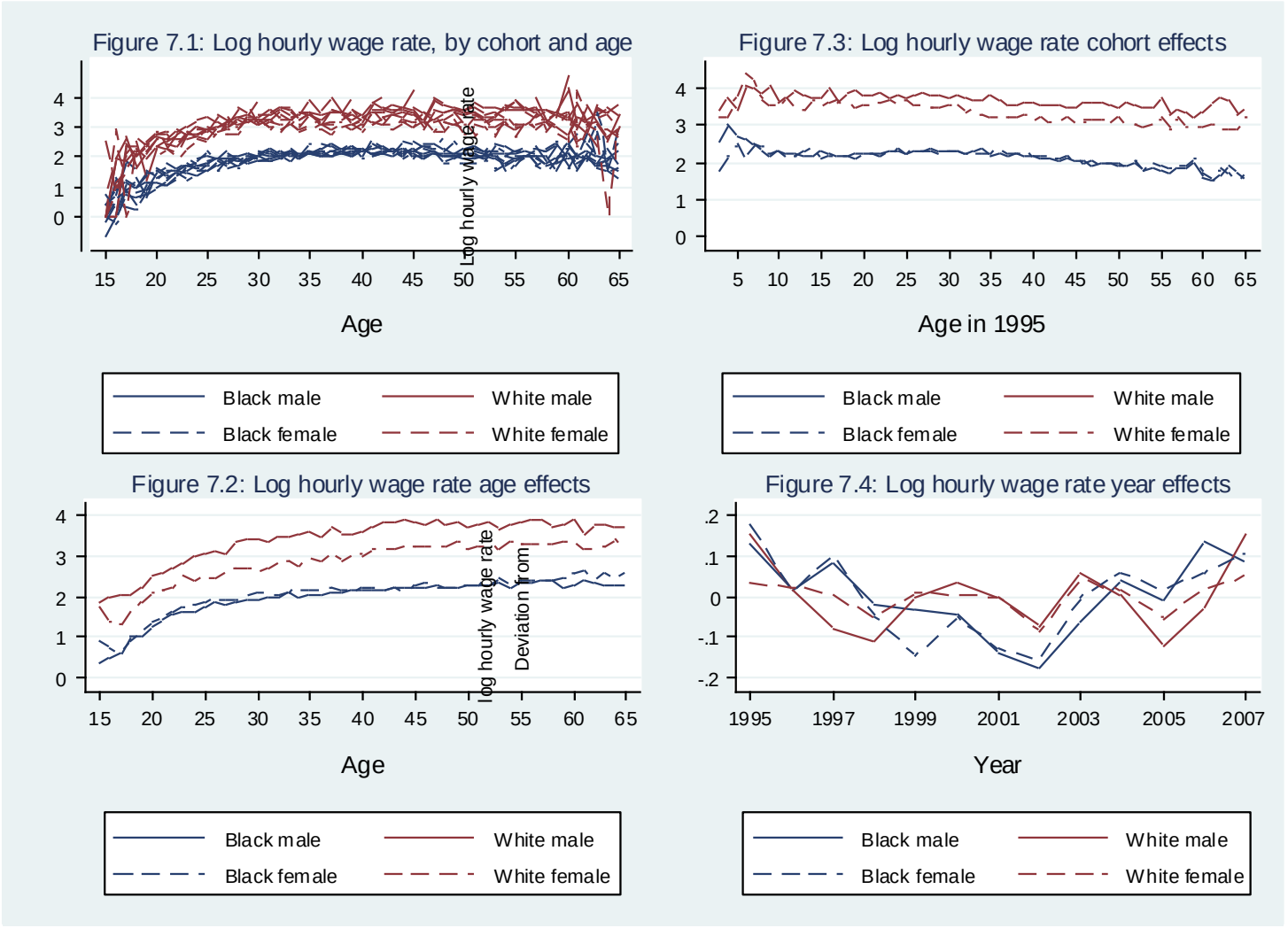


Figure 7: Log average real hourly wage rate decomposition, by race and gender, 1995-2007



We now attempt to interpret the different components of the participation, employment and wage decompositions, and offer some explanations for the observed patterns, as they relate to the increase in the overall unemployment rate.

Starting with the various age effects, employment and wages can be seen to follow a concave life-cycle pattern which is consistent with Mincer's (1962) theory of on-the-job training, but whereas the employment likelihood levels off or even starts to decrease later in life, the expected wage rate does not decrease in age for any of the groups. One interpretation of this is that labour productivity appears to increase rapidly early in the working life, before levelling off or even decreasing as workers near retirement age. Downward wage rigidities, however, preclude wages from reflecting this decreasing productivity so that the burden of adjustment falls solely on employment. The increased labour market rewards to job search (early in the working life) also induce an increase in labour force participation.

There are important disparities between the shapes of these trends across the different groups, however. The increase in the participation rate at young ages is more gradual for black men and women than for whites, suggesting that these groups take longer to leave the school system and to make the transition into the labour market[6]. This discrepancy is even more pronounced for the early-life increase in employment, indicating that black workers take longer to be absorbed into the workforce. This explains why the unemployment rate over the life cycle declines more slowly at early ages for black than for white workers. Another important distinction between the groups is in the decline in labour productivity that occurs later in life; black men and women experience a decline in employment which occurs earlier in life than for white workers. This may well be due to the fact that black workers are disproportionately represented amongst the less skilled occupations where labour productivity starts to decline at earlier ages. While the employment-age profiles of the different groups follow very dissimilar patterns later in life, the participation-age profiles later in life are almost identical across groups. The share of individuals who express a desire to work remains high for all race and gender groups, but only starts to drop off around the late 50s. For white workers the declines in participation and employment move in lock-step, so that older workers do not experience a change in the probability of unemployment. For black workers, however, employment starts decreasing much earlier than participation, which increases the likelihood of unemployment at older ages. It appears that wages do not adjust downward over the life cycle to reflect the decline in productivity. As a result, mismatch in labour supply and demand that occurs at older ages is addressed by job shedding rather than wage reductions for the black population group.

It was noted in section 4.2.1 that the cohort effects represented the largest component of the variation in the unemployment rate, so that understanding the trends in the participation and employment cohort effects are of particular importance. Two distinct trends emerge from the participation profiles. Firstly, for those individuals born between 1930 and 1975 there was a gradually increasing likelihood of participation for the more recent labour market entrants of all race and gender groups; this increase was sharper for women than for men. Secondly, black men and women born between 1975 and 1982 experienced a sudden additional surge in participation which levelled off for those born after 1982. No similar effect is seen for white men or women.

[6] This result is driven particularly by older generations, where transition out of school was still slower for the black population compared to the scenario after the implementation of the "over-aged" policies.

The first trend is almost certain to reflect the effect of increases in educational attainment across cohorts, but may also represent slowly changing cultural norms and perceptions of employment, such as the increasing acceptability for women to take up employment rather than engaging in household production. This trend is consistent with Casale and Posel's (2002) observation that the labour market has undergone a feminisation between 1995 and 1999, although this appears to be part of a much longer trend. Many of the factors they use to explain the increase in participation for women – such as the decline in the marriage rate, and changes in household composition – may be important in accounting for this first trend. These factors are, however, unlikely to explain the second more short-lived surge, given that these factors are bound to be of a slow-changing nature.

The second trend is more difficult to account for. The removal of over-aged learners from the school system, as discussed in section 2, presents the most credible explanation. When the Department of Education proposed this policy around 1996, the 1975-1982 birth cohorts would have been in their late teens and early twenties and are therefore the group most likely to have been affected by these regulations. This explanation also fits Ntuli's (2007) finding that the increase in participation is due to a change in how African women respond to being in younger age groups or completing different levels of education. Additionally, the share of over-aged learners was much higher for black than for white learners, but not very different across genders, which also fits the race and gender dimensions of the second trend. The combination of these two processes explains why participation increased more for African women than for any of the other groups, since this was the only group to have been affected by both the long-term and short-term changes. In explaining the sudden increase in unemployment during the late 1990s, it is the first trend, which occurred at exactly the same time as the school system reform, that is likely to be more important.

The shift towards greater labour market participation has not, however, coincided with a decrease in wages across cohorts. More recent labour market entrants from any of the four groups could expect to earn roughly the same formal sector wages (on average) than older generations. The employment cohort effects for black men showed a steady decline in the employment probability for more recent labour market entrants. This suggests that black men from younger cohorts faced a decrease in the demand for their services, while simultaneously also increasing their labour supply. The fact that wages for this group were more or less stable across generations suggests that labour market institutions precluded a wage decrease from facilitating the absorption of participants into the ranks of the employed. All of these factors combine to deliver a much higher probability of being unemployed for black males who entered the labour market more recently. The employment-cohort effects for black women were more or less constant across generations, but combined with the rapid increase in the participation amongst more recently born cohorts, the likelihood of being unemployed rose dramatically. The employment-cohort effects also show a strong increase for white women and a mild increase for men, which corresponds to the participation-cohort effects. Younger white men and women therefore find themselves in a very similar position to older cohorts, both in terms of their wages and probability of being unemployed. This suggests that sufficient absorption allowed the white labour market to clear at wages consistent with those of previous generations. A similar wage trend in the black labour market however, precluded the labour market from clearing.

The trend of decreasing demand for younger black male workers and a stable demand for younger black female workers is surprising in light of the increased years of education attained by these younger cohorts. The explanation may, however, lie in understanding how this increase was spread

across cohorts. Recent generations of black men and women are much better educated on average, and the proportion of black men (over the age of 20) who have matric as their highest qualification increased from 3% of those born in the 1930s, to 29% of those born in the 1980s (1% and 27% respectively for black women). The increase in the share of black workers who have completed a university degree has been much smaller, however; from 0.4% of black men born in the 1930s to 2.3% born in the 1980s (0.3% and 2.1% of black women). Banerjee *et al.* (2007) show that since 1995 the demand for labour changed to favour graduates, while the demand for those with a completed secondary education or less decreased. The data we have cannot distinguish whether this was the result of skill-biased technological change (which primarily benefited those with tertiary qualifications), or whether the quality of a secondary education actually deteriorated over time. It does seem, however, that the increase in educational attainment achieved by the younger black cohorts was not great enough given that labour demand had shifted to the highest skills categories at the same time. This section of the population "caught up" with the skill requirements that were standard for the previous generation, but the requirements expected of the new generation of workers had changed. Consequently, this resulted in a decrease in employment rates for younger black cohorts. Combined with the increase in participation rates and seemingly rigid wages, this resulted in rising unemployment rates for more recent black labour market entrants.

Finally, as was explained in section 3.3, the cyclical components reflect the response of the various labour market outcomes to short-run changes in aggregate demand. In addition, these effects absorb any remaining differences in measurement across surveys. The latter are presumably small, given that some inconsistencies were removed by omitting informal sector workers from our definition of the employed. The employment-year effects reveal a mild degree of pro-cyclicality, with all four groups experiencing some increase in employment between 2001 and 2007[7]. This responsiveness to the cycle is, however, not as sharp as for the participation profiles, which gives rise to cyclical unemployment particularly for the black cohorts. The effect of the over-capturing of employment in the 1995 OHS and possibly also the 1996 OHS can be observed clearly for black men, and to a lesser extent for black women. It is therefore difficult to gauge how much employment actually decreased during the economic downturn. Substantial increases in employment are only visible from around 2004, almost five years after the start of the economic upswing. It is possible that high hiring and firing costs make it difficult or undesirable for firms to alter the sizes of their workforces unless the changes in aggregate demand cumulatively pass a required threshold for noticeable employment generation to occur. This notwithstanding the fact that, between 2001 and 2007, the employment-year effects show a more than seven percentage point increase for black men and a more than four percentage point increase for black women, which contradicts claims that accelerated economic growth does not lead to any significant employment gains in South Africa.

The wage-year effects show that a very (perhaps implausibly) strong correlation between wages and the business cycle exists. The wages of black men and women drop precipitously between 1995 and 2002, before increasing even more rapidly until 2007. It is possible that some part of the initial decrease in wages reflects the improved capturing of low-paid employment, although our omission of the informal sector workers should have removed most of this bias. The wages of white workers also move pro-cyclically, although the degree of change is smaller than for black workers. The

[7] This period was covered by the LFS, which has a consistent sampling design, so that this trend is more reliable than the period prior to that.

participation-year effects are expected to illustrate how workers respond to the cyclical fluctuation in wages and employment (as well as non-labour market income, which should presumably also be pro-cyclical). The participation rate of white males is more or less unaffected by business cycle fluctuations, whereas all other groups were more likely to enter the labour market in the downswing, while withdrawing again during the upswing. The labour supply of black women was the most sensitive to changes in the cycle, followed by black men and white women. All of this suggests that the added worker hypothesis is more relevant in the South African labour market than the discouraged worker hypothesis. Further, this impact is more likely to affect those living in households with lower incomes.

5 Decomposition of labour market outcomes, with controls

Up to this point, the parametric analysis has provided a description of the labour market experiences of different groups in different life phases, years and generations. This evidence has effectively highlighted the linkages between supply and demand for different groups in explaining rising unemployment. The variation across groups and generations, however, requires further explanation. This section introduces various control variables to the decompositions to explain some of the phenomenon highlighted above. Should the generational profiles become more horizontal, this signals that the control variables introduced partially explain why labour market entrants born in different eras have such different experiences.

Given that much of the most recent rise in unemployment can be attributed to the surge in the participation rate (most notably for black individuals born after 1975), the focus of this section falls on explaining intergenerational differences in participation patterns. We direct our attention to the black subpopulation, since the most notable rises in unemployment and participation rates are registered by this group. In particular, we test the hypothesis that recent labour market entrants' participation decisions are based on their higher educational attainment, lower marital rates (for females) and other changes in household structure, as suggested by Casale & Posel (2002). Females entering the labour market more recently are more likely to head households, are more educated and less likely to be married, prompting increases in labour market attachment for these groups. Further, in recent years the number of unemployed supported by each household increased, so that labour force participation among potential breadwinners likely increased (Klasen & Woolard, 2008). This phenomenon may explain the added worker effect that was found in the results above.

Figure 8 compares the age, period and cohort profiles before and after controlling for the aforementioned factors. Age profiles change marginally for both black males and females. Once removing the disadvantage of comparatively low educational attainment for young individuals, their participation rate increases. Older individuals have a comparatively lower participation rate once controlling for their higher levels of human capital. During the cyclical upswing, the conditioning factors have no impact on participation. However, the response is somewhat muted in the downswing; should the number of participants increase in the upswing in accordance with the added worker effect, having relatively fewer unemployed fellow household members in the downswing does not necessarily result in subsequent withdrawal from the labour market.

The most noticeable changes appear in the birth-cohort effects. For black males, the generational profile becomes virtually flat, so that those born between 1930 and 1975 have a remarkably similar

propensity to participate given their educational and household decisions. Assuming that, according to traditional roles, household formation does not have as large a participation impact on males as on females, differences in education across generations explains the rise in participation rates for recent male labour market entrants. However, it is evident that the "discontinuity" on the horizontal profile that arises for those born between 1975 and 1982 cannot be explained by attainment alone. This surge in participation that stabilised at higher levels for these groups is likely to result from another exogenous shock. The factors that we control for also do not fully account for the differences across genders. Furthermore, their role in explaining the generational rise in female participation rates is also not as clear as for males. However, the strong climb is dampened slightly by the education and household controls, and confirms their role in driving the feminisation of the labour market (Casale & Posel, 2002). Nevertheless, these variables also cannot account for the sudden and sustained increase in female participation for the most recent labour market entrants.

To explore this phenomenon further, note that the economically inactive population consists, to a large degree, of individuals still in school. Transition into the labour market is more likely within this group than for other non-participants. As Burger and van der Berg (2007) illustrate, the proportion of individuals between the ages of 18 and 30 who are still in education has declined substantially from 1995 to 2007. This observation is quite likely the result of the over-aged learner policy. This age group in that time corresponds with the recent birth cohorts for which the participation rate surged. It is therefore likely that instead of making the transition out of education into other forms of inactivity, for instance into further education and training, or into employment, these groups have been forced into unemployment.

We now proceed to explain the recent surge in participation and unemployment among these cohorts. Starting from our original participation decomposition:

$$\bar{p}_{ct} = a_k + \bar{\mu}_c + \tau_t + \bar{v}_{ct} \text{ for } c = 1, \ldots, C \text{ , } t = 1, \ldots, T$$

and noting that

$$\bar{p}_{ct} + \bar{\imath}_{ct} + \bar{s}_{ct} = 1 \text{ ,}$$

where $\bar{\imath}_{ct}$ is the proportion of the cohort that is inactive and not in education, while $\bar{s}_{ct}$ is the proportion of the cohort that is inactive and in education, the participation decompositions are directly influenced by large movements out of the schooling system into the labour market, as is evident by equating these relationships:

$$\bar{p}_{ct} = 1 - \bar{\imath}_{ct} - \bar{s}_{ct} = a_k + \bar{\mu}_c + \tau_t + \bar{v}_{ct}$$

To identify whether the movements in the cross-cohort enrolment data drive the discontinuity in black participation, one could "purify" participation rates as follows:

$$\bar{p}_{ct} + \bar{s}_{ct} = 1 - \bar{\imath}_{ct} = a'_k + \bar{\mu}'_c + \tau'_t + \bar{v}'_{ct}$$

where the prime signs indicate that the profiles differ with the new measure.

By this assumption, we consider learners in school to have the same labour market status as other participants. Given the high entry rates into the labour market following the completion of school, this assumption is not far-fetched. This construct should furthermore be consistent across generations (given that all other factors have not changed), provided that the sudden changes observed above have only resulted from the movement between these two statuses that are now grouped together. If this is indeed the case, then the change in enrolment policy would drive the surge in recent participation rates.

The new decomposition is equivalent to reclassifying non-participants who are currently in education as economically active, yet not employed[8]. This approach is compared to simply introducing a control for the proportion of each cohort that is currently in education and not economically active[9]. This is equivalent to the procedure above and supposes that the coefficient of the enrolment variable should be -1:

$$\bar{p}_{ct} = 1 - \bar{\imath}_{ct} - \bar{s}_{ct} = -\bar{s}_{ct} + a'_k + \bar{\mu}'_c + \tau'_t + \bar{v}'_{ct}$$

Both approaches yield near-identical results, and the latter is presented here.

Figure 9 is the result of adding a control (in addition to the variables accounted for in Figure 8) for the proportion of non-participants currently in school. It is evident that we do indeed observe cohort profiles that are consistent across all birth years. The participation discontinuity is therefore likely to be driven by faster transitions from the schooling system into the labour market for younger generations. This suggests that the option of pursuing further education and training by over-aged school learners has been rejected in favour of entering the labour market. This has compounded the longer-term effect of rising participation rates, so that this trajectory has intensified, resulting in a sustained higher level of participation for the most recent labour market entrants. In light of the fact that employment rates for this group have not increased proportionally, enrolment policies have had the unintended side effect of swiftly adding a large group of individuals to an already steadily increasing job queue. For this reason, the current generation of youths does not only face higher unemployment as a result of its age or inexperience, but because of rapid exit from the education system. This has contributed to some of the rise in unemployment in post-apartheid South Africa.

[8] The presumption here is that individuals invest in education to obtain returns in the labour market. Hence, as soon as they exit the education system, they are likely to be re-classified immediately as unemployed participants. In this case the proportion of individuals who together make up both groups is the same across generations, and a consistent trend should emerge, *ceteris paribus*. However, the transition from the one status to the other at an earlier age for later generations may artificially inflate the participation rate, whereas on an economic basis little has changed except that these individuals no longer attend school. The distinction between the two statuses is therefore only dependent on timing and not necessarily on real movements in the labour market. This timing, however, is influenced markedly by enrollment policies.

[9] This approach does, however, pose a distinct danger of endogeneity bias, even for the age, period and cohort profiles. This is because leaving the labour market potentially could initiate a return to the schooling attained, and *visa versa*. No suitable instruments are available to account for this bias, and results showing how profiles change are presented here for descriptive and not causal purposes. The cause we may wish to isolate by controlling for this variable is, however, exogenous, as the change in enrollment policy in 1996 is clearly not affected by individual labour market decisions. However, the data only starts in 1995, so that we do not have enough information on how quickly older generations (that were not affected by this policy) exited the schooling system. We do know that this coefficient should be -1 based on the equations presented above. Indeed, all regressions yield a coefficient that is not statistically different from this figure, so that the equations may not be biased. The profiles shown here are therefore likely also to be unbiased by including this control.

This calls for a revision of the approach taken to deal with grade repetition in schools. More pertinent, however, is the question of how to attract over-aged learners into FET colleges or any suitable vehicle that allows them to be prepared for absorption into the workplace. The issue is not really whether the job queue should be shortened by temporarily keeping individuals outside the labour market and inside FET colleges. What is important is that once individuals leave the education system, that they are equipped with skills relevant to the job market. Ideally, the process of exiting from the education system should not result in large cohorts of youths waiting in the job queue, but should instead produce more individuals who can be absorbed into the workplace.

Figure 8: Participation decomposition, black population by gender, 1995-2007. Controls: Proportion of cohort with primary education, secondary education, tertiary education, are married, are household heads; Number of broadly unemployed in the household

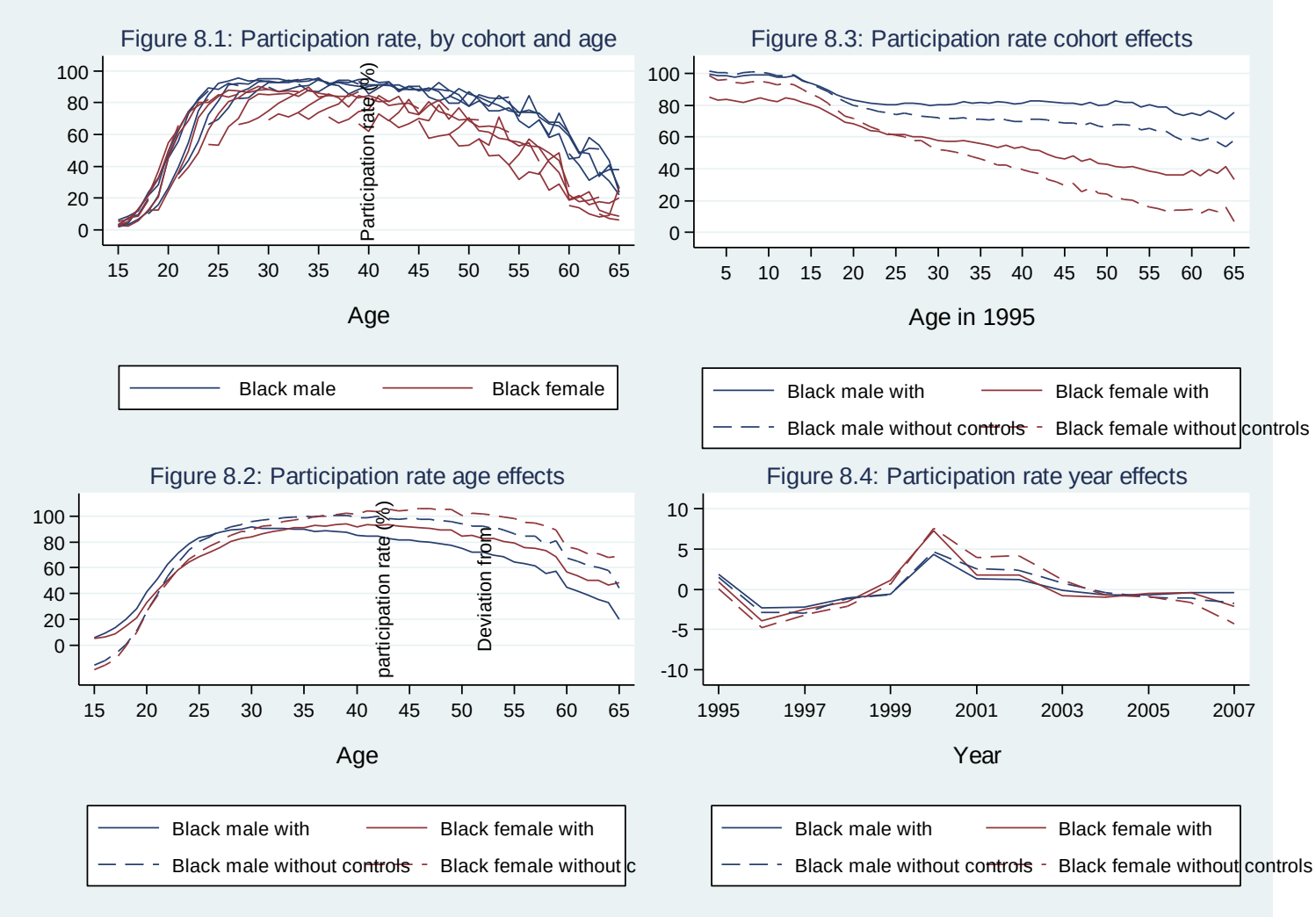
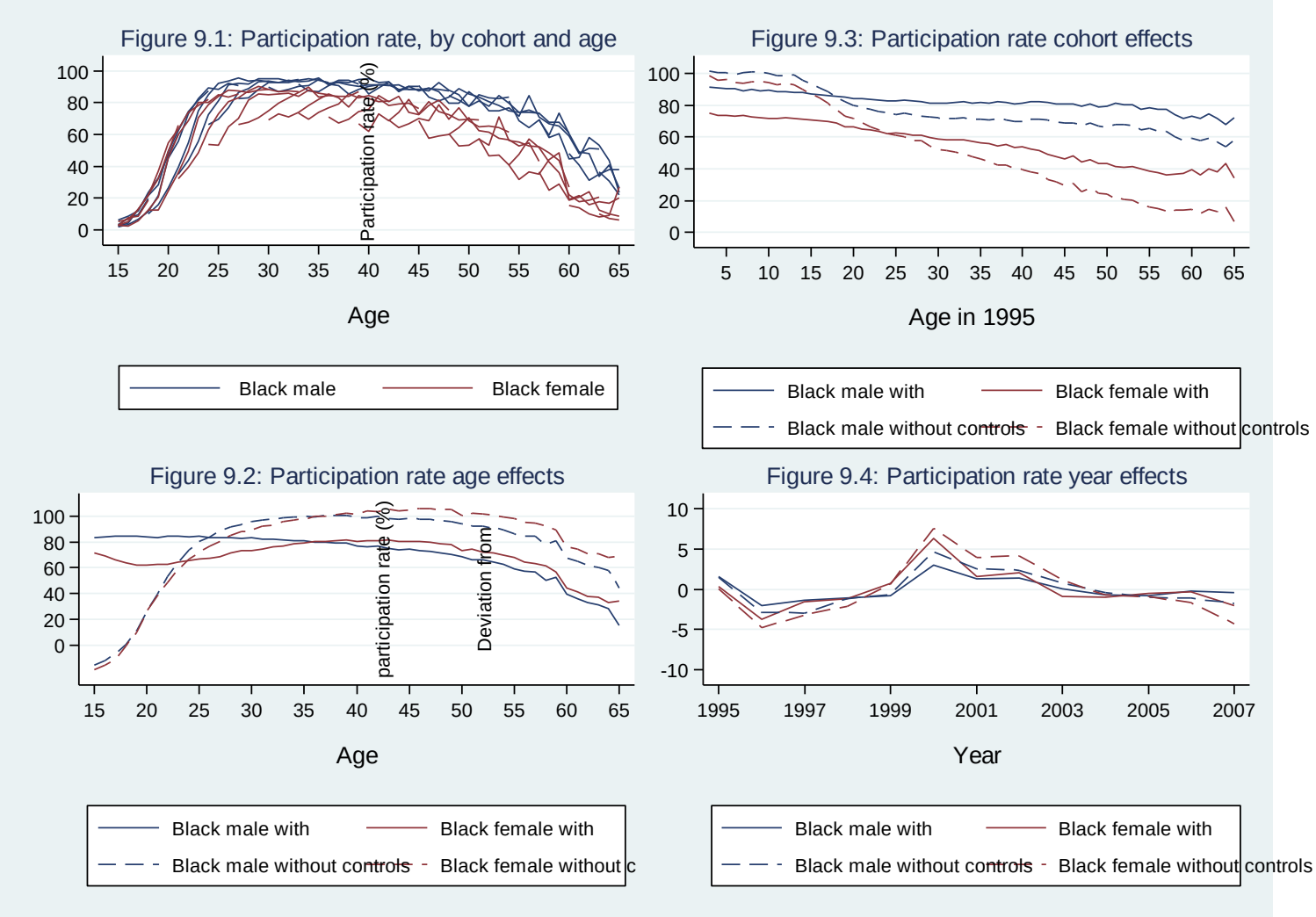


Figure 9: Participation decomposition, black population by gender, 1995-2007. Controls: Proportion of cohort with primary education, secondary education, tertiary education, are married, are household heads, are still in education; Number of broadly unemployed in the household



6 Conclusion

The large comparative static literature has established firmly that long-run participation increases, coupled with relatively slower increases in the rates of absorption, have driven the rising post-apartheid unemployment rate. This study is among the first that edges towards a dynamic view using micro data; this allows an inter-temporal perspective, while maintaining the ability to explain the observed trends with household and demographic characteristics. The findings of the literature are confirmed and extended in this context. In particular, we are able to distinguish between long-run and short-run aspects of labour market status by implementing age, period and generational decompositions on a series of post-1994 cross sections. The Deaton (1997) restriction on time coefficients supposes that they capture short-term business cycle variation in labour market indicators, and other intertemporal impacts are absorbed across generational impacts (in the long term). If other assumptions about coefficient restrictions and the business cycle are made, it is possible that the split between the short and long-run variation may differ marginally.

It is evident that, under these assumptions, unemployment is indeed related to the business cycle. A strong added worker effect is found for the black population, suggesting that in downswings individuals are likely to enter the labour market, while returning to household production in upswings. On the demand side, cyclical employment creation is present in upswings (though not as robust as the strong participation impacts). This refutes allegations of "jobless growth" – however the long lag in employment generation following the start of the upswing suggests that employers are hesitant to translate their gains into more vacancies immediately. This underlines the notion that adjustment costs and labour market rigidity are high in South Africa.

Turning to the long run, it is evident that younger generations among the black population are suffering from higher levels of unemployment compared to older cohorts. This is explained by a steady increase in labour force participation across generations, which converges to the same levels as the white population. A similar pattern exists for white females, which is reflective of the changing gender roles overall. These increases are not matched by higher employment rates for more recent black entrants (though they are for white females). The most likely reason is that demand for largely unskilled black labour has declined over this period due to a changing structure of the economy. Unskilled workers that entered the labour market in the earlier half of the century had a higher probability of being absorbed compared to those entering a labour market that has become skills-biased. This growth in labour supply can be explained by the increase in educational attainment for males, while changing household formation decisions also contribute for females.

How then do higher education levels for these cohorts convert to sluggish absorption? It is evident from the data that the retraining of the population has occurred more slowly than the changing demand structure of the labour market – this suggests that the increases in educational attainment have not yet been enough. For the most recent black labour market entrants, a strong surge into unemployment can be explained by a demographic shift that has not yet been exposed at length. In particular, over-age education policies have forcefully sped up the transition from school into the labour market since 1996. While these measures intended to relieve a schooling system that was overburdened by high repetition rates and teacher-pupil ratios, it has had the unintended effect of pushing a large cohort of individuals into the labour market, perhaps prematurely. Given that our

analysis reveals that these particular cohorts have lower probabilities of finding employment, it is evident that large groups of individuals have been added to a long unskilled-job queue.

The results of this study suggest that age is not necessarily the defining factor in South African unemployment, but that the risks of being part of a particular generation of entrants could be more decisive. If only age were important, the life cycle decline in unemployment would eventually alleviate the worst of the problem, suggesting that policy should be geared towards speeding up this transitional phase. The potential solutions geared at youth would only require short-lived intervention, such as the proposed wage subsidy (Banerjee *et. al.*, 2006). However, if particular generations are affected severely by high unemployment, it may be that this disadvantage follows these groups throughout their working lives. This paper has revealed that structural issues are of great importance. The large increase in the labour force that has not been appropriately trained and pushed into the labour market by over-aged school policies is of substantial concern. Retraining these individuals becomes essential and requires more long-term interventions to succeed in lowering unemployment among these cohorts.

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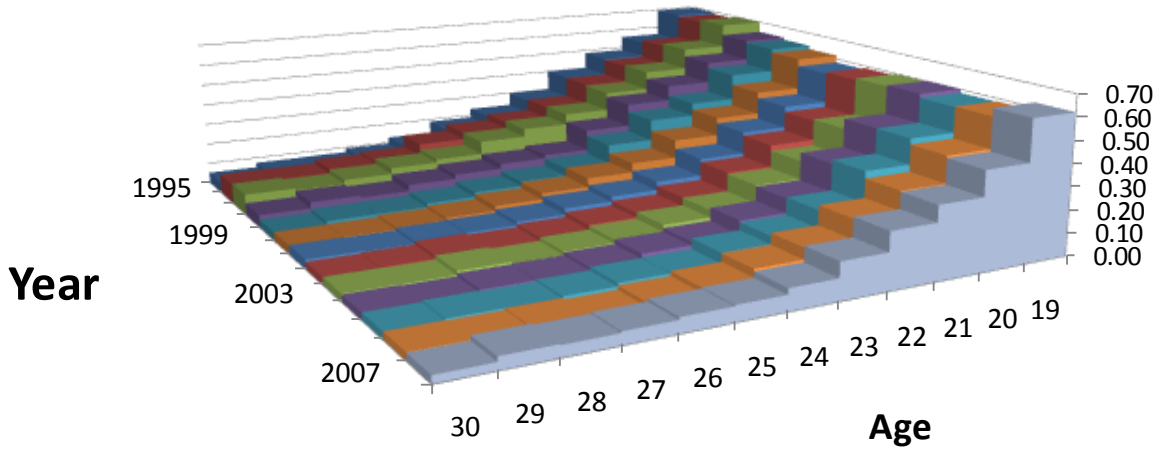
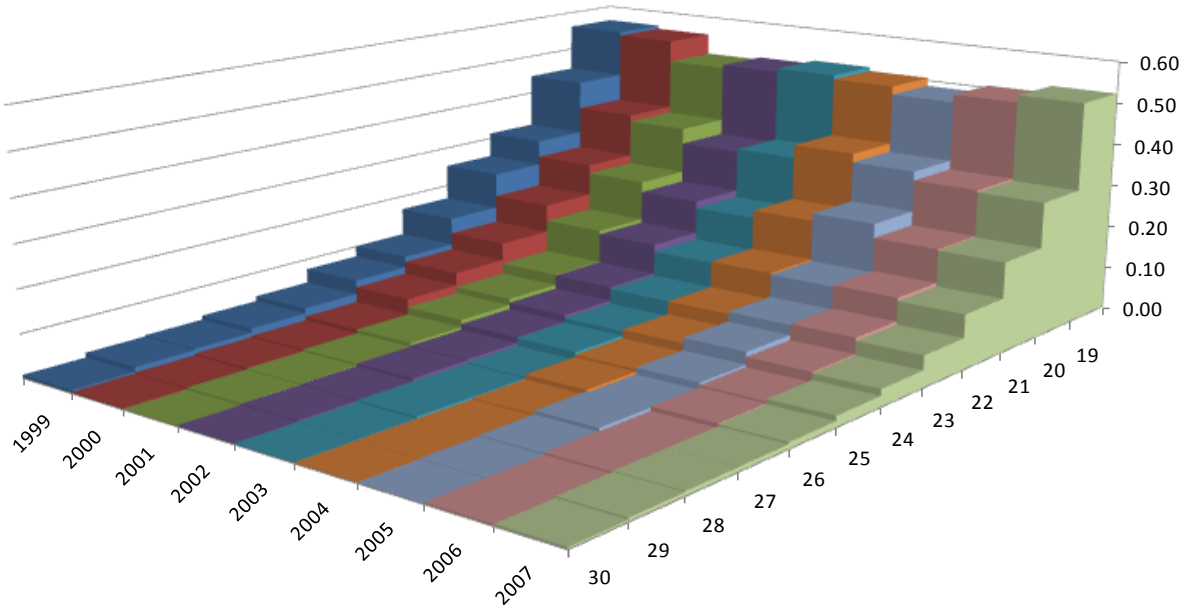
Figure A1 – Proportion of Age Cohort in any form of education – 1995-2007



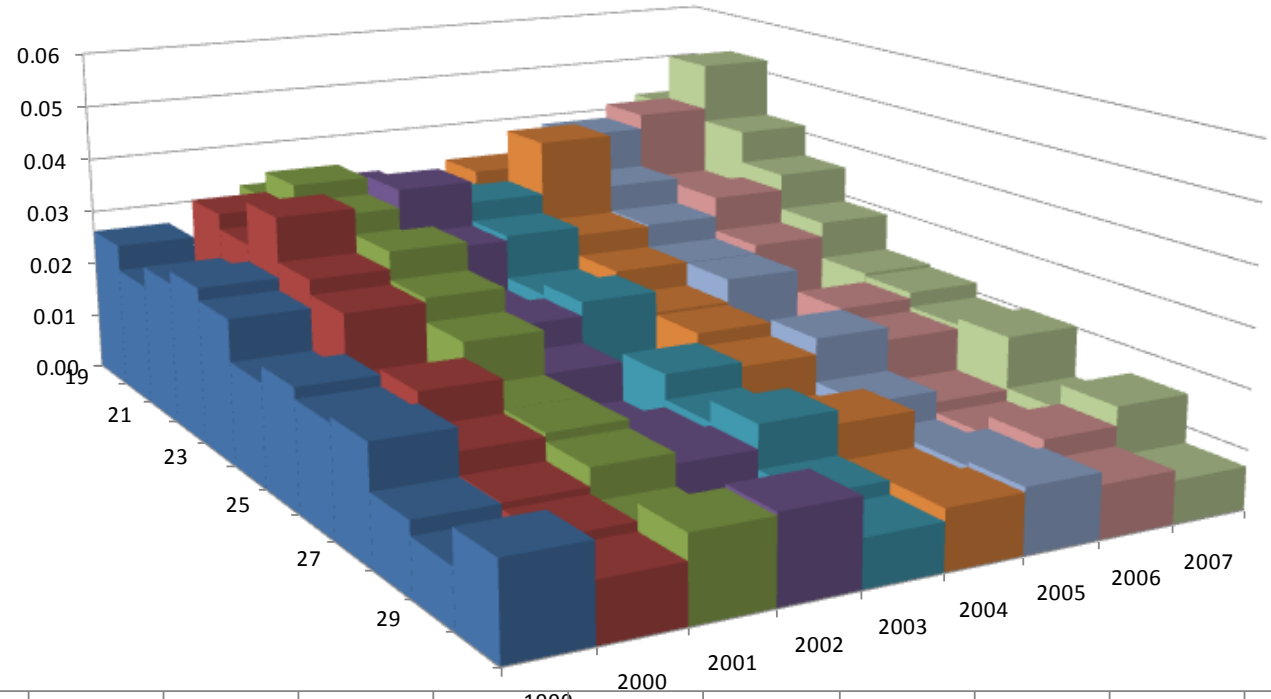
	19	20	21	22	23	24	25	26	27	28	29	30
1995	0.70	0.56	0.48	0.40	0.30	0.23	0.19	0.13	0.09	0.07	0.07	0.05
1996	0.69	0.57	0.48	0.40	0.30	0.25	0.22	0.18	0.12	0.11	0.09	0.09
1997	0.70	0.59	0.48	0.39	0.31	0.26	0.22	0.15	0.14	0.11	0.09	0.10
1998	0.65	0.55	0.45	0.37	0.27	0.17	0.15	0.13	0.11	0.08	0.09	0.06
1999	0.63	0.52	0.40	0.34	0.24	0.15	0.12	0.09	0.07	0.06	0.06	0.04
2000	0.62	0.47	0.37	0.28	0.20	0.15	0.11	0.08	0.06	0.05	0.04	0.04
2001	0.58	0.44	0.34	0.24	0.16	0.12	0.10	0.07	0.05	0.05	0.04	0.04
2002	0.59	0.42	0.33	0.22	0.14	0.10	0.08	0.06	0.04	0.05	0.04	0.03
2003	0.60	0.42	0.30	0.22	0.14	0.10	0.07	0.06	0.04	0.05	0.03	0.04
2004	0.60	0.47	0.34	0.21	0.15	0.09	0.08	0.05	0.04	0.04	0.03	0.03
2005	0.58	0.47	0.36	0.22	0.14	0.11	0.06	0.06	0.04	0.04	0.04	0.03
2006	0.59	0.44	0.33	0.24	0.16	0.11	0.07	0.05	0.03	0.04	0.03	0.03
2007	0.62	0.44	0.32	0.25	0.16	0.10	0.07	0.06	0.05	0.05	0.05	0.03

Figure A2 – Proportion of Age Cohort in School Education – 1999-2007



	19	20	21	22	23	24	25	26	27	28	29	30
1999	0.56	0.45	0.31	0.25	0.17	0.10	0.08	0.04	0.03	0.02	0.02	0.01
2000	0.55	0.38	0.27	0.20	0.13	0.09	0.06	0.02	0.01	0.01	0.01	0.00
2001	0.50	0.36	0.25	0.16	0.08	0.05	0.04	0.02	0.01	0.01	0.01	0.00
2002	0.51	0.33	0.23	0.15	0.08	0.04	0.03	0.02	0.01	0.01	0.01	0.00
2003	0.52	0.33	0.21	0.13	0.07	0.04	0.03	0.01	0.01	0.01	0.00	0.00
2004	0.51	0.36	0.23	0.13	0.07	0.04	0.02	0.02	0.01	0.00	0.00	0.00
2005	0.49	0.34	0.25	0.13	0.08	0.05	0.03	0.01	0.01	0.01	0.00	0.00
2006	0.51	0.32	0.21	0.13	0.08	0.04	0.02	0.02	0.01	0.01	0.00	0.00
2007	0.52	0.32	0.21	0.13	0.07	0.04	0.03	0.01	0.01	0.01	0.01	0.00

Figure A2 – Proportion of Age Cohort in College and Adult Education – 1999-2007



	19	20	21	22	23	24	25	26	27	28	29	30
1999	0.03	0.02	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.02
2000	0.02	0.03	0.03	0.04	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.01
2001	0.03	0.04	0.03	0.03	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01
2002	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01	0.01
2003	0.03	0.03	0.03	0.03	0.02	0.02	0.01	0.02	0.01	0.02	0.01	0.01
2004	0.03	0.03	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.01	0.01
2005	0.04	0.04	0.03	0.03	0.02	0.02	0.02	0.02	0.01	0.01	0.01	0.01
2006	0.03	0.04	0.03	0.03	0.03	0.02	0.02	0.02	0.01	0.01	0.01	0.01
2007	0.04	0.05	0.04	0.04	0.03	0.02	0.02	0.02	0.02	0.01	0.02	0.01