

COHORT ANALYSIS OF INFORMAL SECTOR IN TURKEY

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SEZER YAŞAR

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Approval of the Graduate School of Social Sciences

Prof. Dr. Meliha Altunışık
Director

I certify that this thesis satisfies all the requirements as a thesis for the degree of Master of Science.

Prof. Dr. Erol Taymaz
Head of Department

This is to certify that we have read this thesis and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

Assoc. Prof. Dr. Murat G. Kırdar
Supervisor

Examining Committee Members

Assoc. Prof. Dr. Hakan Ercan	(METU, ECON)	_____
Assoc. Prof. Dr. Murat G. Kırdar	(METU, ECON)	_____
Assoc. Prof. Dr. Nur Asena Caner	(TOBB, ETU)	_____

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Name, Last Name: Sezer Yaşar

Signature :

ABSTRACT

COHORT ANALYSIS OF INFORMAL SECTOR IN TURKEY

Yaşar, Sezer

M.S. Department of Economics

Supervisor: Assoc. Prof. Dr. Murat G. Kırdar

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This thesis examines the life-cycle profile of informal employment in Turkey. To achieve this goal cohort analysis technique and 2000-2007 Household Labor Force Survey micro level data of State Institute of Statistics is used. Informal sector is composed of people working without social security coverage due to their current jobs. Analyzes are conducted both for the total sample and six education groups separately. Besides informal employment, labor force participation and unemployment rates are also examined and using these variables net transitions between the sectors over the life-cycle are tried to be observed. According to the results; informal employment rate decreases at young ages, relatively stable at middle ages and then increases rapidly at older ages. Moreover, strong cohort effects are found in many variables and the cross section profiles differ from the true life-cycle profiles remarkably.

Keywords: Cohort Analysis, Informal Sector, Informal Employment, Social Security

ÖZ

TÜRKİYE'DE KAYITDIŞI SEKTÖRÜN KOHORT ANALİZİ

Yaşar, Sezer

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Bu çalışmada Türkiye'de şehirde yaşayan erkekler arasında kayıt dışı çalışmasının yaşam döngüsü profili incelenmiştir. Bu amaçla kohort analizi yöntemi ve Türkiye İstatistik Kurumu 2000-2007 Hanehalkı İşgücü Anketi mikro veri seti kullanılmıştır. Kayıtlı sektör mevcut işlerinden dolayı herhangi bir sosyal güvenlik kurumuna bağlı olmadan çalışan kişiler olarak tanımlanmıştır. Analizler toplam örneklem ve altı eğitim grubu için ayrı ayrı yapılmıştır. Kayıt dışı çalışmanın yanı sıra işgücüne katılım ve işsizlik oranları da incelenmiş ve bu oranlar kullanılarak yaşam döngüsü boyunca sektörler arası geçişler gözlemlenmeye çalışılmıştır. Çalışmanın sonuçlarına göre kayıt dışı çalışma genç yaşlarda azalmakta, orta yaşlarda göreceli olarak sabit kalmakta ve ileri yaşlarda artmaktadır. Ayrıca birçok değişkende güçlü kohort etkileri bulunmakta ve yatay kesit profilleri gerçek yaşam döngüsü profillerini yansıtmamaktadır.

Anahtar Kelimeler: Kohort Analiz, Kayıt Dışı Sektör, Kayıt Dışı İstihdam, Sosyal Güvenlik

To My Family

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CHAPTER 1

INTRODUCTION

Particularly in developing countries informal sector has an important share in economies and specifically in labor markets. However, working in informal sector is disadvantageous from many aspects. Wages in informal sector is usually lower than formal sector and it also lacks many services like pension opportunity and social security coverage. In 2007, 37% of total male employment and 33% of urban male employment in Turkey was in the form of informal employment i.e. they were working without social security coverage due to their current jobs.

Aim of this thesis is to observe the life-cycle behavior of informal employment among urban males in Turkey. To achieve this goal cohort analysis and 2000-2007 Household Labor Force Survey micro level data of State Institute of Statistics is used. In case of strong cohort effects cross section profiles do not reflect the true life-cycle profiles. Therefore, to obtain life-cycle profiles cohort analysis is used which decomposes data into age, cohort and time effects. Using the age effects life-cycle profiles are obtained. Nine labor market variables are analyzed empirically; labor force participation rate, employment rate, informal employment rate, share of informal and formal employment in labor force and population, and the share of unemployment in population. In addition to observing the life-cycle profiles, net transitions between the sectors are tried to be examined. One of the most important factors that determine the labor market status of people is education. So, analyses are conducted both for the total sample and for six education groups separately.

An obstacle with the data is that single ages are not available for the years 2006 and 2007. Therefore, to obtain single age values a linear combination of grouped age values are used as explained in Appendix A.

Informal sector in Turkey is studied by Tansel (1999; 2000) and she focuses on sector choice and labor market segmentation between the formal and informal sectors. Therefore, this thesis will be a truly new contribution for the literature in

Turkey. In international literature informal sector has long been studied but as for Turkey most of the papers that focus on the employment aspect of the informal sector studies sector choice and its implications on labor market segmentation and labor supply. To the best of my knowledge in the literature there is only one paper by Duval-Hernández and Romano (2009) that studies the life-cycle behavior of informal employment. This thesis adds to the paper of Duval-Hernández and Romano by looking at the labor market from a more general perspective. We not only analyze the key variables such as labor force participation, unemployment and informal employment rates but also shares of the sectors in labor force and population. Besides, we try to infer the net transition between the sectors over the life-cycle.

As mentioned informal sector has long been studied by many researches. Nevertheless, there is not a strict informal employment definition in the literature. In this paper informal sector composed of workers working without social security coverage due to their current jobs. In the data social security of people that are not related to their current jobs are not available. Therefore, people who have a social security coverage that is not related to their current jobs cannot be identified. There are papers that also take self-employment or unpaid family work as informal sector. However, when the welfare effect of social security that persists over the life-cycle is considered social security coverage is a more proper definition for informal employment in Turkey.

The remainder of the thesis follows with Chapter 2 in which literature is explained in two sections; literature on informal sector and literature on cohort analysis.

In Chapter 3, extent of the data and the labor market status definitions are explained. Employment and unemployment definitions of the State Institute of Statistics changed over time. Definitions used in this thesis and the descriptive statistics of the analyzed variables are presented in Chapter 3.

Cross section analysis is given in Chapter 4. In this chapter cross section profiles are presented for 2000 and 2007 both for the total sample and for each education group separately.

In Chapter 5 cohort-age analysis is given. Different from the cross section analysis cohort-age analysis follows profiles of cohorts over time or age. Therefore, it gives a descriptive presentation of possible time and cohort effects. In this chapter demographic characteristics of the cohorts are also analyzed to help explain the profiles obtained in the cohort analyses. Profiles in this chapter are also presented for total sample and for each education group separately.

Methodology and the result of the empirical analyses are presented in Chapter 6. In Methodology identification methods and specification of the model is discussed. In the rest of the chapter life-cycle profiles are presented for total sample and for each education group separately. Then cohort and age profiles are explained briefly. Comparison of life-cycle and cross section profiles are also presented in this chapter.

Finally Chapter 7 briefly summarizes the results and concludes the thesis.

CHAPTER 2

LITERATURE SURVEY

In this chapter literature on informal sector and cohort analysis is presented. To the best of my knowledge there is only one paper by Duval-Hernández and Romano (1999) that studies informal sector utilizing cohort analysis. Therefore, the two literatures are explained separately and the paper by Duval-Hernández and Romano is summarized under the topic Literature on Cohort Analysis.

2.1. Literature on Informal Sector

Informal sector has long been studied by many researchers. Nevertheless, most of the studies focus on sector selection and labor market segmentation between the formal and informal sector. There are also papers that studies hours of work in formal and informal sector, and the relation between informality and poverty. There are two papers by Tansel (1999; 2000) on informal sector in Turkey that is also in the context of labor market segmentation.

Although, studies concentrate on certain topics there is not a standardized informal sector definition in the literature. However, the two most commonly used criteria to define informal sector are employment status and working with formal contract or having social security coverage.

One of the first papers on informal sector by Hill (1983) focuses on sector selection between the formal and informal sector among Japan women using a 1975 survey conducted in the Tokyo Metropolitan Area. In this paper informal sector is composed of family workers and formal sector is composed of employees. A multinomial logit model with three dependent variables is estimated for sector selection where not-working is the base. According to results of the model while predicted wages have positive marginal effect on the probability to work in formal sector; education, husband's income and home ownership have negative marginal effects. However, coefficients are not robust against the child variable.

Gindling (1991) analyzes labor market segmentation between the public and private-formal and between the private-formal and private-informal sectors in San José, Costa Rica using a survey conducted in April 1982 in the metropolitan area of San José. Private-formal sector is composed of occupations that work closely with the public-sector or have protection against foreign competition, workers who are members of a professional organization or have post-graduate education. Private-formal sector is composed of workers who work without machinery or with manual machines; work in houses or on streets or who are home servants. To test for segmentation selectivity corrected wage equations are intended to be compared. However, no selection bias is determined in the wage equations and Ordinary Least Square (OLS) wage equations are compared. Gindling finds that expected wages are higher in public sector compared to private-formal sector for the total sample and higher in private-formal sector compared to private-informal sector for 91% of the sample. So, he concludes that the results support the labor market segmentation hypothesis.

Pradhan and van Soest (1995) analyze the determinants of sector choice and wages in urban areas of Bolivia by jointly estimating the sector choice and wage equations. For this purpose they use 1989 Bolivian household where informal sector is composed of self-employed workers and formal sector is composed of wage workers and independent professionals. For males while age, having a prime age household and net dissaving has negative marginal effect on the probability to work in formal sector, being married has positive marginal effect. For females being married, having a young child, net dissaving and unemployment has negative marginal effect on the probability to work in formal sector. Moreover, for females while age and economic activity have positive marginal effect on the probability to work in informal sector, being married, having a prime age household member and net dissaving have negative marginal effect. In wage equations Gindling finds that while economic activity and education increases wages, unemployment decreases. Besides, while age increases formal sector wages, it decreases informal sector wages. However, effect of age is insignificant for informal sector.

Magnac (1991) analyzes labor market segmentation between formal and informal sector in Colombia female labor market using a 1980 household survey data collected in the main towns of Colombia. Formal sector is composed of workers working as employees or blue-collar workers and informal sector is composed of workers working as self-employed. Different from other papers Magnac allows for comparative advantage for individuals in the formal and informal sector. Segmentation hypothesis against competitive markets hypothesis is tested by testing if the entry cost for formal sector is different from zero. Since Magnac allows for comparative advantage for individuals between the sectors potential wages may differ between sectors even if there is a competitive market. A multivariate Tobit model with three variables participation, sector choice and wages is estimated. According to estimation results competitive market is not rejected and potential wages differ between sectors.

Yamada (1996) tries to answer two questions; whether people work in informal and self-employed sector with their own choice and whether people in this sector obtain returns to their entrepreneurial ability. In the paper 1985-86 and 1990 World Bank Living Standards survey data of urban Peru is used. Based on the hypothesis that people are in informal and self-employed sector by their own choice Yamada sets up a general equilibrium model where people choose to work in agriculture or manufacturing sector for wage or in informal and self-employed sector for an independent income. Empirical implications of the model are tested by estimating wage equations and structural probit sector selection equations. Yamada finds that while informal and self-employed sector is chosen freely and competitive with other sectors, informal wage-earning sector supports the segmented labor market hypothesis.

Hill (1989) analyzes sector choice, hours of work and wages of Japan women using a 1975 survey conducted in the Tokyo Metropolitan Area. Informal sector is composed of family workers and formal sector is composed of employees. A multinomial logit model with three dependent variables is estimated to analyze sector choice where not-working is the base. Then hours of work and wage equations are estimated

jointly with a three-stage process. Hill finds that probability of formal employment is positively affected by labor market experience and negatively affected by husband's income and having children under six. Probability of informal employment is positively affected by age, years of schooling and labor market experience and negatively affected by husband's income and having children under six. While wages in informal sector increases with years of schooling, wages in formal sector also increases with labor market experience. Hours of work both in the formal and informal sector increases with predicted wage.

Dorantes (2004) analyzes the relation between household poverty and working of household head in informal sector. Chile socioeconomic survey CASEN data collected in the year 2000 is used in the paper. Informal sector is composed of wage and salary workers working without a formal contract or social security coverage. Two probit models to explain sector choice of household heads and poverty of households are estimated. Dorantes finds that poverty of household increases the probability for household head to work in informal sector and working of household head in informal sector increases the probability of household being under poverty line. Additionally, probability to work in informal sector increases with number of household members working in informal sector and decreases with age, family size, years of education and tenure. Being married decrease the probability of working in informal sector for males but increase for females. Additionally, Dorantes states that for males there is a heterogeneous informal sector structure such that while some informal jobs are involuntarily chosen and demand-led some other high skill informal jobs are supply led. For females Dorantes finds that all informal sector jobs are demand-led.

As mentioned above there are two papers on informal sector in Turkey both of which is by Tansel and focus on sector selection and wages in formal and informal sector. In her first paper Tansel (1999) analyzes labor market segmentation between formal and informal sector in Turkey using 1994 Household Expenditure Survey data of State Institute of Statistics. To test for segmentation selectivity corrected wages equations in formal and informal sector are compared. For sector selection a

multinomial logit model with four dependent variables are estimated; not working, working in the formal sector, working in the informal sector and working in other employment types. Informal sector is composed of workers working without social security coverage and formal sector is composed of workers working with social security coverage. When estimated wages for different years of experience and education levels are compared Tansel states that there is segmentation between formal and informal sector for both genders.

Other paper of Tansel (2000) on informal sector is similar to her previous paper with differences in the separation of market into sectors. In this paper Tansel separates the labor market into five sections: not-working, wage earner in formal private sector, wage earner in informal private sector, self-employed and other employment types. Moreover, in this paper Oaxaca-Blinder Decomposition method is used to analyze the wage differences between genders and sectors. When expected wages for different years of experience and education levels are compared Tansel finds that in male labor market there is segmentation between formal and informal sector and discrimination against females particularly in formal sector.

2.2. Literature on Cohort Analysis

Cohort analysis is used by many researchers in different contexts. It is used in the context of income, saving and consumption by Paxson (1996), in the context of consumption by Attanasio and Weber (1995) and by Parker (1999), in the context of saving by Deaton (1997) and Attanasio (1998) and in the context of earning by and Beaudry and Green (2000) and by Fitzenberger (2001). Studies using cohort analysis and related to the scope of this study is about labor force participation and employment rates.

Beaudry and Lemieux (1999) analyze stagnation in female labor force participation rate of Canada in 1990s using eleven years of 1976-94 Survey of Consumer Finance data. They use cohort analysis where age polynomial, cohort polynomial, unemployment rate and polynomial of age-cohort interaction term are explanatory variables. They find that labor force participation rate of females in Canada increases

until middle ages, peaks around age 50 and then decreases. Younger cohorts enter the labor market with a higher participation level and have a more flat life-cycle profile at young ages. Similar profiles are also observed for employment rate. They also decompose aggregate participation rate into age, cohort, cyclical and macroeconomic effects and conclude that the rapid increase in the female participation rate in 1970s and 80s and the stagnation in 90s is mainly caused by cohort effect. Predicting the future rates Beaudry and Lemieux state that the rapid increase in female participation and employment rates will no longer continue but there may be 2-3 percent increase in the future seven years.

Fitzenberger et al. (2004) analyze labor force participation and employment rates in West Germany using cohort techniques and twenty years of 1976-1995 Micro-Census data. Analysis is conducted for each gender and three skill levels separately and also full-time and part-time employment rate of females are differentiated. Explanatory variables of the model are age polynomial, cohort polynomial, time trend and time dummies. For identification linear cohort effect is assumed to be zero and time dummies are assumed to be orthogonal to time trend and average to zero. For males Fitzenberger et al. find that there is negative time trend in participation rates of all skill levels and the trend is most notable for low skilled workers. Participation rate life-cycle profiles exhibit a hump shape at all skill levels and peaks around ages 40-45. Age effect is also most notable for low skilled workers. No cohort effect is observed in participation rates at any skill level. Employment rate profiles are also found to be very similar to participation rate profiles. For females Fitzenberger et al. find very different profiles from males. Comparing the time trend and cohort effects they conclude that gender gap in participation rate decreased at all skill levels in West Germany. For employment rates of females they also find similar results in general. Moreover, comparing the full-time and part-time employment rates for females they state that the increase in female employment rate mainly supported by the increase in part-time employment.

Fallick and Pingle (2007) decompose changes in aggregate labor force participation rate in the USA into the effects driven by aging in population, trends in age groups

and business cycle. To analyze effects driven by trends in age groups cohort analysis is used for each gender separately. In the cohort analyses as explanatory variables age dummies, cohort dummies, current and two lagged values of employment gap and various socioeconomic variables are used. Moreover, for identification one of the cohort effects is assumed to be equal to one. For males life-cycle profiles are found to be very similar between cohorts. Participation rate increases until ages around 25-29, relatively stable until ages around 50-54 and then decreases. Cohort effects for males are negative towards younger cohorts at all age groups except for oldest age group. Considering the estimation results and the changes in the population share of age groups they conclude that the aggregate labor force participation rate trend in the USA increases at a decreasing rate until 2002 and then decreases. Moreover, while for males aggregate trend is always decreasing; it is increasing at a decreasing rate for females.

Balleer et al. (2009) analyze labor force participation rate in Euro area using mainly twenty five years of 1983-2007 EU Labor Force Survey data. A similar model used by Fallick and Pingle (2007) is utilized separately for each gender. Final specification of the model is estimated for the five largest EU countries as aggregated and separately. According to the aggregated results of males age profile is found to be very similar between cohorts but younger cohorts enter the labor market later in the life-cycle. Participation increases until early thirties, relatively stable until early fifties and then decreases. Moreover, using the estimation results Balleer et al. tries to predict the aggregate labor force participation rate until 2030 in the five largest EU countries. They find that while participation rate of males decreases, participation rate of females increases at a decreasing rate until 2030. However, in 2030 there still remains a gap between the participation rate of males and females. Total labor force participation rate increases until 2015 but then starts to decrease.

Duval-Hernández and Romano (2009) analyze labor force participation, unemployment, formal and informal employment, and self-employment rates in urban Mexico using eighteen years 1987-2009 National Survey of Employment and Occupation data of Mexico. Informal employment is composed of salaried workers

working without any social security or medical coverage. Cohort analysis is used in the paper where age, cohort and time dummies are used as explanatory variables and for identification time effect is assumed to be orthogonal to time trend and average to zero. Analyses are conducted for each gender and three education levels separately.

For males, Duval-Hernández and Romano find that age effects at participation rates are similar among education levels but entry to the labor market is later at higher education levels. It is relatively stable until around age 50 and then decreases. Unemployment rate of males decreases until around age 30, and then relatively stable except for higher education group of which unemployment rate increases at older ages. Formal employment rate peaks around ages 25-30 at all education levels and then decreases. Moreover, formal employment rate increases with education in general. Age effect at informal employment rate of males exhibits a U shape profile; decreasing at younger ages, relatively stable at middle ages and then increasing after around mid fifties. Moreover, informal employment rate decreases with education in general. Self-employment rate increases with age at all education levels. For males while labor force participation rate is stable among cohorts at middle and higher education levels, it is decreasing for younger cohorts at elementary education level. Unemployment and informal employment rates increase and formal employment rate decreases towards younger cohorts at all education levels. Additionally, self-employment rate is relatively stable among cohorts at all education levels.

CHAPTER 3

DATA

In this thesis 2000-2007 Household Labor Force Survey micro level data of State Institute of Statistics is used. Sample is restricted to males between ages 15-65 who live in urban areas where an urban is defined as the places with at least 20000 populations.

Objective of the Household Labor Force Surveys is to obtain information on the topics such as economic activity, occupation, employment status and hours of work of employed people, and the occupations looked for by unemployed people with their unemployment duration. Surveys cover all the settlements in Turkey and the statistical units are households.

Household Labor Force Surveys are conducted since 1966 but the surveys until 1988 are not comparable with each other as a time-series due to geographical, definition, concept, variable and classification differences. After 1988 survey was revised to obtain data that is comparable as a time-series and with international data. From 1988 to 1999 survey was conducted in April and October of each year. In each implementation 11160 households were surveyed between the years 1988-1994 and about 15000 households between the years 1995-2000. In 2000 important changes were made in the application frequency, sample size, estimation dimension and questionnaire of the surveys. Sample size of a period (three months) was increased to 23000 and the surveys have been conducted monthly. Selected households have been followed for four periods and new questions were added to questionnaire. In 2004 number of questions was increased from 47 to 98 and the sample size of a period was increased to 23000. Finally, in 2005 number of questions was increased to 110.

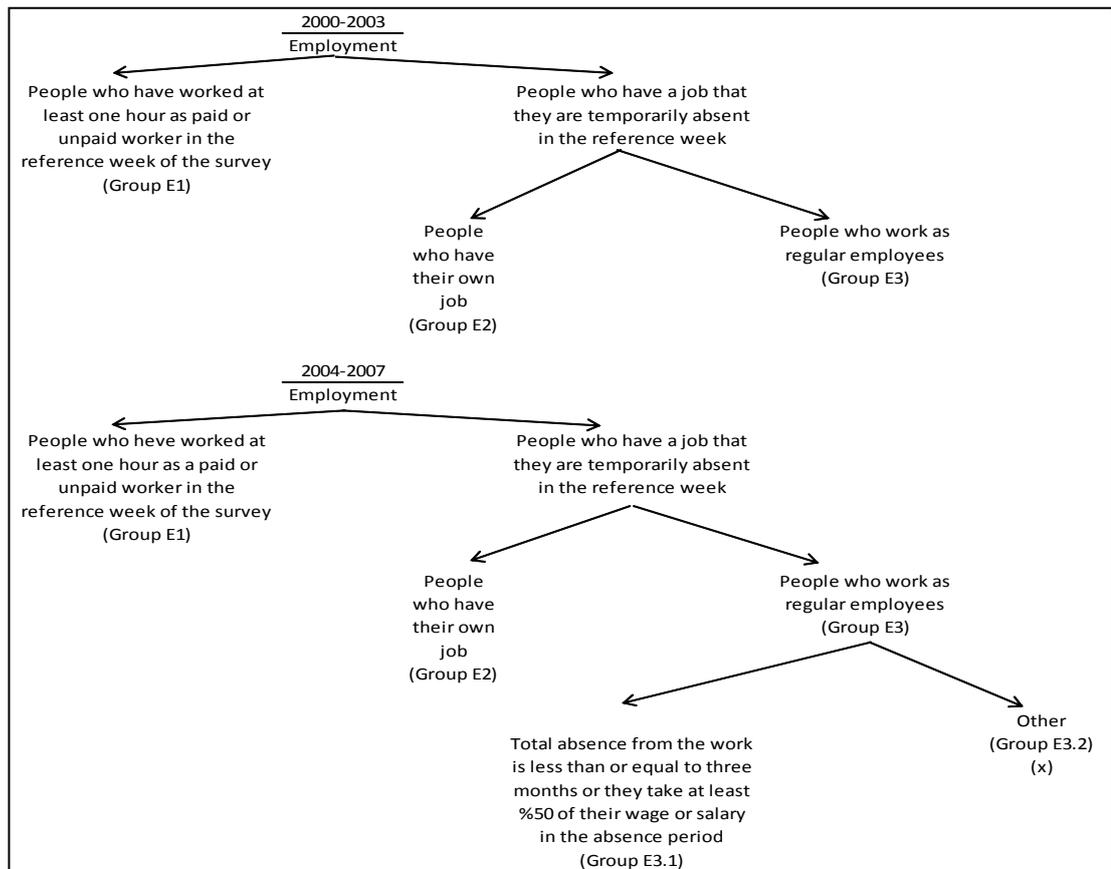
In the survey with the questions on employment, unemployment and inactivity people who are 15 years old or above are classified as employed, unemployed or non-participant. Employed people are asked the social security question “Are you registered with any social security institution related to your main job?”. In this

study, employed people who answer this question as “Yes” are classified as in formal sector and who answer this question as “No” are classified as in informal sector.

However, in 2004 State Institute of Statistics made some changes in the definition of employment and unemployment. As seen in Figure 3.1, before 2004 people are in employment if they worked at least one hour as paid or unpaid worker in the reference week (Group E1) or if they have a job that they are temporarily away which is their own job (Group E2) or where they work as regular employee (Group E3). After 2004 Group E3 is divided into two and while Group E3.1 was put in employment, Group E3.2 was put out of employment. So, after 2004 people in Group E3 are in employment if they will return to work within three months or they are taking at least 50% of their wage or salary.

Before 2004 people are in unemployment if in the last three months they have taken a step to look for a job and also will be able to start work within two weeks if opportunity exists (Group U1) or if they have found a job that they are waiting to start and also will be able to start work within two weeks if opportunity exists (Group U2) (Figure 3.2).

After 2004 Group U2 is separated into two groups and while people in Group U2.1 who will start work within three months are in unemployment, Group U2.2 is non-participant. Moreover, after 2004 a new group (Group U3) is added to unemployment. First part of this group is the people who have been looking for a job for at least a month but will not be able to start work within two weeks if opportunity exists. Because they have found a job that they are waiting to start and they will start this job within three months. Second part of this group is people who are not looking for a job for at least three months and also will not be able to start work within two weeks if opportunity exists. Because they have found a job that they are waiting to start and they will start this job within three months.



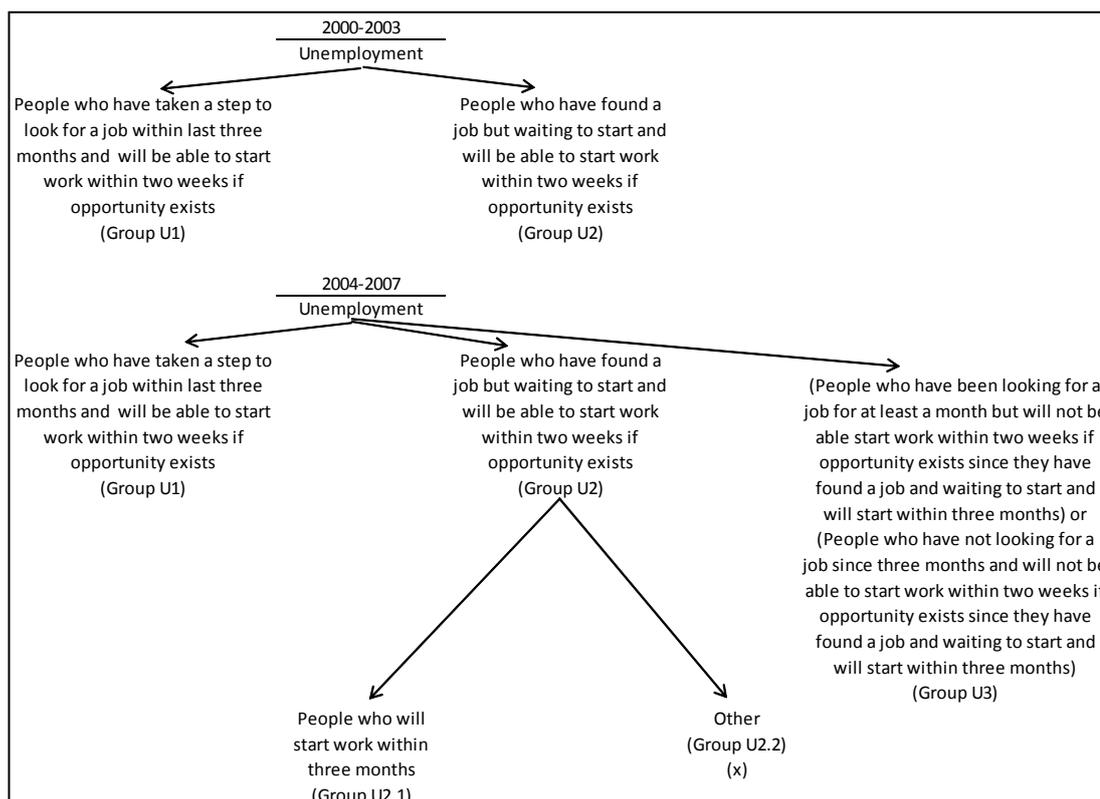
Reference Week: 1st week of each month starting with Monday, x: out of employment

Figure 3.1: Employment Definition of the State Institute of Statistics Before and After 2004

Source: 2008 Household Labor Force Survey Micro Level Data Information File of the State Institute of Statics; Labor Statistics Team of the State Institute of Statistics

In this study employment is composed of Group E1, E2 and E3 for 2000-2003 and Group E1, E2 and E3.1 for 2004-2007. Because there are not relevant questions in questionnaires to differentiate between Group E3.1 and E3.2, and because Group E3 is not asked the questions on unemployment and inactivity for 2000-2003 Group E3 must be included in employment totally for 2000-2003. Moreover, as Group E3.2 is not asked social security question for 2004-2007 it must be included out of

employment. Unemployment is composed of Group U1 and U2 for all years 2000-2007. So, unemployment definition is consistent for all years under consideration. Extent of the inconsistency in the employment definition before and after 2004 can be seen in Table 3.1 for urban males.



Reference week: 1st week of each month starting with Monday, x: non-participant

Figure 3.2: Unemployment Definition of the State Institute of Statistics Before and After 2004

Source: 2008 Household Labor Force Survey Micro Level Data Information File of the State Institute of Statics; Labor Statistics Team of the State Institute of Statistics

Number of observations in Group E3.2 and Group E4, people who have a job that they are temporarily away and where they work as unpaid family worker in this job, are given together as State Institute of Statistics does not give the relevant questions

to researchers to differentiate between these two groups. Inconsistency in employment definition stems from Group E3.2 that is included in employment for 2000-2003 but taken as out of employment for 2004-2007. However, compared to total employment, Group E3.2 together with Group E4 composes less than 0.003 of the total sample in each year. As this paper uses cohort analysis and the variables of interest are cohort-year averages, difference between employment definitions are not expected to have an important effect on the results. So, inconsistency in employment definitions between the two periods is ignored.

Table 3.1: Number of Observations in Employment Groups

Years	Group E1	Group E2	Group E3		Group E4	Total Urban Male
2000	46,558	226	553		2	49,339
2001	45,602	368	709		0	48,680
2002	43,939	389	468		0	46,798
2003	43,320	382	520		0	46,225
	Group E1	Group E2	Group E3.1	Group E3.2	Group E4	Total Urban Male
2004	63,686	813	641	319		67,463
2005	66,537	793	626	298		70,259
2006	67,302	930	630	317		71,185
2007	66,531	924	846	200		70,508

Group E4: People Who Have a Job That They Are Temporarily Away and Where They Work As Unpaid Family Worker

One of the key variables in cohort analysis is age. We have two data sets of the same observations. First data set covers 2000-2005 and age is single. However, this data set lacks the relevant variables to determine the labor market status of people. Second data set covers 2000-2007 and has the relevant variables to determine the labor market status of people but age is grouped in five year intervals. By merging the two data sets single age of individuals is obtained in the second data set for 2000-2005. To conduct the analyses on single ages a linear function of cohort-year averages obtained from the grouped age data is used to approximate the cohort-year averages of single ages. Performance of this method is controlled for 2000-2005 using the merged data set and seen that the method performs well enough. So, the method is generalized for the all sample period 2000-2007. Therefore, analyses that

use cohort-year averages of single ages for the period 2000-2007 are based on the values obtained by this method. Details on merging process and the method used to obtain single age values are given in Appendix A.

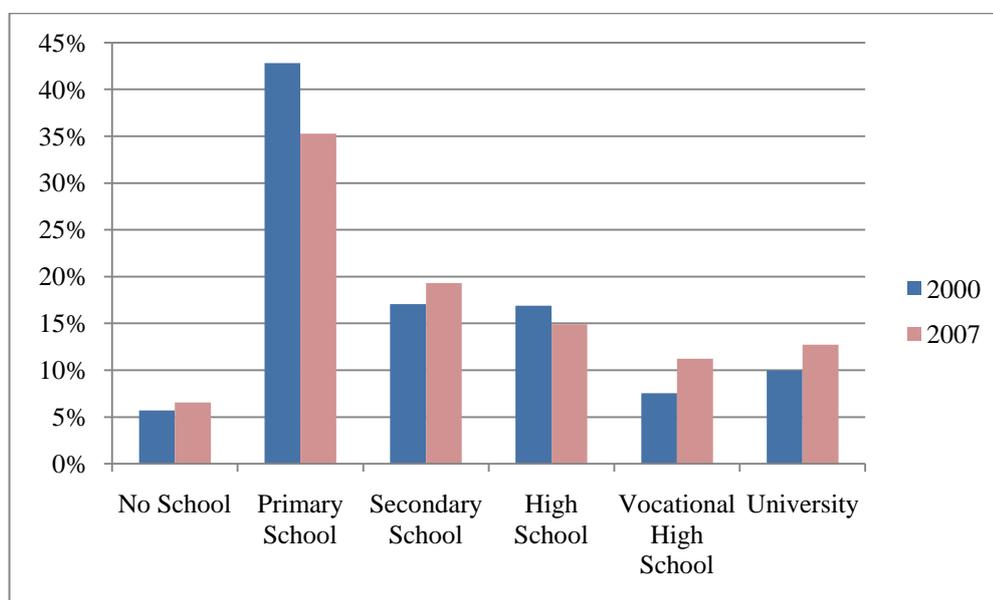


Figure 3.3: Educational Attainment of Urban Males for Ages 15 and Above

One of the most important factors that affect the labor market status of people is education. So, the analyses are also conducted for each education group separately. In the data last successfully completed education level is available for each individual and seven education levels are specified: literate; illiterate but not completed any educational institution; primary school; secondary school, vocational school at secondary school level or primary education which will be referred as secondary school after on; high school; vocational or technical high school which will be referred as vocational high school after on; higher education i.e. university, faculty or upper which will be referred as university after on. In this study literate and illiterate but not completed any educational institution categories are combined to one category “no school” to ease the analysis and interpretation of the results. Share of education groups among urban males at age 15 or above in 2000 and 2007 is given in Figure 3.3. As seen in the figure, primary school graduates have the largest share in both years; 35% in 2000 and 43% in 2007. Secondary and high

school graduates follow primary school graduates with 15% and 20% shares in 2000 and 2007 respectively. The smallest group is no school graduates with around 6% and 7% shares in 2000 and 2007 respectively. Between 2000 and 2007 while there is a decrease in the share of primary and high school graduates, there is an increase in the share of secondary school, vocational high school and university graduates. Moreover, in both years 11% of the sample was continuing to an education institution.

Total sample size of the study is 760190; sample size by education groups are given in Table 3.2.

Table 3.2: Sample Sizes

Education Group	Sample Size
No Sch.	57531
Primary Sch.	295,817
Secondary Sch.	140,798
High Sch.	110,806
Voc. High Sch.	72,595
Uni.	82,643
Total	760,190

Empirically analyzed variables are calculated for each cohort- year cell and they are labor force participation rate, employment rate calculated as total number of employed people divided by total population, unemployment rate, informal employment rate calculated as total number of informal worker divided by total number of employed people, share of informal employment in labor force calculated as total number of informal worker divided by total labor force, share of formal employment in labor force calculated as total number of formal worker divided by total labor force, share of informal employment in population calculated as total number of informal worker divided by total population, share of formal employment in population calculated as total number of formal worker divided by total population, share of unemployment in population calculated as total number of

unemployed divided by total population. Analyses for total sample cover eight years from 2000 to 2007, 39 cohorts who were born between the years 1955 and 1983, 46 ages from 17 to 62 and so 312 cohort-year cells.

Additionally, demographic variables such as marriage rate, having children rate of household heads, average number of children of household heads, urban/total population ratio (urbanization rate), average household size and average years of schooling which are calculated for each cohort-year cell are utilized to explain the results. Method to obtain single age values from grouped age data is not used for demographic variables and so they are analyzed for 2000-2005.

In Figures 3.4 through 3.6 aggregate labor force participation rate, employment rate, unemployment rate and informal employment rate are given. While participation rate has a decreasing trend in the first period, it relatively stable in the second period. On the other hand, employment rate has a decreasing trend in the both periods. Informal employment and unemployment rate are relatively stable in the first period but they have an increasing trend in the second period. Particularly informal employment rate increases from around 29% to 35% between 2000-2004 and in 2007 it is around 33%. Unemployment rate increases rapidly from around 8% to 13% between 2000-2002 and in 2007 it is around 11%.

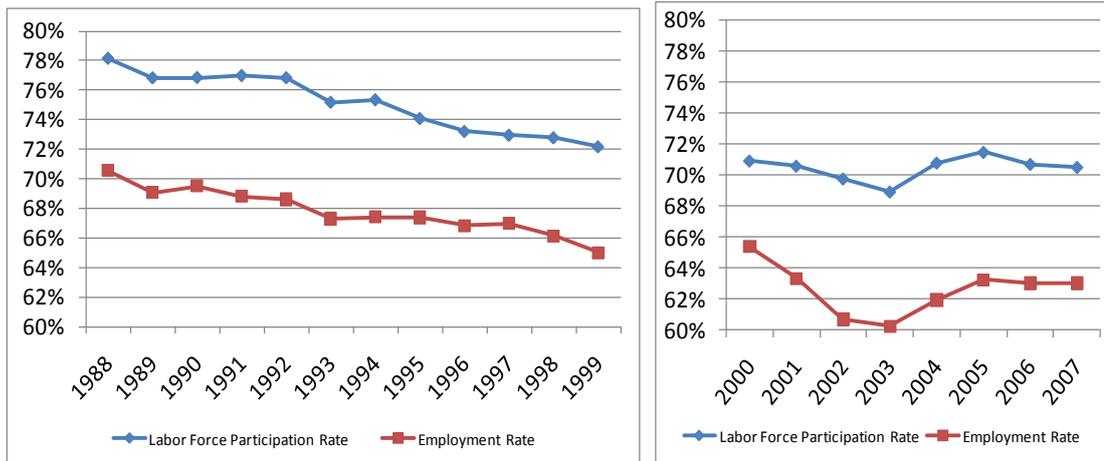


Figure 3.4: Labor Force Participation and Employment Rates over Years

Source: Data Obtained from the State Institute of Statistics by Information Demand

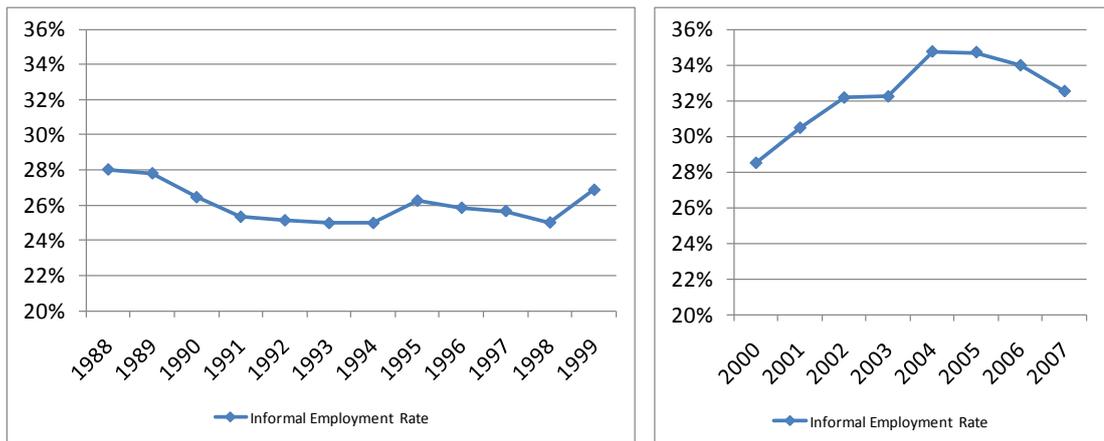


Figure 3.5: Informal Employment Rate over Years

Source: Data Obtained from the State Institute of Statistics by Information Demand

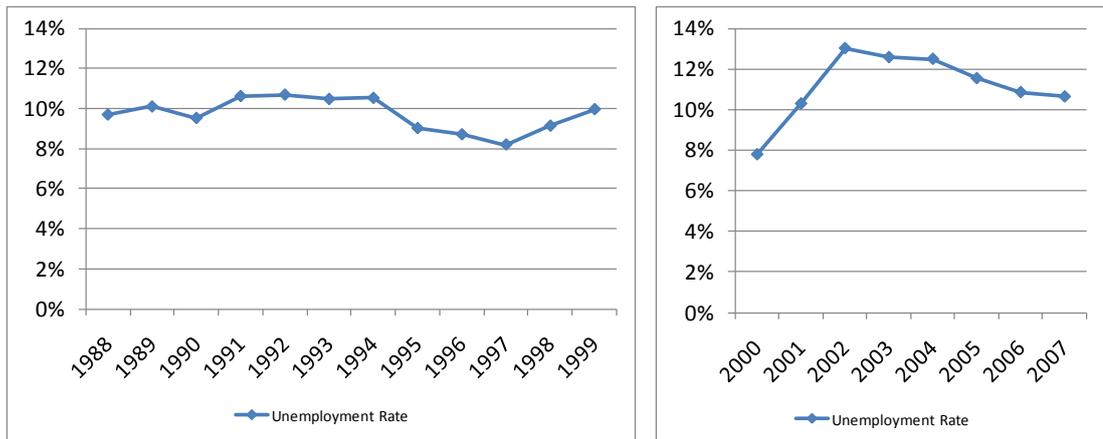


Figure 3.6: Unemployment Rate over Years

Source: Data Obtained from the State Institute of Statistics by Information Demand

For total sample descriptive statistics of the analyzed variables are given in Table 3.3. As seen in the table, mean labor force participation rate is 77%. Maximum labor force participation rate 96% occurs for the 1967 born cohort at age 37 and the minimum labor force participation rate 25% occurs for the 1945 born cohort at age 62. So, as can be expected maximum labor force participation rate occurs at a middle age and the minimum labor force participation rate occurs at the oldest age. Mean unemployment rate is 10% where the maximum unemployment rate 25% arises for the 1981 born cohort at age 22 and the minimum unemployment rate 4% arises for the 1978 born cohort at age 42. Mean employment rate is 69% with a maximum of 91% for the 1963 born cohort at age 27 and a minimum of 23% at the same cell with the minimum of labor force participation. Mean informal employment rate is 33%; highest informal employment rate 70% occurs at the same cell with the minimum of labor force participation rate and the lowest informal employment rate 18% occurs at the same cell with the minimum of unemployment rate.

Table 3.3: Descriptive Statistics of the Variables

Variable	Obs.	Mean	Std. Dev.	Min	Max
Labor Force Participation Rate	312	0.77	0.20	0.25	0.96
Unemployment Rate	312	0.10	0.04	0.04	0.25
Employment Rate	312	0.69	0.19	0.23	0.91
Informal Employment Rate	312	0.33	0.12	0.18	0.70
Share of Informal Employment in Labor Force	312	0.29	0.10	0.17	0.65
Share of Formal Employment in Labor Force	312	0.60	0.12	0.26	0.78
Share of Informal Employment in Population	312	0.21	0.03	0.14	0.28
Share of Formal Employment in Population	312	0.49	0.19	0.07	0.73
Share of Unemployment in Population	312	0.08	0.03	0.02	0.17
Marriage Rate	234	0.79	0.29	0.01	0.98
Having a Child Rate	234	0.61	0.29	0.00	0.95
Average Number of Number of Children	234	0.55	0.37	0.00	1.19
Urbanization Rate	234	0.63	0.04	0.52	0.73
Average Household Size	234	4.51	0.40	3.43	5.54
Average Years of Schooling	234	6.32	1.06	3.65	8.22

Mean marriage rate is 79% with a maximum of 98% for the 1957 born cohort at age 48 and a minimum of 1% for the youngest cohort at the youngest age. Variables related to children can only be analyzed for household heads. Children are defined as the people at age less than 17 and living in the same household with the head of household. Children of other household members or children who are not living in the same household with the head of household cannot be detected in the data. Mean having children rate is 61% with a maximum of 95% for the 1968 born household heads at age 37 and a minimum of 0% for the latest born household heads at the youngest age. Average number of children is 0.55 with a maximum number of 1.19 for the 1964 born household heads at the same age with the maximum of having children. Mean urbanization rate is 63% and the highest rate occurs for the 1981 born cohort at age 21. Minimum urbanization rate occurs for the oldest cohort at age 56. Average household size is 4.51 with a minimum of 3.43 years for the oldest cohort at age 58 and a maximum of 5.54 for the youngest cohort at the youngest age. This may stem from the fact that the maximum household size occurs at the households that have young children living with them. In the data only last successfully completed

education institution is available. Therefore, years of schooling is calculated as the years needed to complete the last successfully completed institution under regular conditions. Average year of schooling is 6.32 years with a maximum of 8.22 years for the 1982 born cohort at age 2 and a minimum of 3.65 years for the oldest cohort at the oldest age.

CHAPTER 4

CROSS SECTION ANALYSIS

In this section 2000 and 2007 cross section profiles are analyzed for total sample and for each education group separately. Cross section profiles include both the effect of age and cohort. Therefore in case of strong cohort effects cross sections profiles do not give the true life-cycle profiles. Nevertheless, examining cross section profiles can give a general idea on the variables and the age profiles.

As mentioned before 2000-2007 single age values are obtained by the method explained in Appendix A.

4.1. Cross Section Profiles for Total Sample

As given in Figure 4.1.1 labor force participation rate exhibits a hump shaped cross section profile; increasing until age 27, relatively stable until age 42 and then decreasing. At age 17 labor force participation rate is around 35%, increases to more than 90% at age 27 and then decreases to less than 30% at age 62. When 2000 and 2007 cross section profiles are compared it can be seen that they are almost the same but the 2007 profile is steeper at young and old ages.

Cross section labor force participation rate profile in the largest twelve European countries EU12 (Balleer et al., 2009, p. 35) and the USA (Fallick and Pingle, 2007) also have similar shapes. However, profile of the EU12 increases until age around 31, stable until age around 56 and then decreases. In the USA as well labor force participation rate starts to decrease at ages around 50-54. So, according to the cross section profiles old age people in Turkey drop out the labor force earlier than the EU12 and the USA.

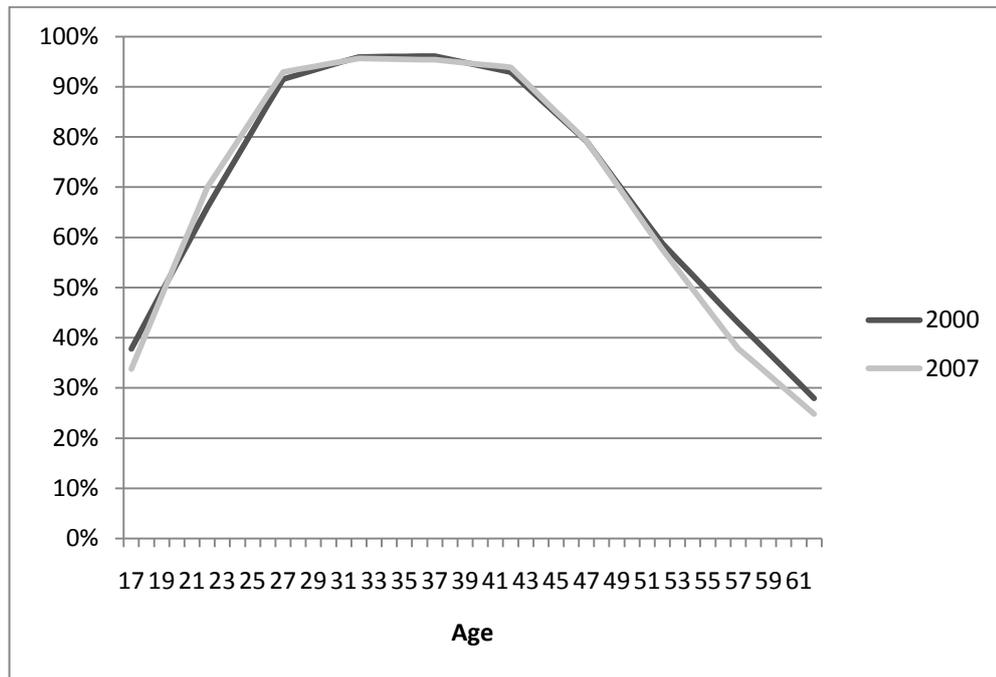


Figure 4.1.1: Labor Force Participation Rate Cross Section Profiles for Total Sample

Employment rate has very similar profiles with the labor force participation rate (Figure 4.1.2). In 2007, it increases from 26% at age 17 to 83% at age 27, relatively stable until age 42 and then decreases to 23% at age 62. Nevertheless, labor force participation rate is more stable than employment rate at middle ages. When 2000 and 2007 employment rate profiles are compared; 2007 profile is lower at middle and older ages on average 1%.

Cross section unemployment rate profiles are given in Figure 4.1.3. As seen in the figure unemployment rate decreases sharply at young ages and relatively stable at middle and old ages. In 2007 unemployment rate is 21% at age 17, decreases to 7% at age 37 with a steeper slope until age 27, and then exhibiting a flat concave profile reaches at 8% at age 62. When 2000 and 2007 cross section profiles are compared; unemployment rate is higher in 2007 at all ages on average 3%. This may be due to cyclical effects or time trend as well as cohort differences between the two years.

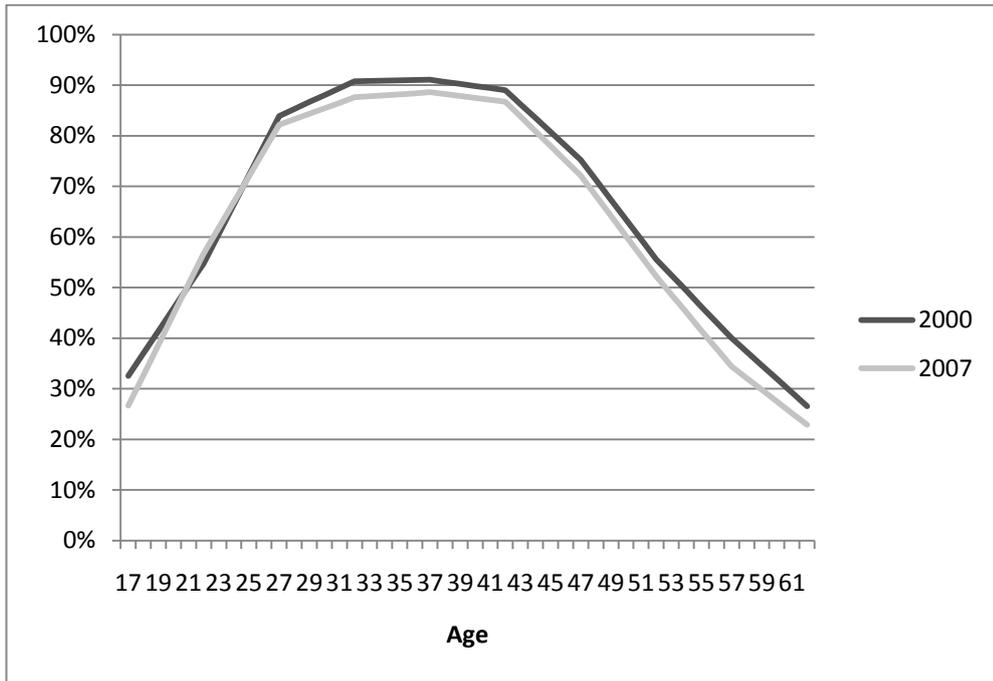


Figure 4.1.2: Employment Rate Cross Section Profiles for Total Sample

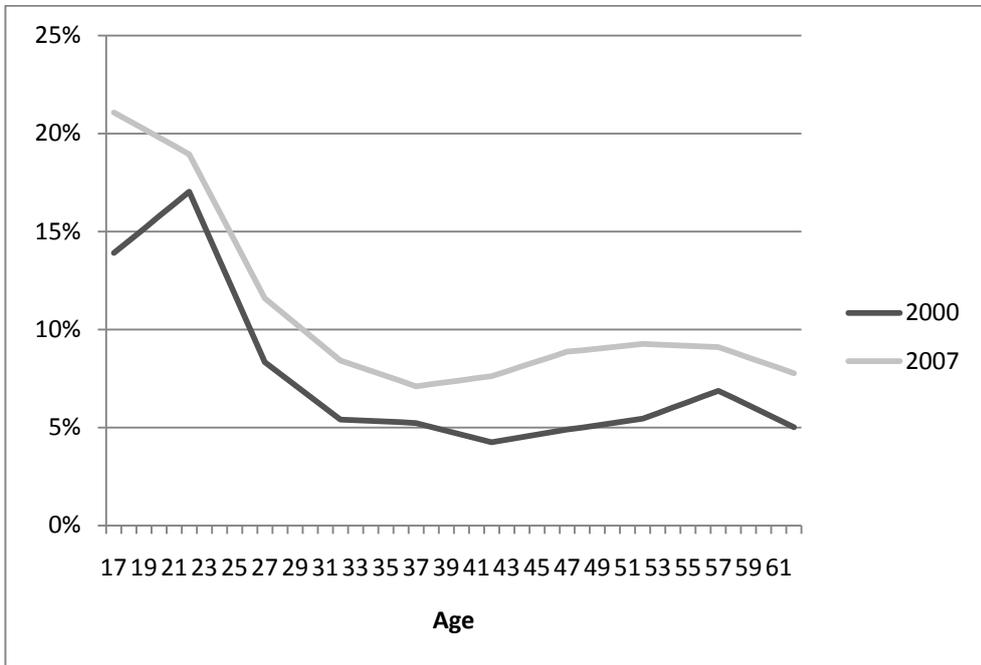


Figure 4.1.3: Unemployment Rate Cross Section Profiles for Total Sample

Informal employment rate cross section profiles exhibit a U shape as given in Figure 4.1.4. In 2007 informal employment rate is 75% at age 17, decreases sharply to 27% at age 27, relatively stable until age 42 and increases sharply to 70% at age 62. When 2000 and 2007 profiles are compared; informality increases in 2007 and the difference increases towards older ages particularly after early thirties. Cohort effect may have caused such a change in the profiles; younger cohorts may have more tendencies to work in informal sector but this tendency may be decreasing towards younger cohorts. There may also be time effect that is specific to old age groups. A policy change that causes older workers pass from formality to informality may also cause such a shift.

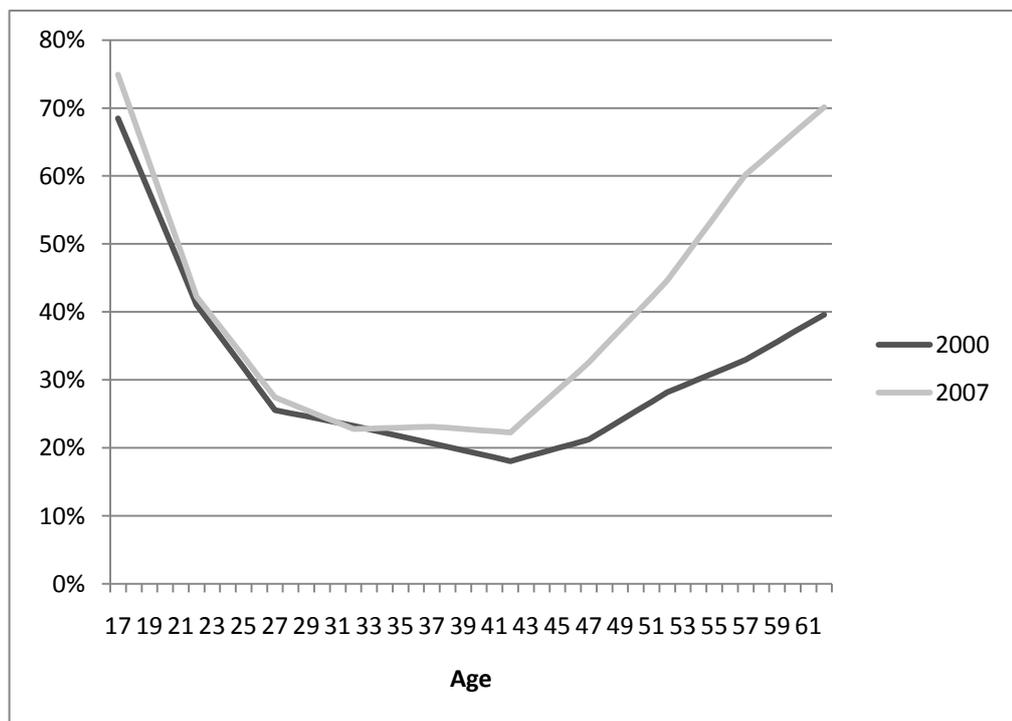


Figure 4.1.4: Informal Employment Rate Cross Section Profiles for Total Sample

Share of informal employment in labor force has a similar profile with informal employment rate as seen in Figure 4.1.5. However, share of informal employment in

labor force is at a lower level than informal employment rate at all ages as it also includes unemployment in the denominator.

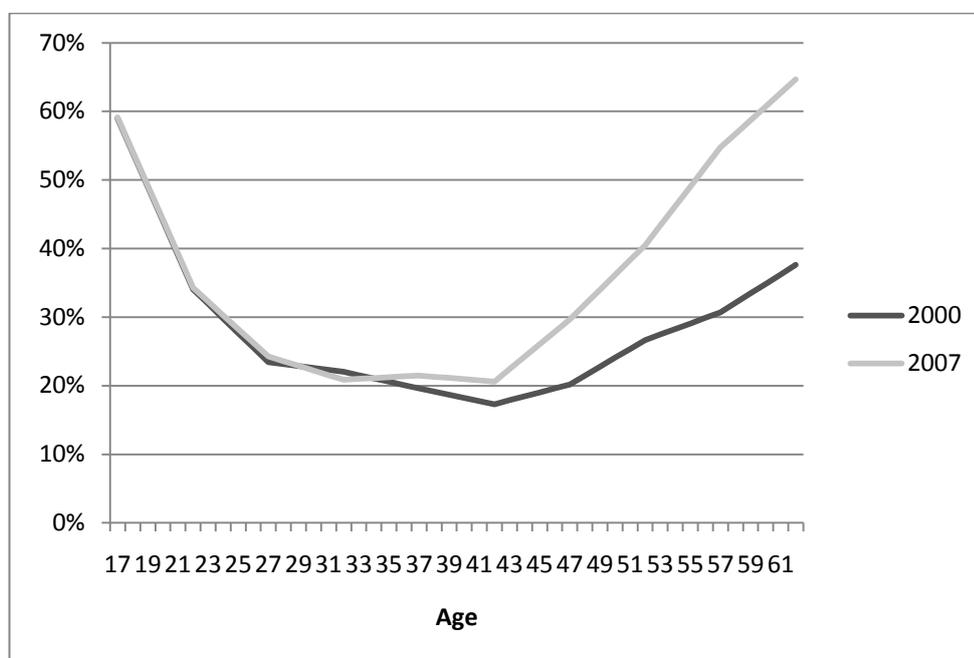


Figure 4.1.5: Share of Informal Employment in Labor Force Cross Section Profiles for Total Sample

Share of formal employment in labor force is 20% at age 17, increases to 65% at age 27 and 72% at age 42, and then decreases to 29% at age 62 (Figure 4.1.6). It changes in the opposite of informal employment rate and the share of informal employment in labor force..

Share of informal employment in population has a different profile as given in Figure 4.1.7. In 2007 share of informal employment in population is 20% at age 17, increases to 24% at age 22, decreases to 20% at age 42, increases to 23% at age 47 and then decreases to 16% at age 62. Different from 2007 profile, 2000 profile is monotonically decreasing. Different profiles between the two years for the ages 17-22 may be related to different profiles in unemployment between two years. While cross section unemployment profile in 2007 decreases between the ages 17-22, it

increases in 2000 at the same ages. There may have been a transition from unemployment to informality in recent years which did not exist in former years.

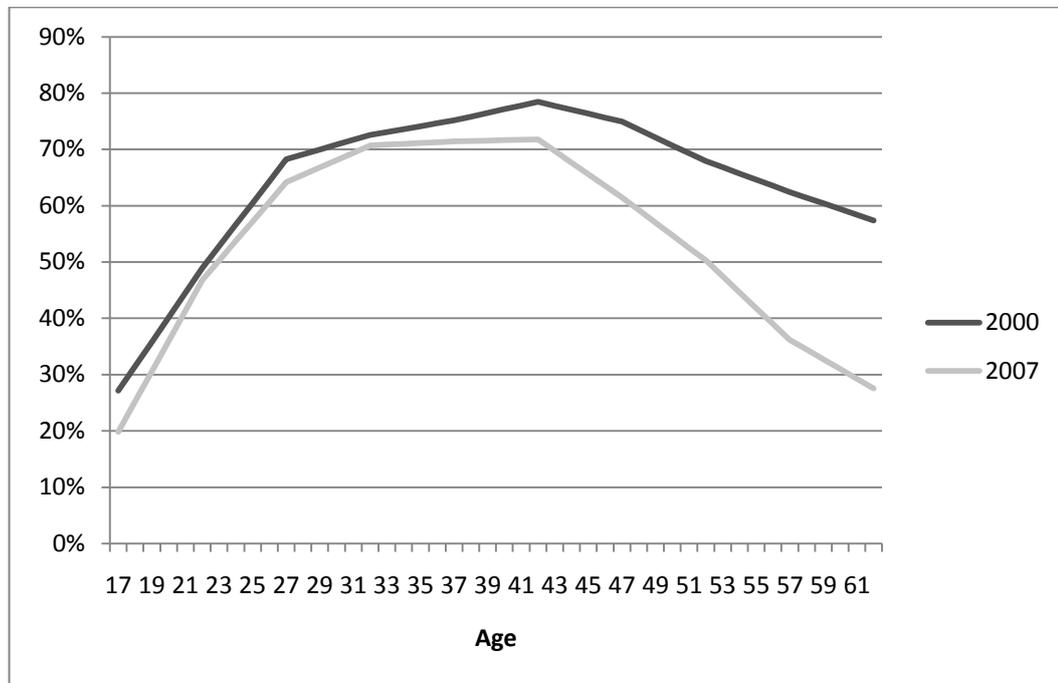


Figure 4.1.6: Share of Formal Employment in Labor Force Cross Section Profiles for Total Sample

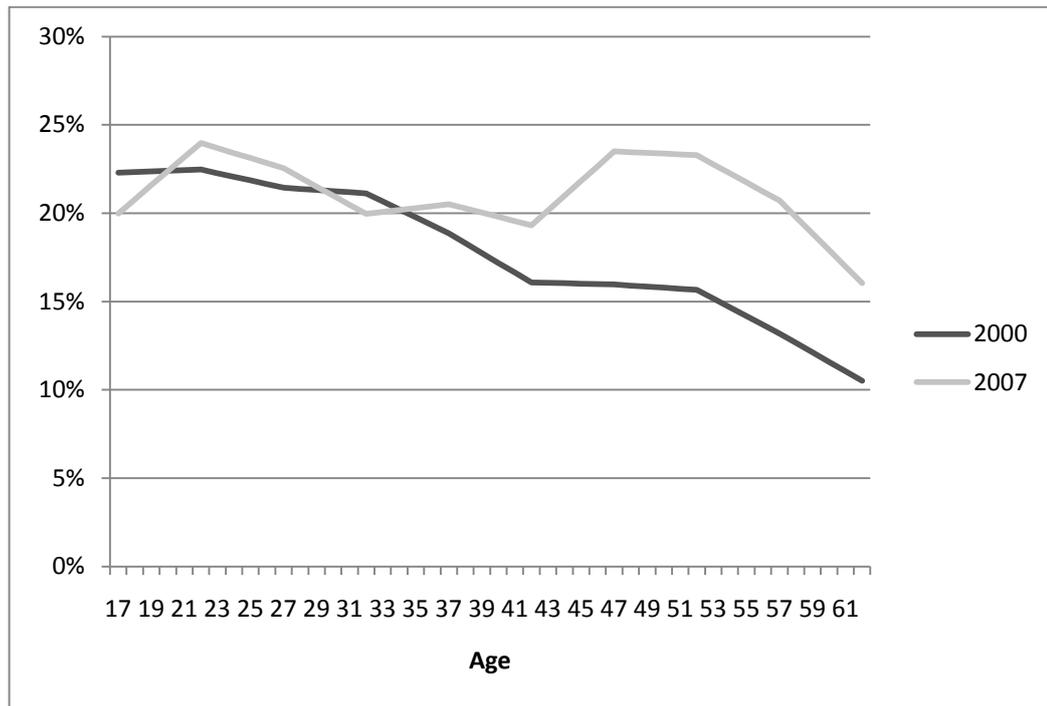


Figure 4.1.7: Share of Informal Employment in Population Cross Section Profiles for Total Sample

Cross section profiles of the share of formal employment in population exhibit a hump shape as seen in Figure 4.1.8. In 2007 it increases sharply from 7% at age 17 to 67% at age 32 with a steeper slope until age 27. It is relatively stable until age 42 and then decreases sharply to 7% at age 62. Compared to 2000, in 2007 formality is lower at all ages and the difference increases towards older ages. This may be related to the increases in informal employment rate at older ages in 2007.

When employment rate, share of informal employment in population and share of formal employment in population are considered together while share of informal employment in population is in a decreasing trend towards older ages, share of formal employment in population has a similar profile with employment rate. So, it may be concluded that changes in employment rate mainly stems from the changes in the formal employment rate.

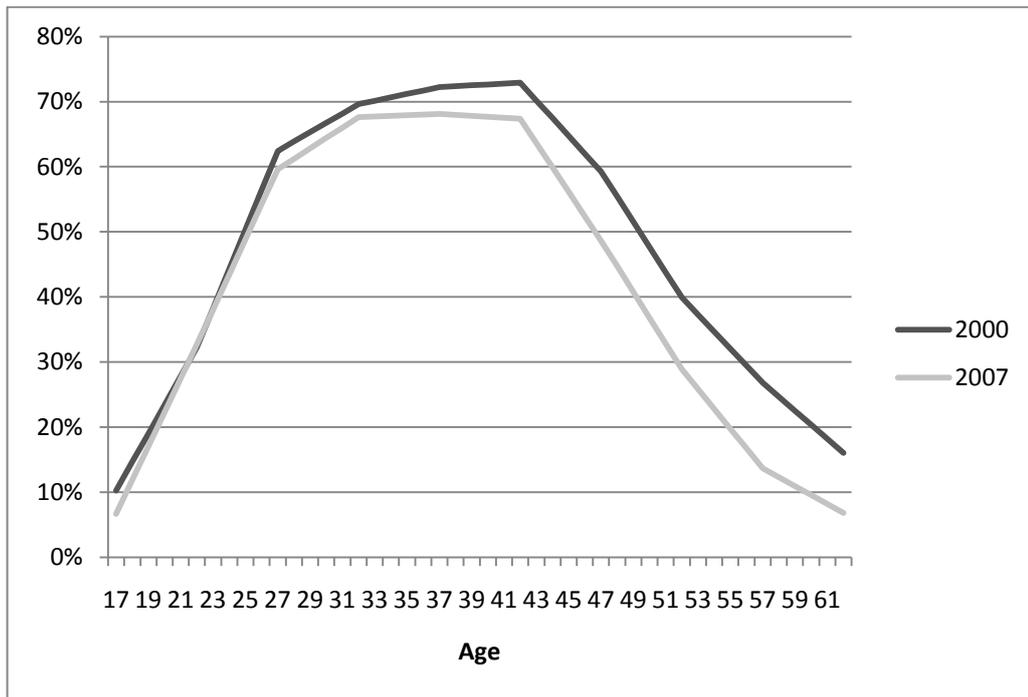


Figure 4.1.8: Share of Formal Employment in Population Cross Section Profiles for Total Sample

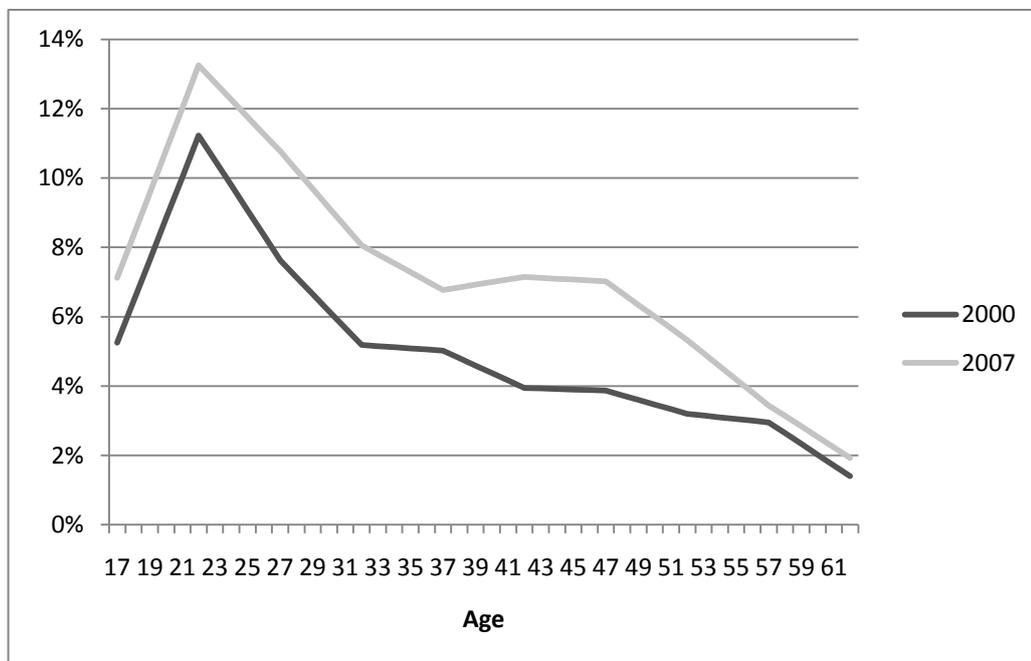


Figure 4.1.9: Share of Unemployment in Population Cross Section Profiles for Total Sample

As seen in Figure 4.1.9, in 2007 share of unemployment in population increases from 7% at age 17 to 13% at age 22, decreases to 7% at age 37, relatively stable until age 47 and then decreases to 20% at age 62. When 2000 and 2007 profiles are compared; share of unemployment in population is higher in 2007 at all ages but the difference is lower at the start and end of the profile.

When the 2007 profiles are considered together labor force participation rate, employment rate, informal employment rate and the share of informal employment in labor force increase until age 27, relatively stable until age 42 and then decrease. Share of formal employment in labor force and the share of formal employment in population increase until age 32 with a steeper slope until age 27, relatively stable until age 42 and then decrease. Unemployment rate decreases until age 37 with a steeper slope until age 27, increases until age 57 and then decreases. Share of informal employment in population increases until age 22, decreases until age 42, increases until age 47 and then decreases. Share of unemployment in population increases until age 22, decreases until age 37, stable until age 47 and then decreases. As it is stated there are some critical ages on the cross section profiles that point certain trends over the ages.

When 2000 and 2007 profiles are compared; there is increase in unemployment rate at all ages and in informal employment rate particularly at older ages. Between 2000 and 2007 profiles both cohort and year change. Increase in unemployment and informality may stem from attributes of cohorts as well as time trend or cyclical effects which is particularly effective at older ages in case of informality.

4.2. Cross Section Profiles by Education Groups

In this section cross section profiles of each variable analyzed for total sample in the previous section will be presented for the six each education groups separately. Each education group is named with the largest education level included in this group and which education levels are included in each education group is explained in Data.

Labor force participation rate cross section profiles by education groups are given presented in Figure 4.2.1. When 2007 profiles are compared between the education groups; no school graduates have lower labor force participation rate than other groups at young and middle ages; about 25% less than other groups when labor force participation rate peaks. No school graduates have lower opportunity cost of non-participating and also this group may be living in larger households with other breadwinners which may lead to low participation rate. Profiles of the no school graduates and the other education groups get closer at older ages as the other education groups retire. Since no school graduates have higher informality rate, they mostly cannot retire and should have to continue working at older ages.

Other education groups have similar labor force participation rate profiles between each other except at the beginning of the profile and the high labor force participation rate of university graduates at older ages. Until around age 32 high school graduates have lower labor force participation rate. This is expectable as an important portion of this group studies in the university or for the university entrance exams. However, this is not the case for vocational high school graduates and they enter the labor force earlier compared to high school graduates. Moreover, except for high school graduates, lower educated groups reach their maximum participation rate earlier. When 2000 and 2007 cross section profiles are compared; only no school graduates have a different pattern of change between the two years. In 2007 labor force participation rate of no school graduates is higher than 2000 until age 27 and lower than 2000 for older ages. There may be negative trend for no school graduates as higher educated people are expected to be demanded more by the time.

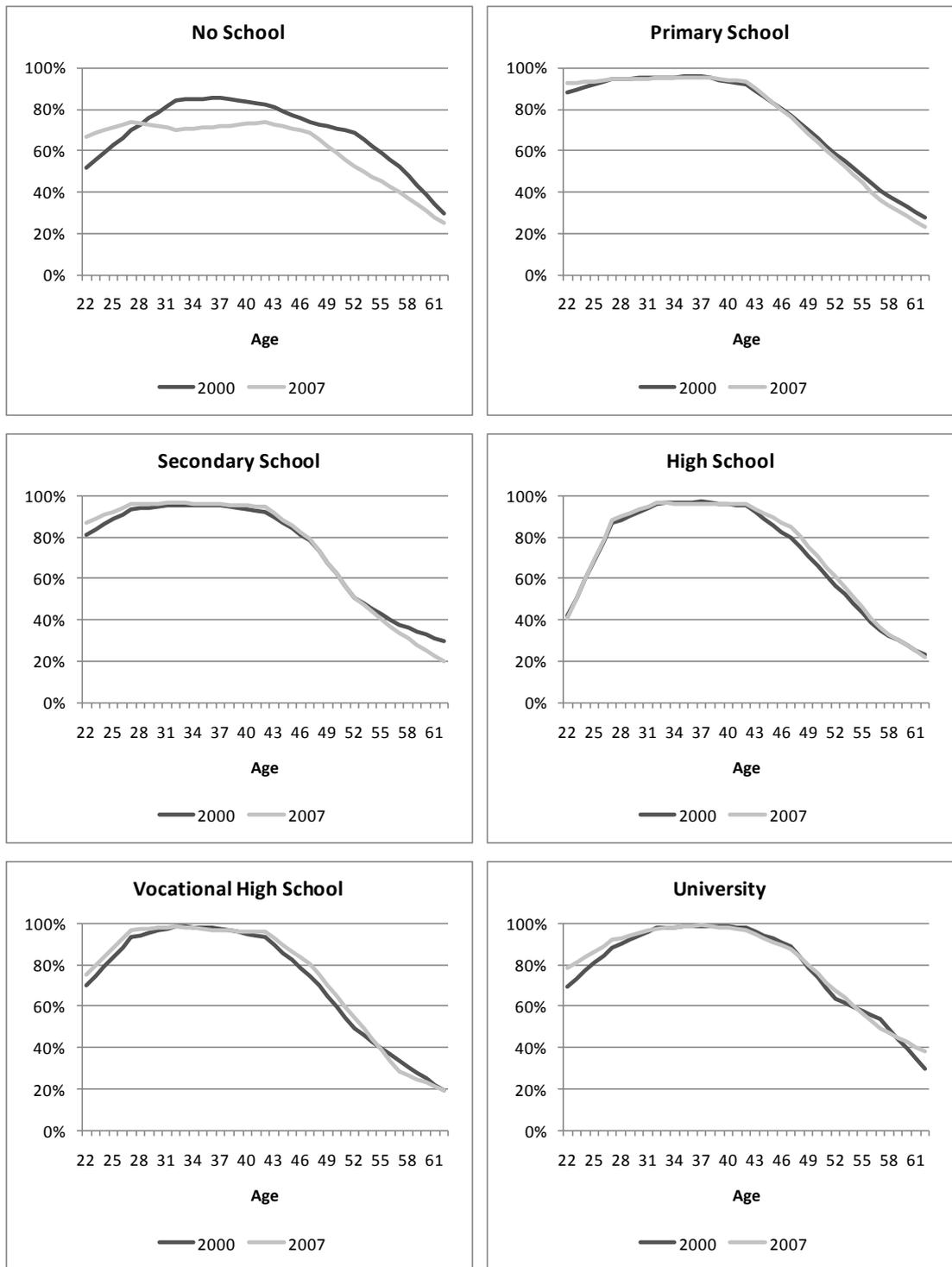


Figure 4.2.1: Labor Force Participation Rate Cross Section Profiles by Education Groups

According to the cross section profiles labor force participation rate in Turkey peaks earlier than Germany which peaks at ages around forties (Fitzenberger et al., 2004, p. 107). At age 25, low skilled males in Germany who are comparable with secondary school graduates or lower educated groups in Turkey have around 30% lower participation rate than Turkey. On the other hand, medium skilled males who are comparable with vocational high school graduates in Turkey have similar level of participation rate. High skilled males who are comparable with university graduates in Turkey have around 91% labor force participation rate at age 25 which is 2-3% more than Turkey. At age 55, labor force participation rate in Germany is higher than 80% at all skill levels which is at least 23% more than Turkey at any skill level.

Employment rate by education groups has similar profiles with the labor force participation rate as seen in Figure 4.2.2. However, higher employment of university graduates is more evident in employment as they have lower unemployment rate compared to other groups. Employment rate peaks earlier in Turkey compared to Germany which peaks at early forties at all skill levels (Fitzenberger et al., 2004, p. 109). Compared to secondary school graduates and lower educated groups in Turkey, low skilled males in Germany have around 20% less employment rate at age 25. On the other hand, medium skilled males have around 10% higher employment rate compared to vocational high school graduates in Turkey. Moreover, high skilled males have around 14% more employment rate compared to university graduates in Turkey. At age 55, employment rate in Germany is around 10% more than Turkey at any skill level.

Unemployment rate for each education group is given in Figure 4.2.3. As seen in the figure, in 2007 no school graduates have the highest unemployment rate which is on average 10% more than other education groups. It is around 20-25% until age 47 and then decreases to 13% at age 62. In 2007, except for no school graduates other groups have 15-25% of unemployment rate at age 22 which decreases to 0-10% at middle ages and exhibits a relatively stable profile after middle ages. However, profile of vocational high school graduates increases at older ages remarkably different from other groups. Although university graduates have very high

unemployment rate at young ages, they have the lowest unemployment rate after age 30. Unemployment rate generally decreases with education and the vocational high school graduates have lower unemployment rate than high school graduates. Unemployment rate increases in 2007 compared to 2000 and the increase gets smaller with education in general. Increase in 2007 is particularly pronounced for no school graduates. Increase of unemployment rate in 2007 may stem from cyclical effects as well as trend and cohort effects. Nevertheless, lower educated groups must be affected more from these effects more.

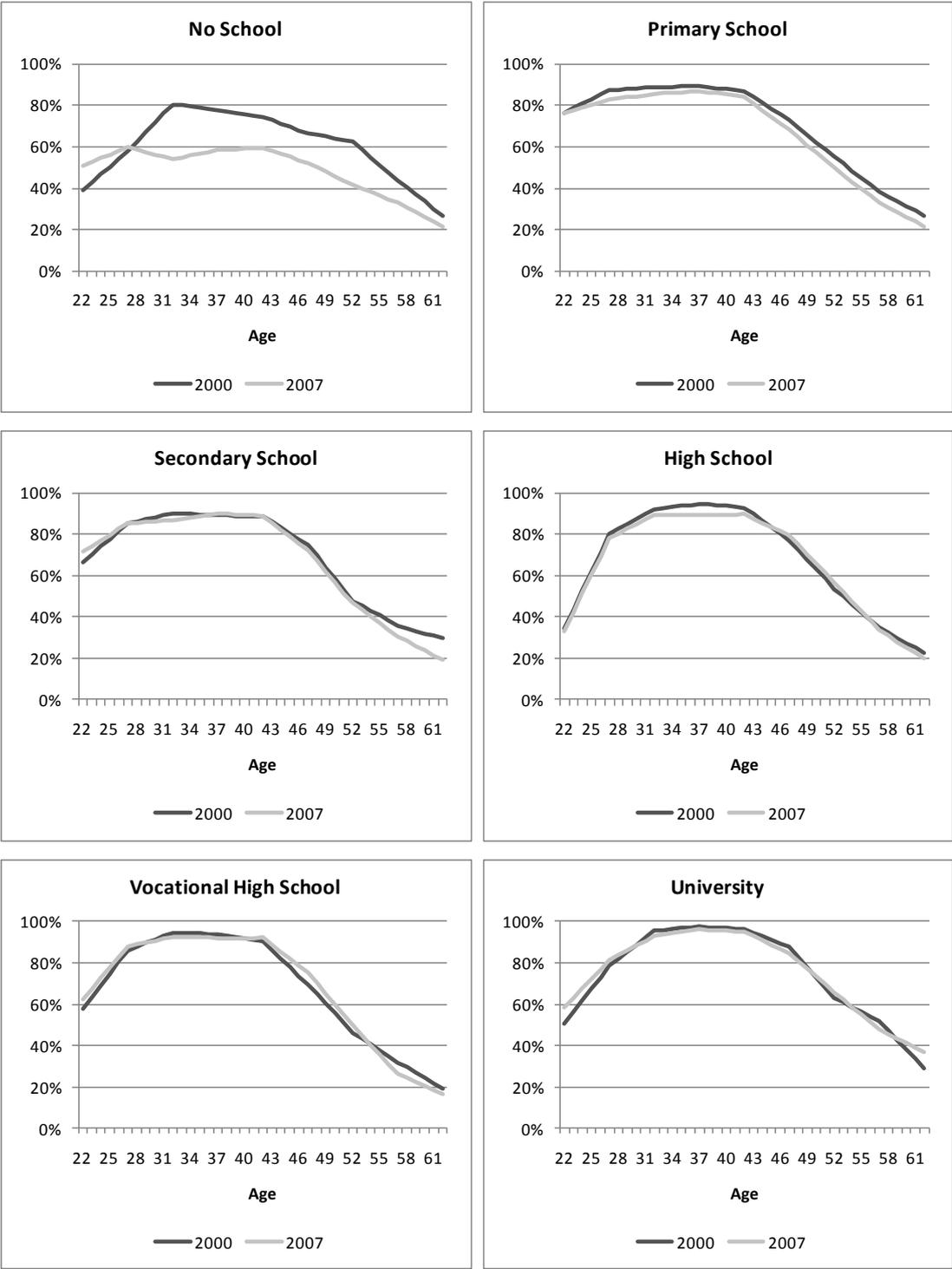


Figure 4.2.2: Employment Rate Cross Section Profiles by Education Groups

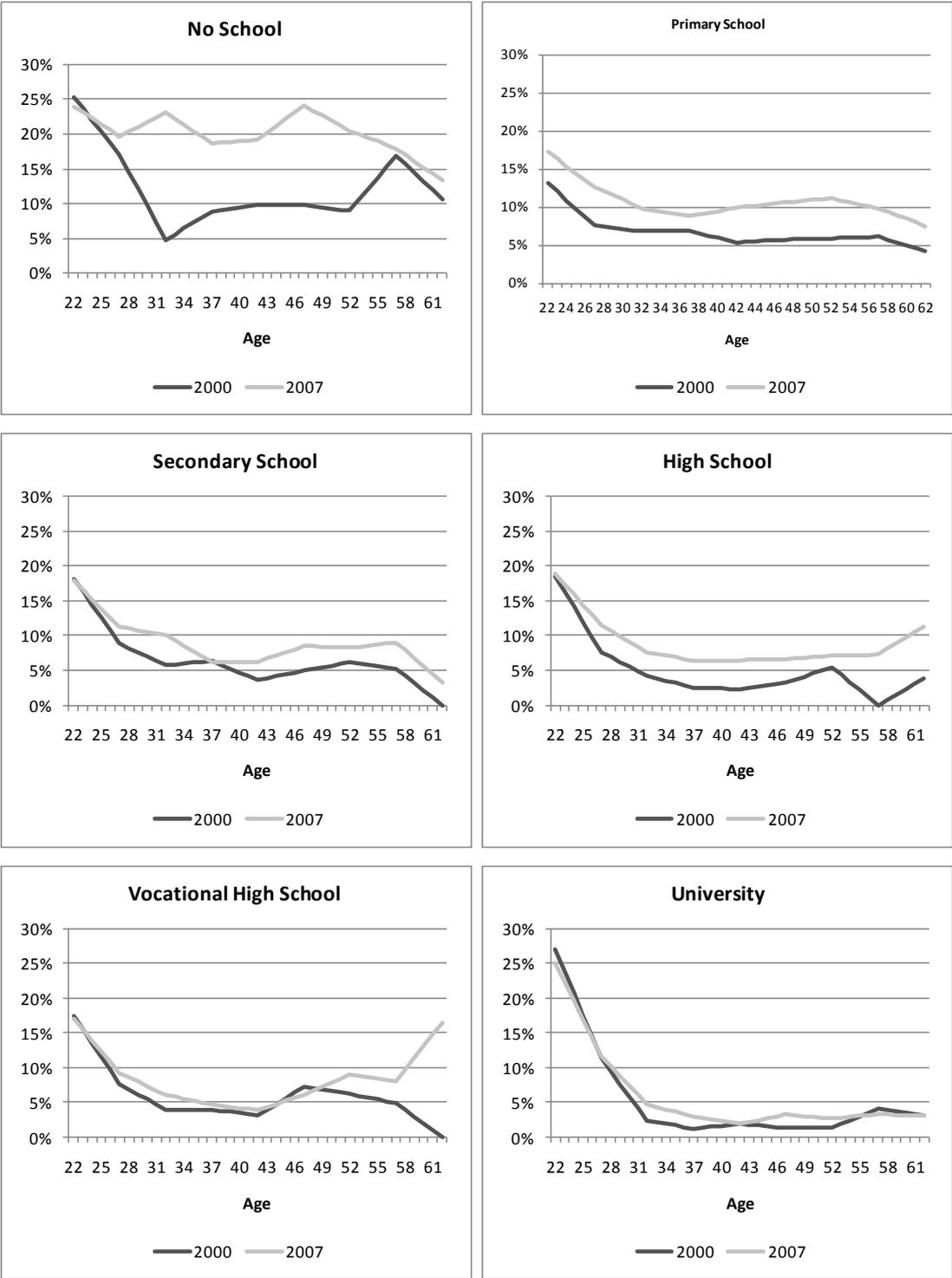


Figure 4.2.3: Unemployment Rate Cross Section Profiles by Education Groups

Informal employment rate by education groups is given in Figure 4.2.4 and it is very clear that informality decreases with education. Informal employment rate particularly highest for no school graduates and the informal employment rate of other education groups are on average 30-60% less than no school graduates. When 2000 and 2007 profiles are compared; similar changes are observed with total sample for each education group except for no school graduates. While increase in informal employment rate in 2007 is rather noticeable for older ages at other education groups, it is evident at all ages for no school graduates. Average increase in informal employment rate between 2000 and 2007 is 14% for primary and no school graduates, 11% for high school and vocational high school graduates and 9% for university graduates.

Share of informal employment in labor force has a very similar profile with informal employment rate (Figure 4.2.5). However, increase in the share of informal employment in labor force from 2000 to 2007 is less than the increase in informal employment rate as unemployment rate also increases from 2000 to 2007. This is particularly evident for no school graduates.

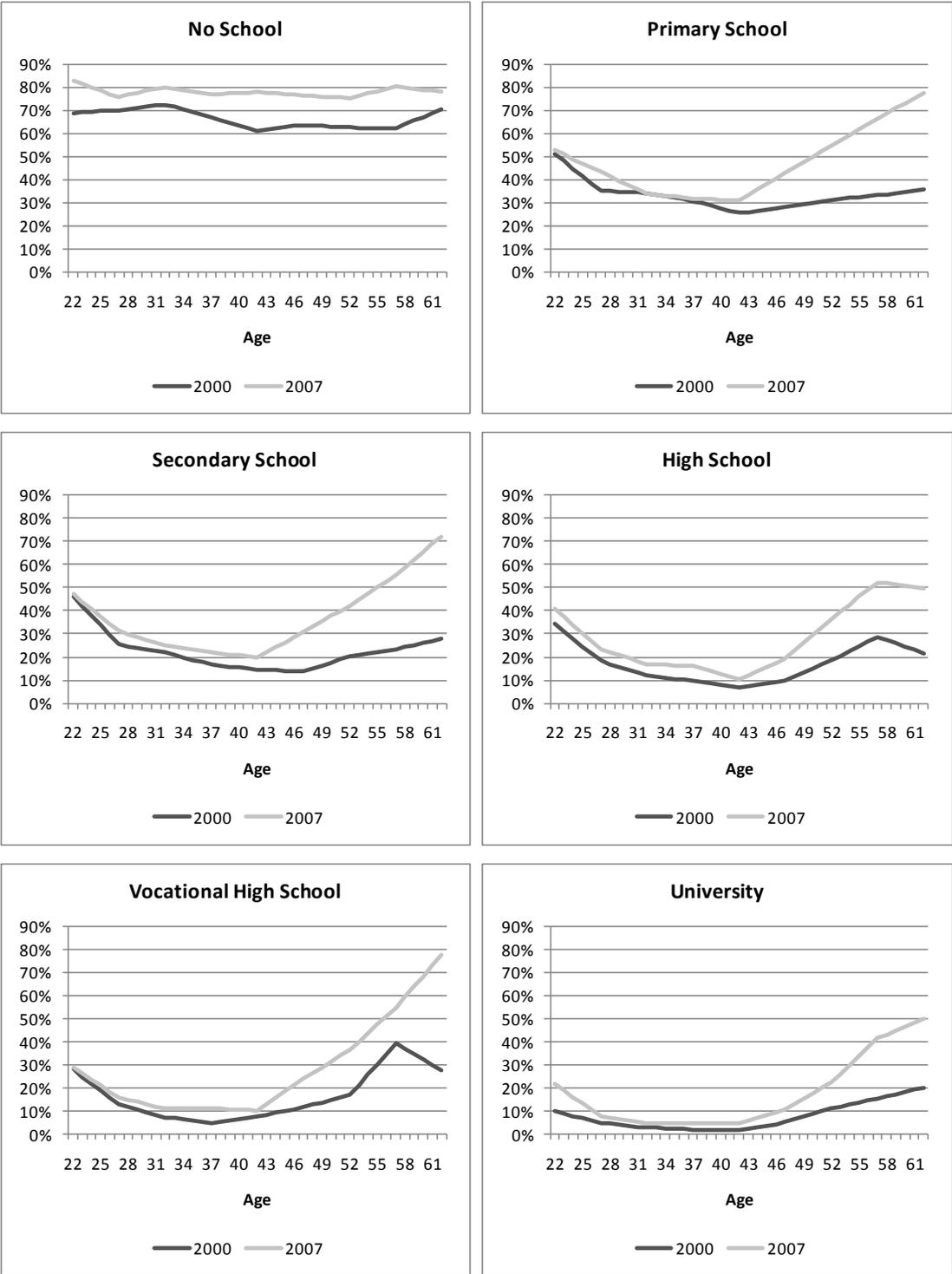


Figure 4.2.4: Informal Employment Rate Cross Section Profiles by Education Groups

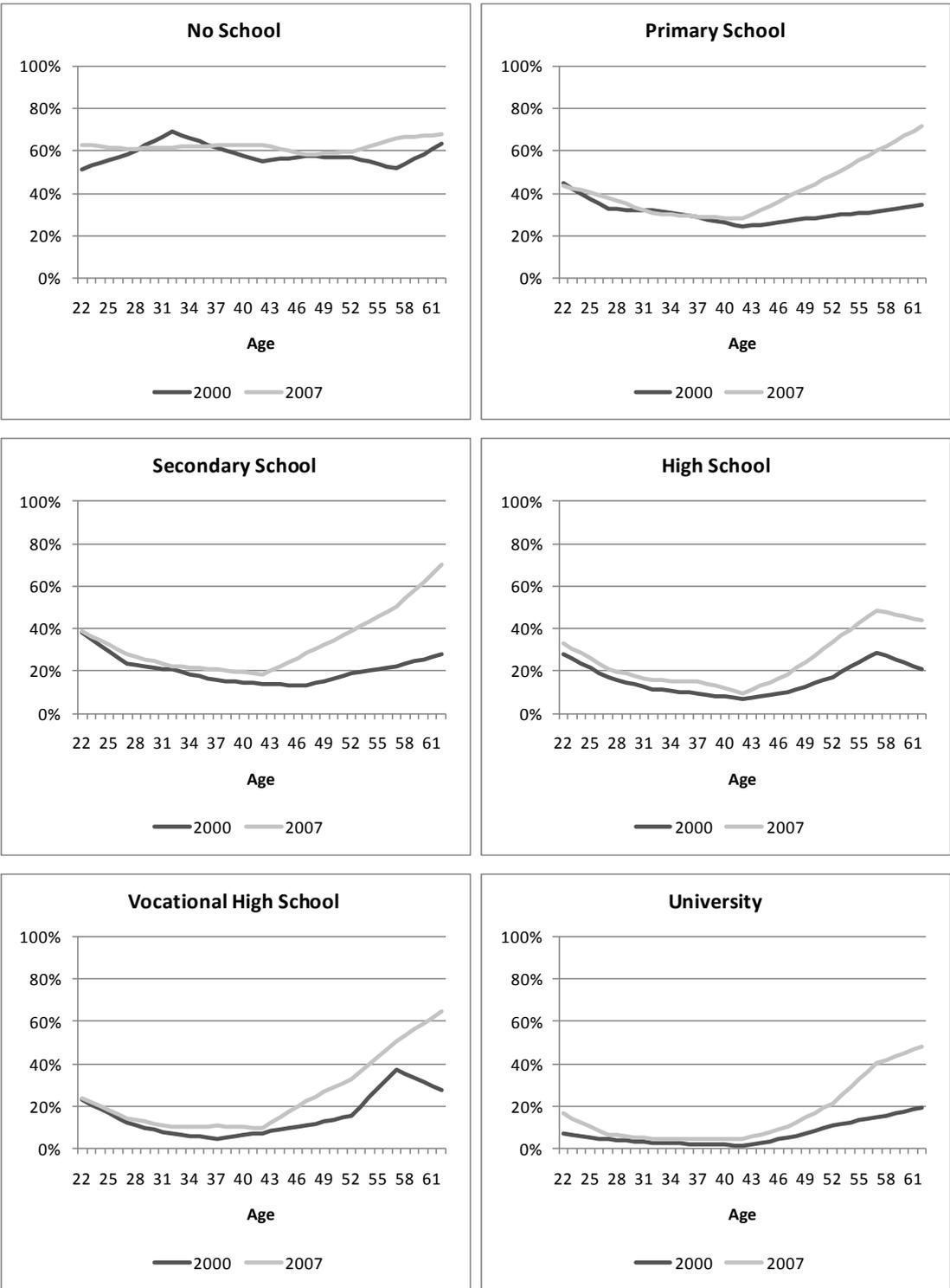


Figure 4.2.5: Share of Informal Employment in Labor Force Cross Section Profiles by Education Groups

As in the case of share of informal employment in labor force, share of formal employment in labor force of each education group is similar to the profile for total sample except for no school graduates (Figure 4.2.6). They exhibit a hump shaped profile and the decrease in 2007 in the share of formal employment in labor force is particularly pronounced after age 42. However, share of formal employment in labor force of no school graduates is relatively stable around 18% in 2007 and the decrease in 2007 is evident at all ages.

Share of informal employment in population by education groups is given in Figure 4.2.7. When 2007 profiles are considered, informality decreases with education in general and no school graduates have the highest informality rate. Except for no school graduates profiles of other groups decrease until age 42, increase until age 47 and then with some differences between the education groups decrease towards age 62. Compared to other education groups, profile of no school graduates decreases sharply after age 42. This may be related to the fact that most of the no school graduates work in the informal sector. So, at older ages as people leave the labor force this mainly effects informal employment for no school graduates. When 2000 and 2007 profiles are compared, share of informal employment in population increases in 2007 for all education groups except for no school graduates. Share of informal employment in population may not be increasing in 2007 for no school graduates due to a general decrease in the employment of this group.

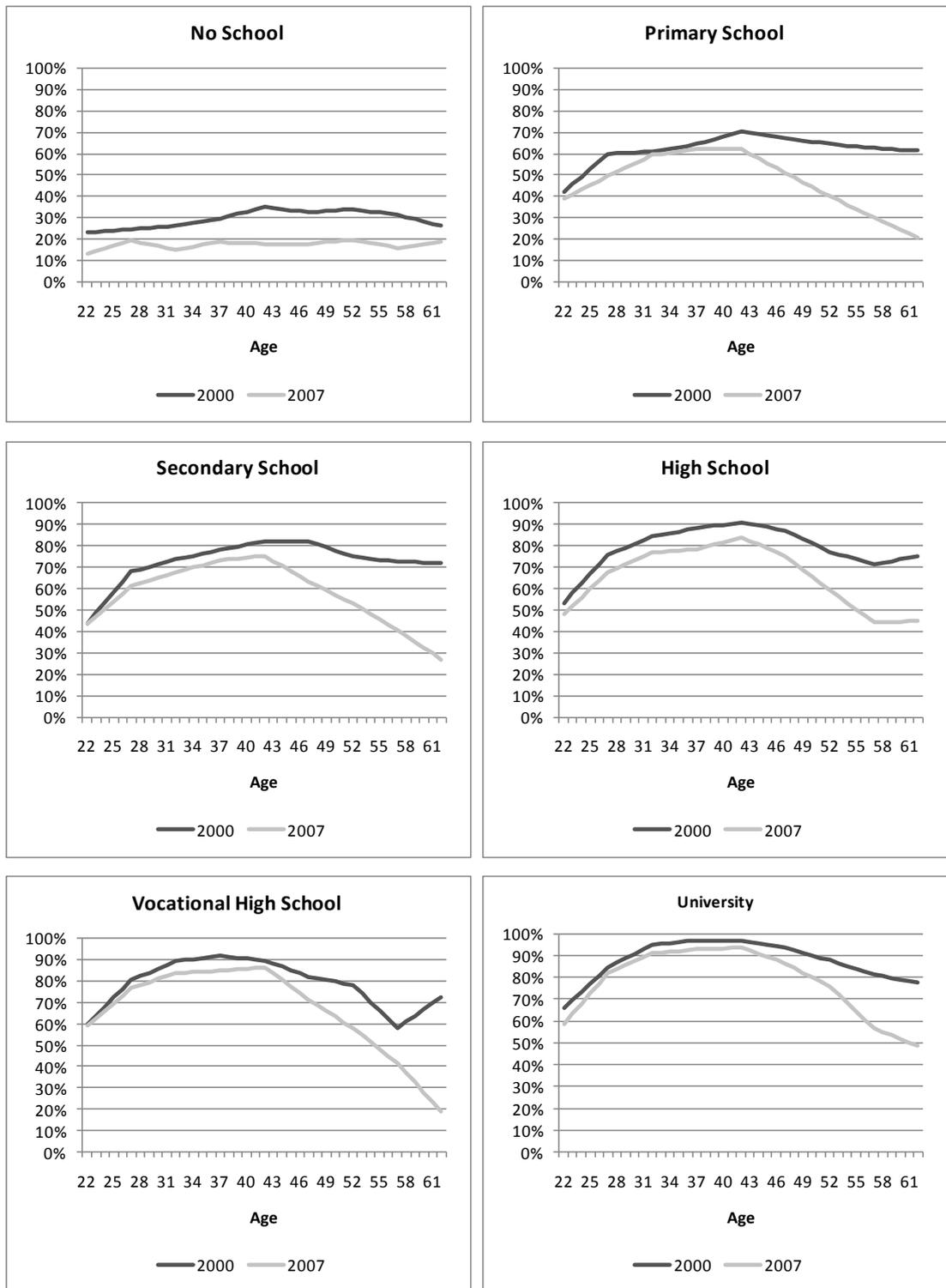


Figure 4.2.6: Share of Formal Employment in Labor Force Cross Section Profiles by Education Groups

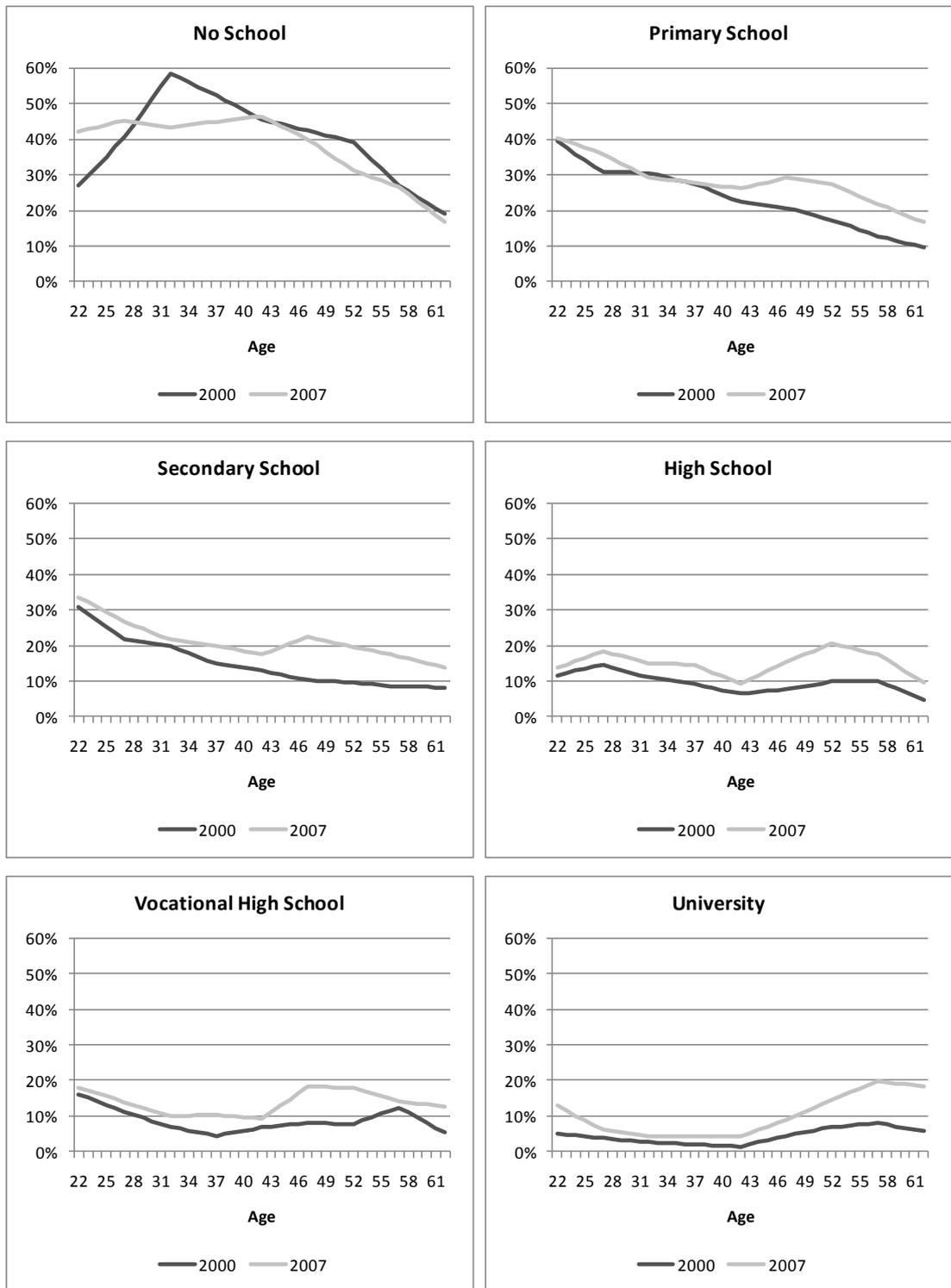


Figure 4.2.7: Share of Informal Employment in Population Cross Section Profiles by Education Groups

As seen in Figure 4.2.8 share of formal employment in population has a very similar profile with the share of formal employment in labor force but at a lower level as the denominator is larger. Moreover, compared to other education groups difference between the share formal employment in population and labor force is larger for high school graduates. This may stem from the lower labor force participation and employment rates of high school graduates at young ages. When 2000 and 2007 profiles are compared formality decreases in 2007 and the decrease is more pronounced of lower educated groups. Except for no school graduates decrease of formality at older ages is more pronounced for old age groups similar to the case of share of informal employment in labor force and population, and the share of formal employment in labor force.

Share of unemployment in population is given in Figure 4.2.9 and it has a decreasing trend towards older ages for all education groups. As in the case of unemployment rate, university graduates have very high share of unemployment in population at young ages, around 20% at age 22, but they have the lowest share of unemployment in population after thirties. Besides, vocational high school graduates on average have smaller share of unemployment in population compared to high school graduates.

When employment rate and share of informal and formal employment in population are considered together similar to the case for total sample except for no school graduates there is a certain share of informal employment in population and the change in employment rate mainly stems from the change in formal employment. For no school graduates, the situation is just the opposite; formal employment has a certain share and the change in employment rate stems from the change in informal employment. As for total sample from 2000 to 2007 while unemployment and informal employment increase, formal employment decreases for all education groups but no school graduates. For no school graduates informal employment also decreases but the decrease is less than formal employment.

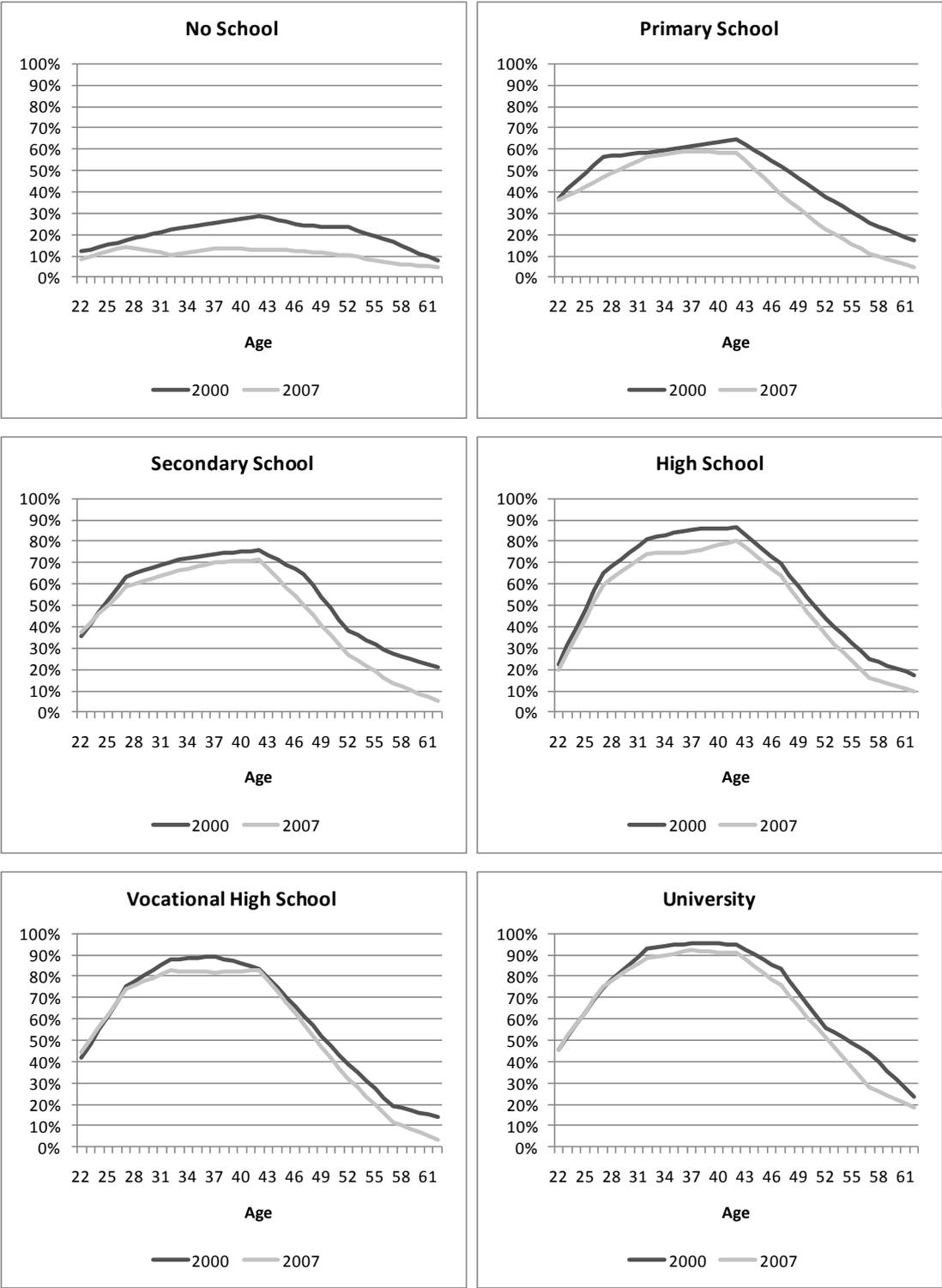


Figure 4.2.8: Share of Formal Employment in Population Cross Section Profiles by Education Groups

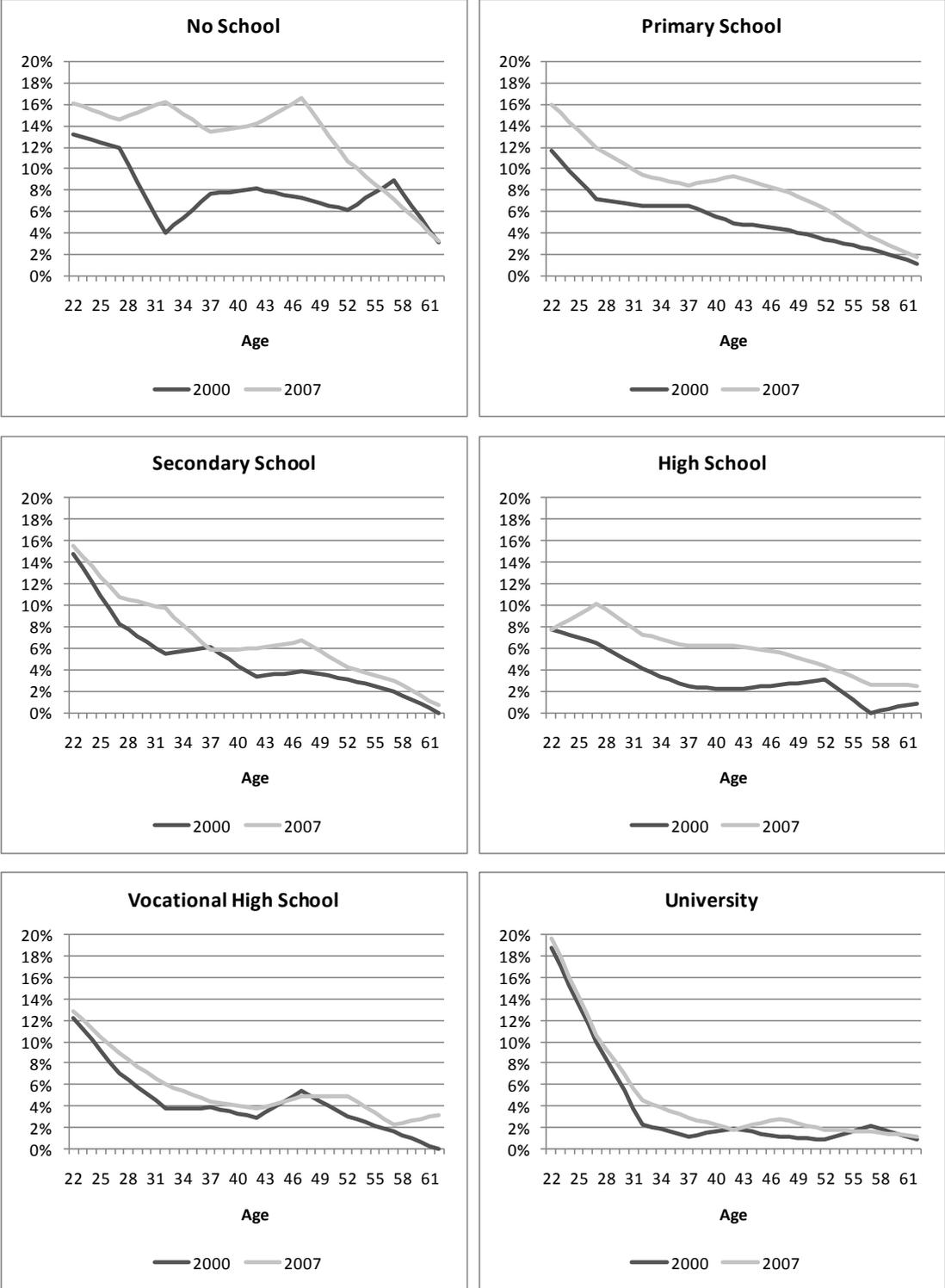


Figure 4.2.9: Share of Unemployment in Population Cross Section Profiles by Education Groups

CHAPTER 5

COHORT-AGE ANALYSIS

In this chapter variables are followed in time for each cohort which is identified by the birth year. On the cross section profile of a given year both age and cohort change. In this section on the profile of each cohort time and age change, and between the profile of cohorts for a given age cohort and time change. So, by cohort-age analysis possible cohort effects on the cross section profiles can be identified and true life-cycle profiles may be inferred better. As in the previous chapter firstly total sample profiles will be analyzed and then analysis will be given for each education group. In this chapter also demographic characteristics are analyzed for 2000-2005. To keep the figures more readable profile of every one of three cohorts are presented in each figure. So, two consecutive cohort profiles have five years in common in analysis covering 2000-2007 and three years in common in analysis covering 2000-2005.

5.1. Cohort-Age Profiles for Total Sample

Labor force participation rate for each cohort in time is given in Figure 5.1.1. As can be seen in the figure cohort-age profiles are very similar to the cross section profile; increasing until age 27, relatively stable until age 42 and then decreasing. There are not noticeable level differences between the profiles of different cohorts which may be interpreted as there are not strong cohort effects in the labor force participation rate and the cross section profile represents the true life-cycle profile. Nevertheless, as mentioned before level differences between the cohort profiles for a given age may stem from two sources; cohort and age effect. So, these two effects may be cancelling each other.

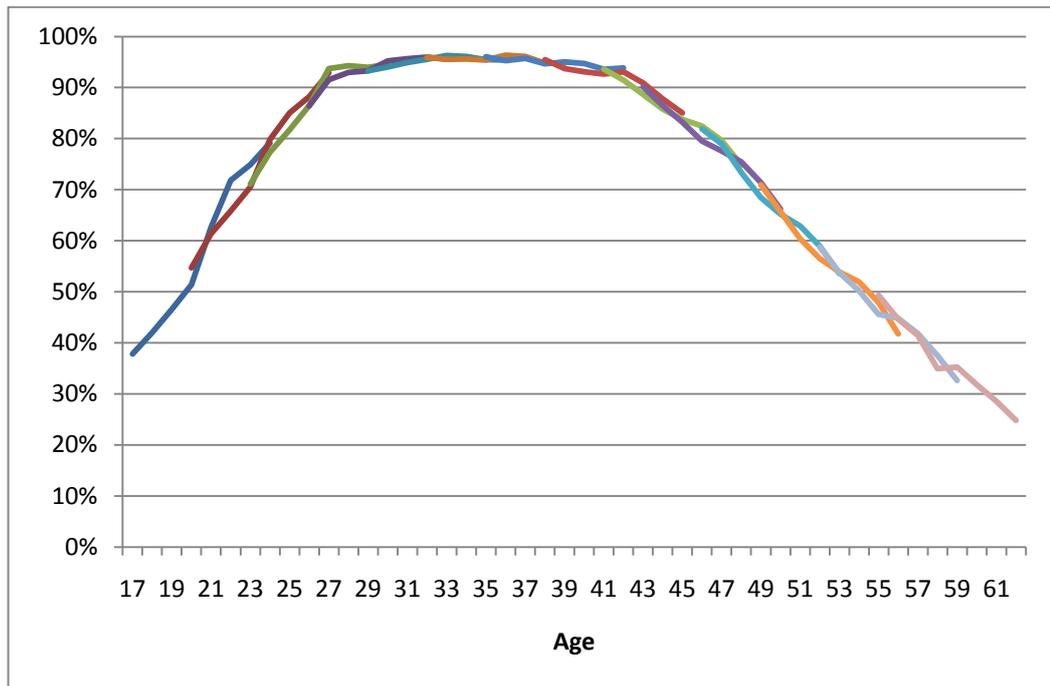


Figure 5.1.1: Labor Force Participation Rate Cohort-Age Profiles for Total Sample

Employment rate cohort-age profiles also have a similar profile with the cross section profile as seen in Figure 5.1.2. A noticeable point is the convex shape that is common to the profile of each individual cohort which deeps in 2002. This may be a result of the 2001 crisis. Like labor force participation rate there does not seem a strong cohort effect and the cross section profile is likely to represent the life-cycle profile.

Unemployment profile of each cohort is given in Figure 5.1.3. As seen in the figure effect of the 2001 crisis is more evident in the unemployment rate; profile of each individual cohort is increasing until 2002 and then decreasing.

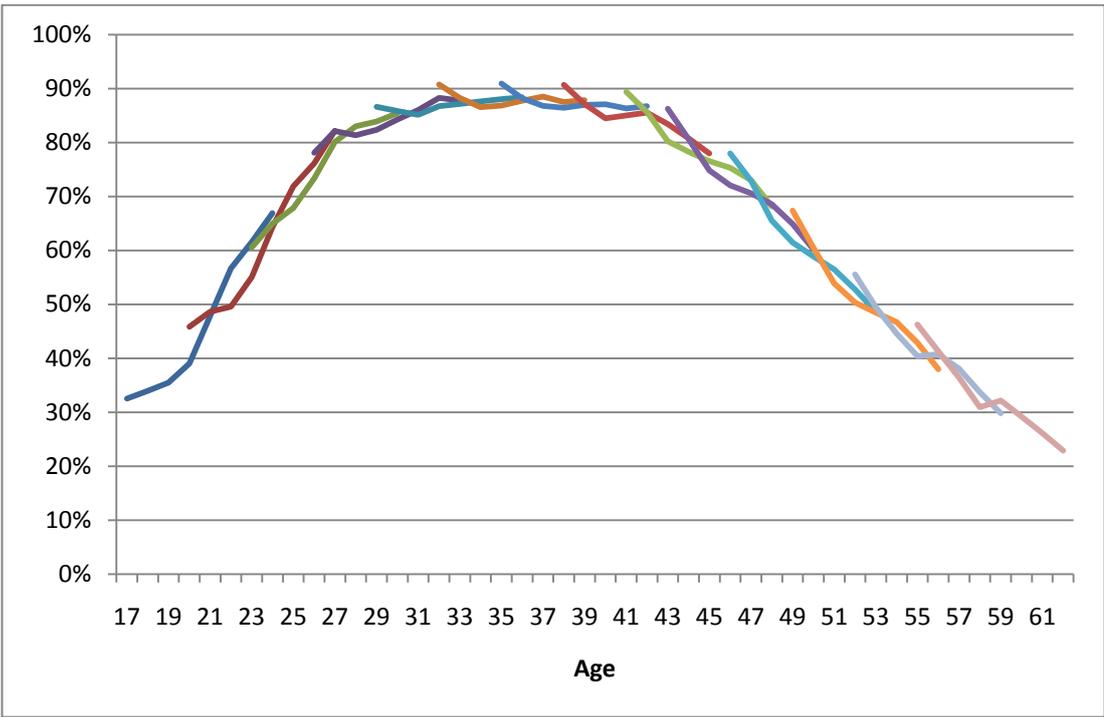


Figure 5.1.2: Employment Rate Cohort-Age Profiles for Total Sample

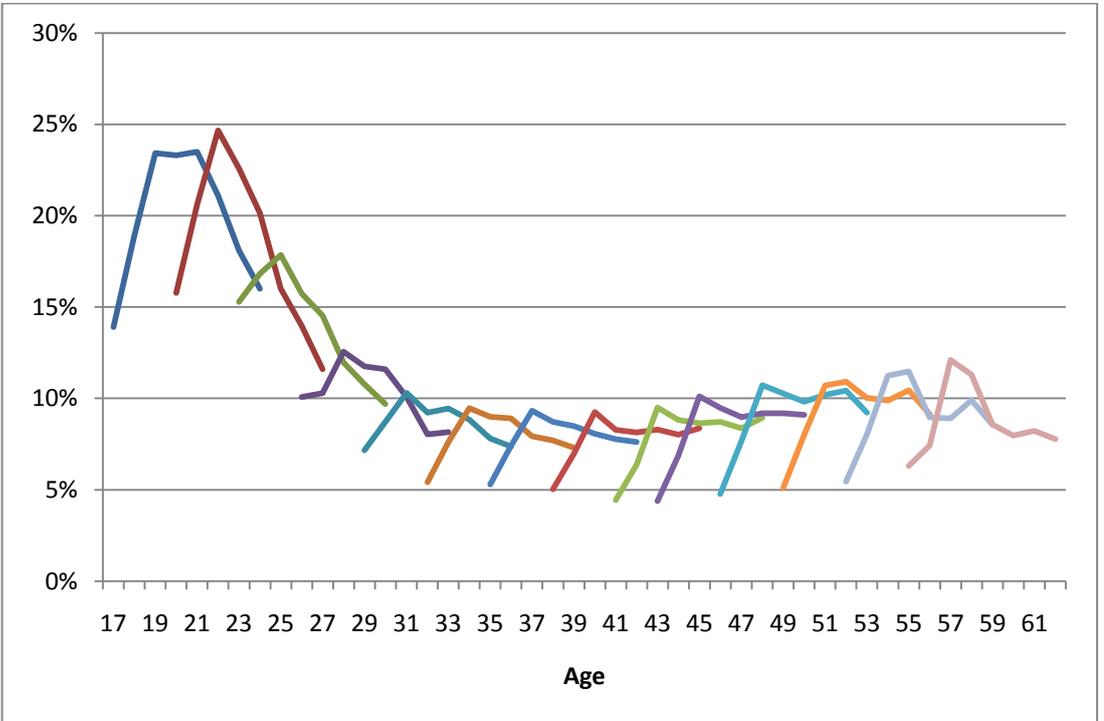


Figure 5.1.3: Unemployment Rate Cohort-Age Profiles for Total Sample

Informal employment rate profile for each cohort is given in Figure 5.1.4. Cohort-age profile exhibits a hump shape like the cross section profile. However, there may be a cohort effect which is decreasing towards younger cohorts and leads to the profile of older cohorts lay on a lower level than the profile of younger cohorts. This pattern is particularly strong for older cohorts and this may also be a result of a policy change that leads to the older people to pass to the informal sector more rapidly than before. Moreover, positive time trend in the informal employment of older people may also lead to such strong cohort differences for older cohorts. Whatever the reason a life-cycle profile with a steeper slope at older ages can be expected in the cohort analysis. Moreover, rotation of the cross section informality profiles upwards for older ages in 2007 may be a result of the differences in the profiles of older cohorts observed in cohort-age profiles.

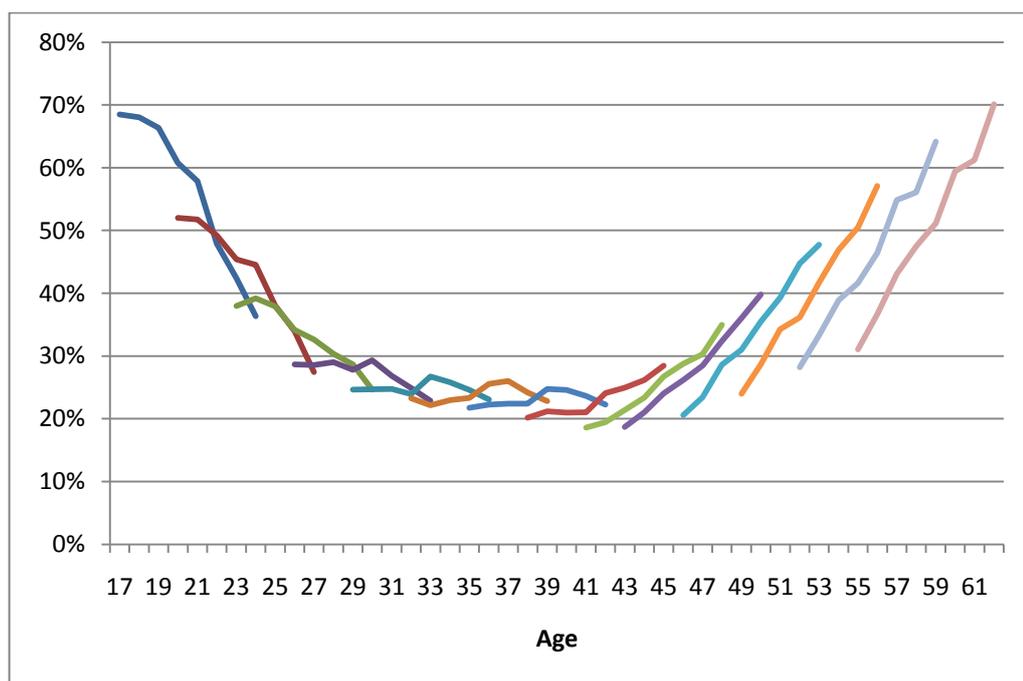


Figure 5.1.4: Informal Employment Rate Cohort-Age Profiles for Total Sample

As in the case of the cross section profiles cohort-age profiles of the share of informal employment in labor force is similar to the informal employment rate

cohort-age profiles (Figure 5.1.5). Lower informality for older cohorts is also observable in the share of informal employment in labor force and as in the case of informal employment rate it is more evident at older cohorts.

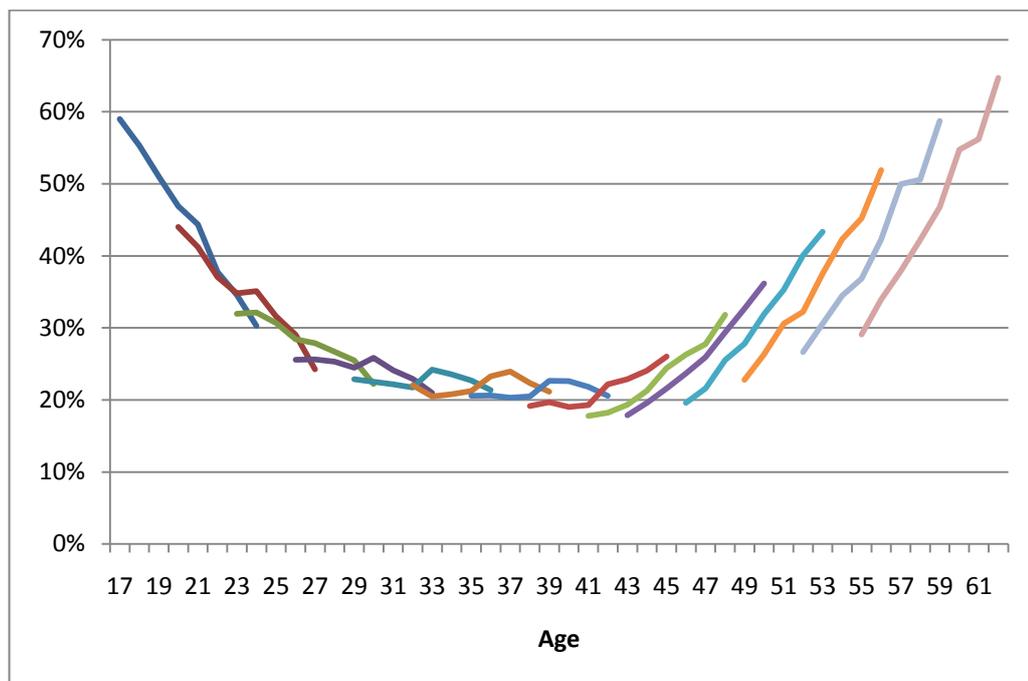


Figure 5.1.5: Share of Informal Employment in Labor Force Cohort-Age Profiles for Total Sample

Share of formal employment in labor force for each cohort is given in Figure 5.1.6. Different from the informal employment rate and the share of informal employment in labor force, effect of the 2001 crisis is more evident in the share of formal employment in labor force. Profile of each cohort exhibits a convex shape around 2002. So, the 2001 crisis seem to cause a decrease in formal sector employment and an increase in unemployment. As can be expected from the informal employment rate and share of informal employment in labor force, profiles of older cohorts are at a higher level than younger cohorts. So, life-cycle profile of share of formal employment in labor force can be expected to be steeper at older ages.

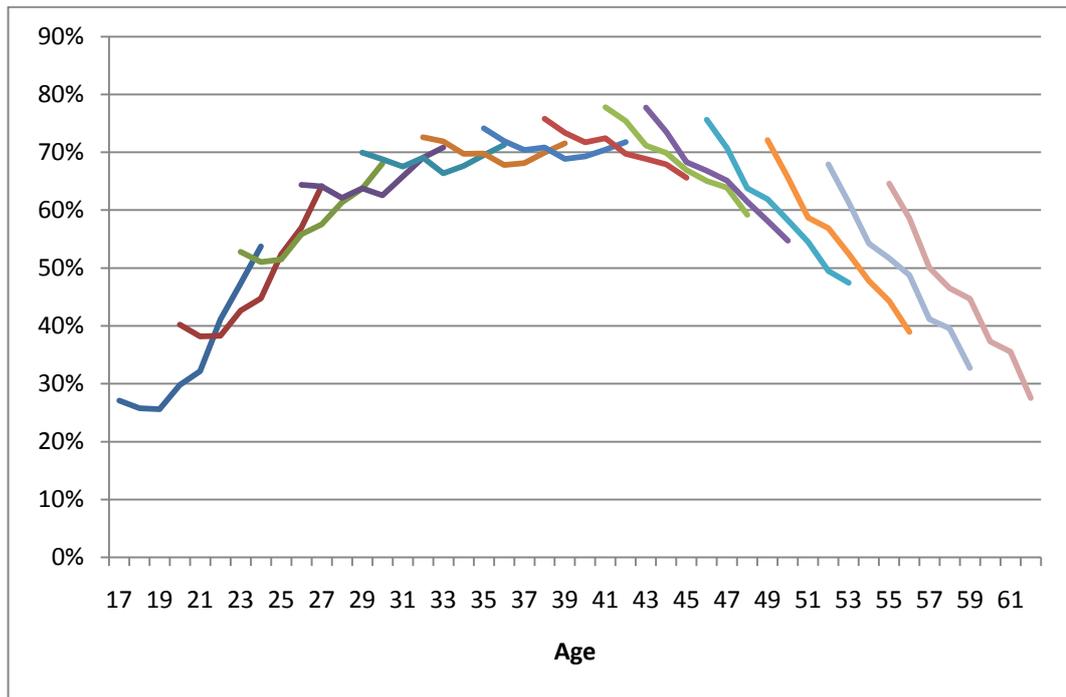


Figure 5.1.6: Share of Formal Employment in Labor Force Cohort-Age Profiles for Total Sample

Share of informal employment in population for each cohort is noisier than the informal employment rate and the share of informal employment in labor force (Figure 5.1.7). So, while informal employment have a more stable share in employment and labor force, it has a more volatile share in population. This may be due to the forces effecting informal employment over time. These forces may be affecting all labor force in a similar manner. Lower informality rate of older cohorts is also evident in Figure 5.1.7. So, for the share of informal employment in population an increasing profile at older ages can be expected at the cohort analysis.

As in the case of the share of formal employment in labor force, effect of the 2001 crisis can also be seen in the share of formal employment in population (Figure 5.1.8). Moreover, the effect is more evident towards younger cohorts. Positive cohort effects towards older cohorts are also evident in Figure 5.1.8. So, for the share of formal employment in population a more rapidly decreasing life-cycle profile can be expected.

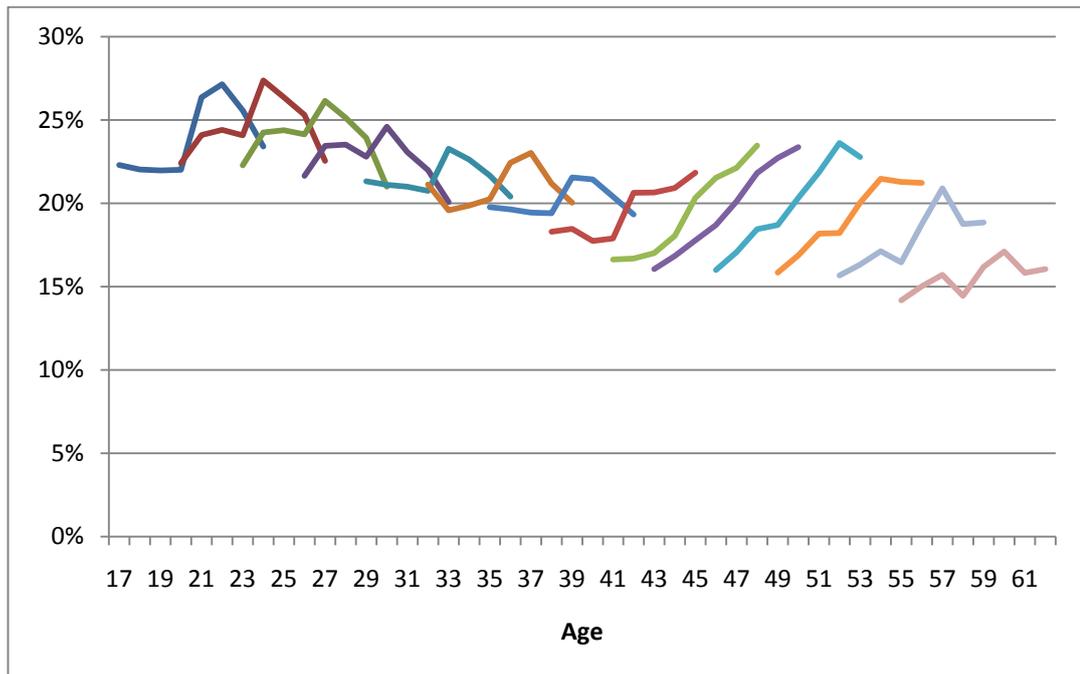


Figure 5.1.7: Share of Informal Employment in Population Cohort-Age Profiles for Total Sample

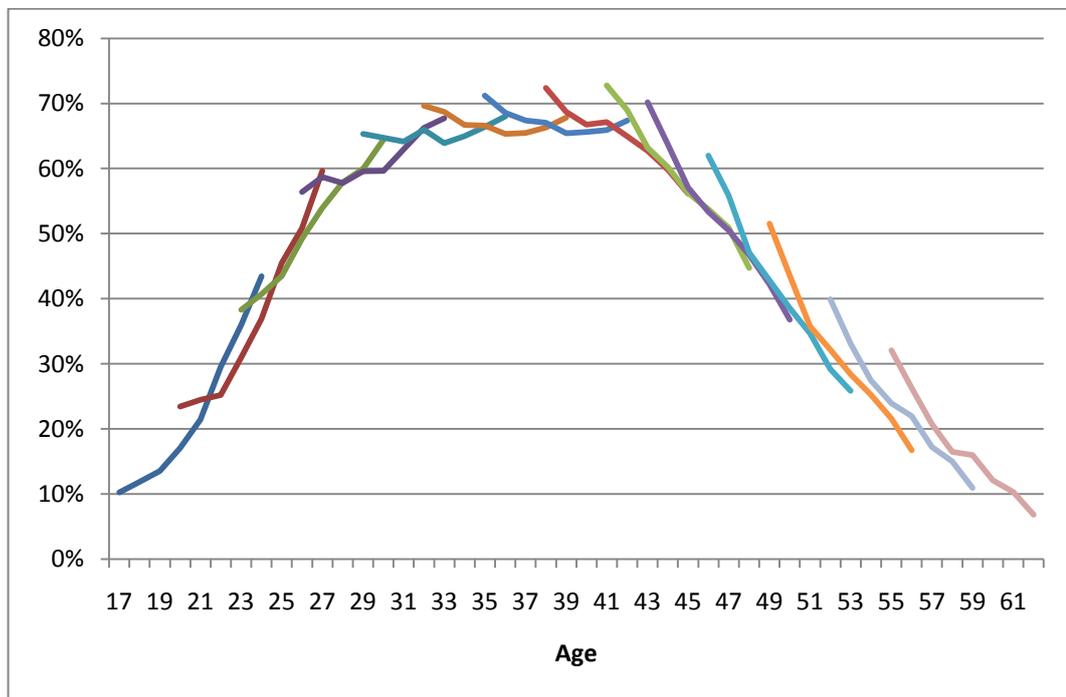


Figure 5.1.8: Share of Formal Employment in Population Cohort-Age Profiles for Total Sample

Share of unemployment in population for each cohort is presented in Figure 5.1.9. As in the case of unemployment rate, effect of the 2001 crisis is very noticeable on the share of unemployment in population and common to all cohorts.

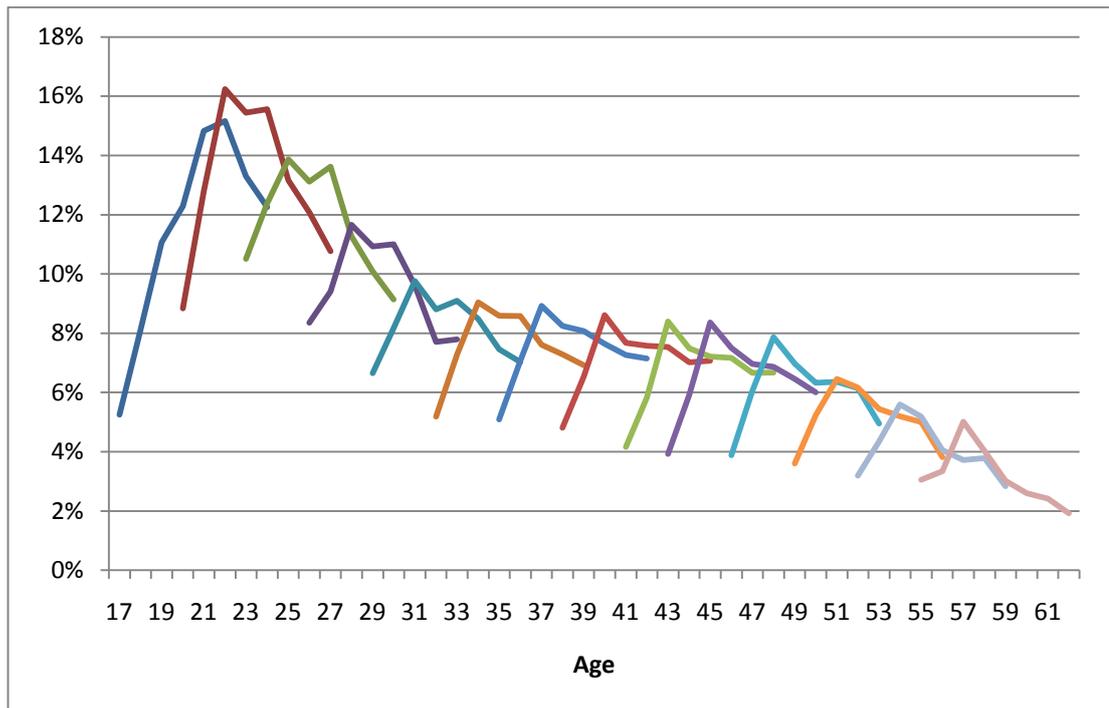


Figure 5.1.9: Share of Unemployment in Population Cohort-Age Profiles for Total Sample

5.2. Cohort-Age Profiles for Education Groups

As seen in Figure 5.2.1 like cross section profiles cohort-age profiles of labor force participation rate also differ between the education groups. Compared to other education groups no school graduates have noisier profile and the profiles of older cohorts are above the profile of younger cohorts. Participation rate of no school graduates may be affected by cyclical fluctuations more compared to other education groups which may be the reason of the noisier profiles of no school graduates. Increasing demand for more educated workers may cause lower participation rate for younger cohorts of no school graduates.

As seen in Figure 5.2.2 employment rate profiles are noisier than labor force participation rate profiles. Profile of each cohort decreases towards 2002 and then recovers. This pattern is stronger for lower educated groups and can be expected to be a result of the 2001 crisis. Negative cohort effects towards younger cohorts of no school graduates observed for participation rate is also evident for employment rate.

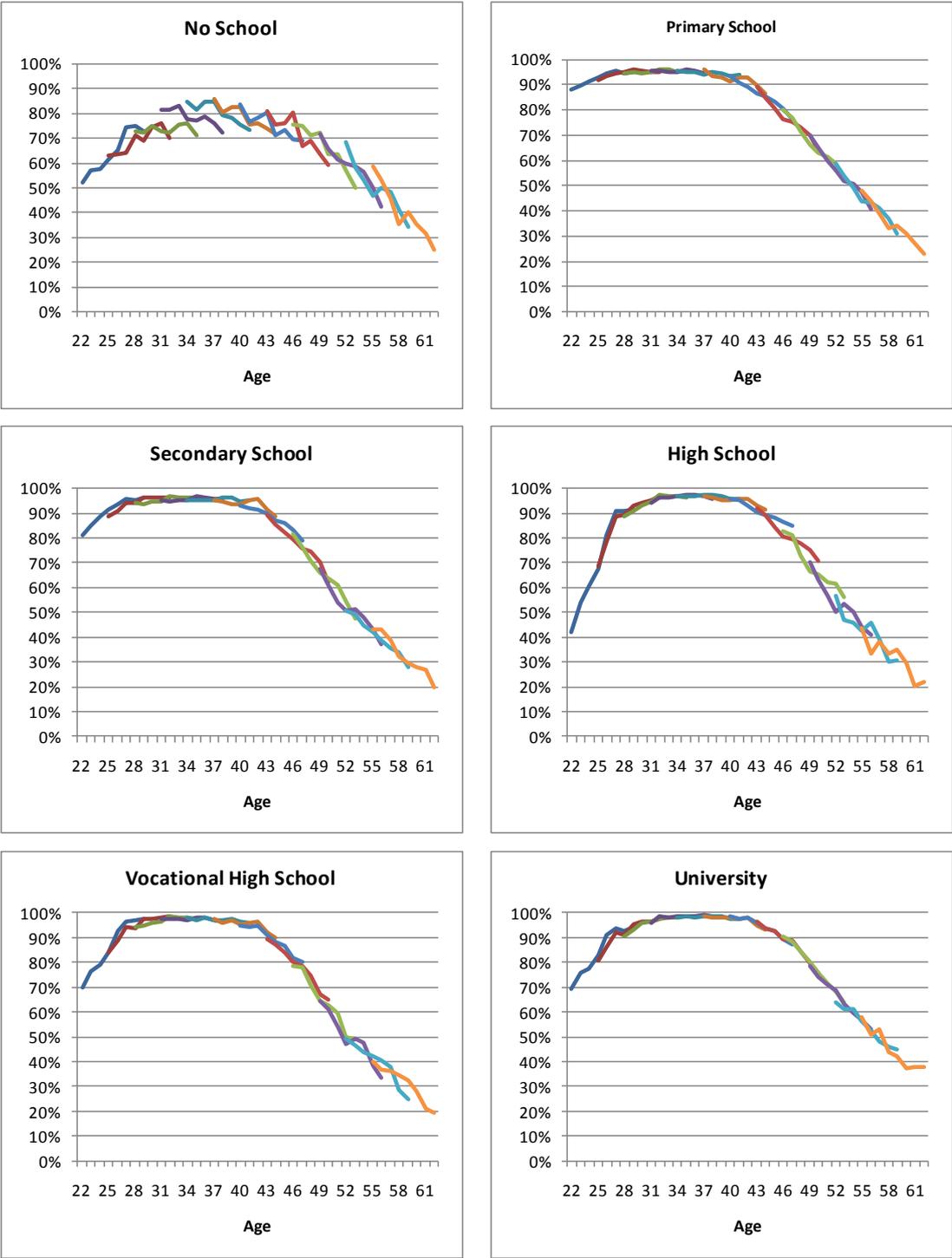


Figure 5.2.1: Labor Force Participation Rate Cohort-Age Profiles by Education Groups

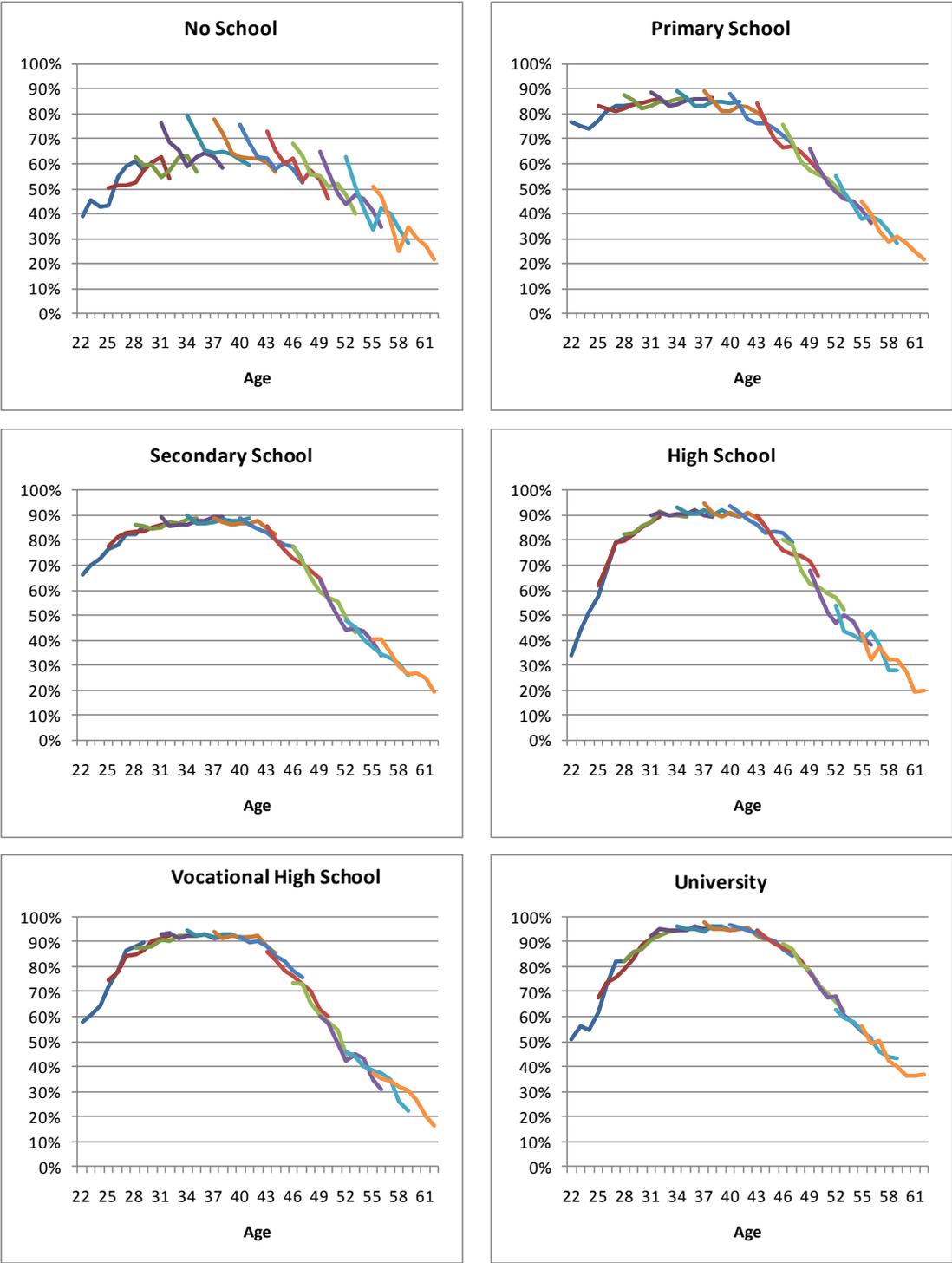


Figure 5.2.2: Employment Rate Cohort-Age Profiles by Education Groups

Unemployment rate profiles are given in Figure 5.2.3. As seen in the figure unemployment rate should be highly affected by the 2001 crisis and as in the case of employment rate effect of the crisis decreases with education. Another noticeable point is that while profile of each education group exhibits a hump shape, this pattern is not observable for university graduates. Moreover, as we observed in the cross section profiles although university graduates have very high unemployment rates at young ages, it decreases sharply towards middle ages and then remains stable.

As seen in Figure 5.2.4 positive cohorts effects at informal employment rate towards younger cohorts observed for total sample is evident for each education group. Although the effect is particularly observable at older cohorts for each education group it is evident for all cohorts of the no school graduates. In the life-cycle profiles as the cohort effects will be removed more rapidly increasing informal employment rate profiles can be expected.

Share of informal employment in labor force has similar profiles with the informal employment rate (Figure 5.2.5).

Share of formal employment in labor force by education groups is presented in Figure 5.2.6. Except for no school graduates each education group have similar profiles with total sample. Profile of older cohorts lay above the profile of younger cohorts and this pattern is more evident for at older cohorts except for no school graduates. At no school graduates cohort differences insist over all cohorts and more evident than other education groups. Life-cycle profiles can be expected to be decreasing more rapidly towards older ages compared to cross section profiles.

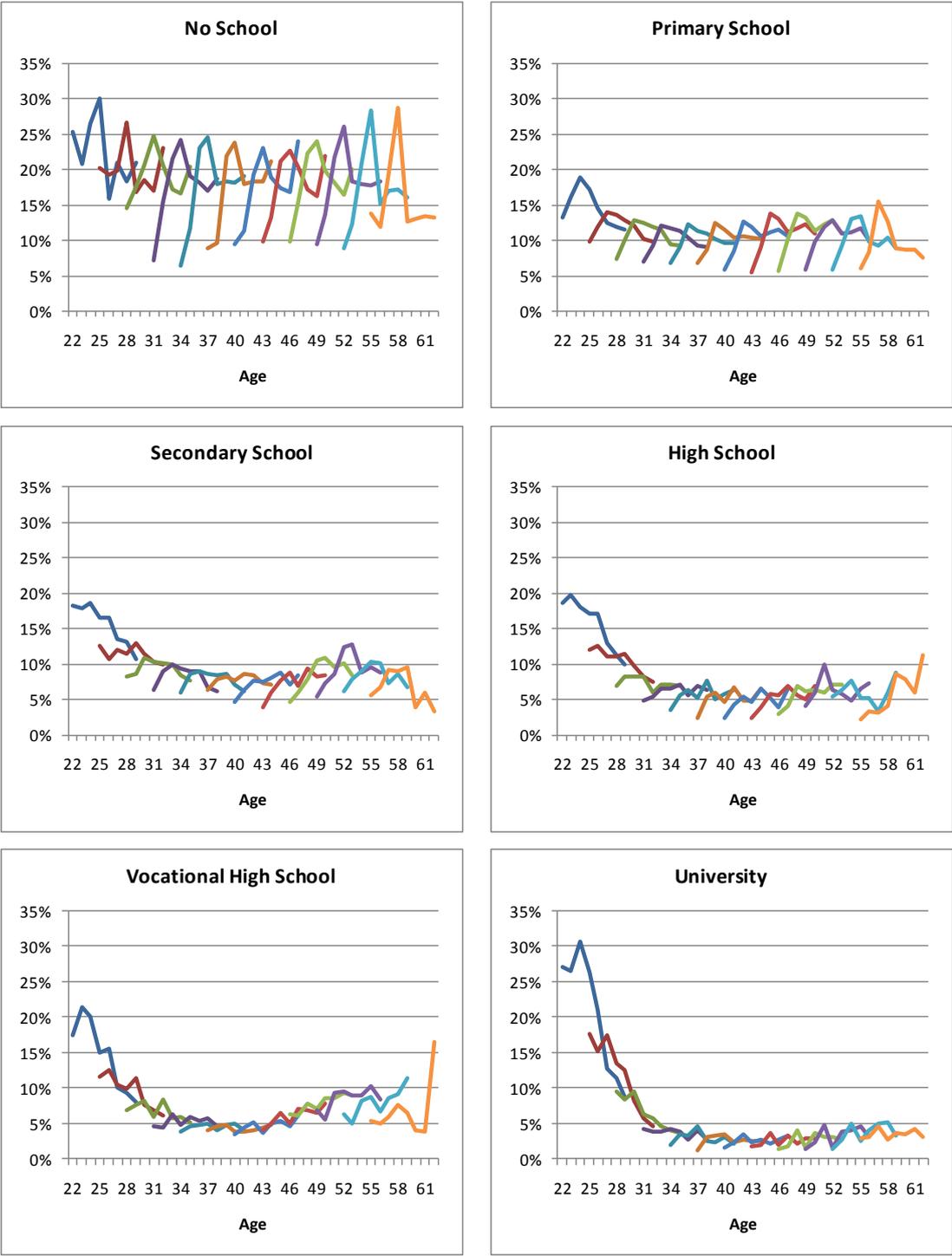


Figure 5.2.3: Unemployment Rate Cohort-Age Profiles by Education Groups

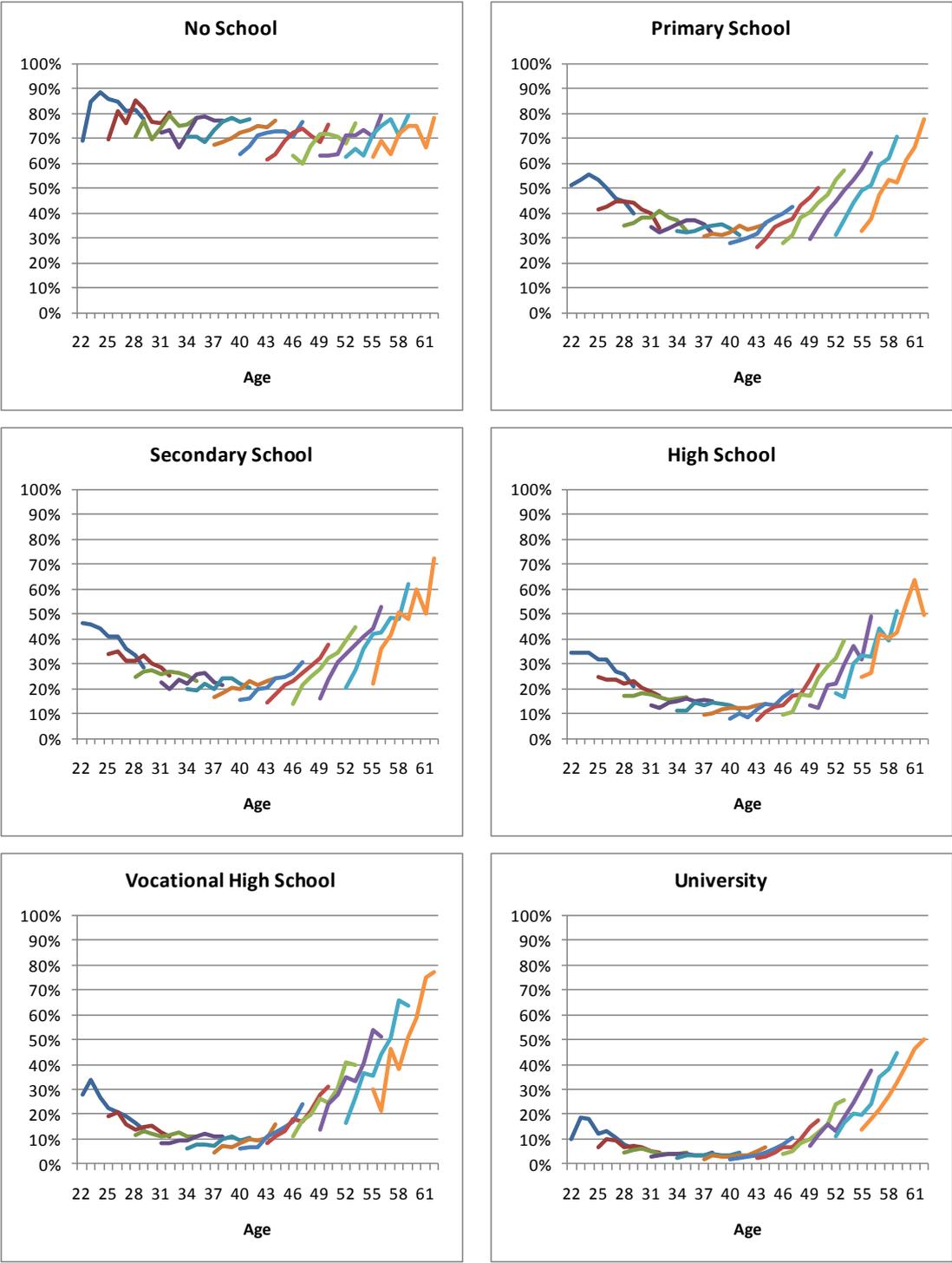


Figure 5.2.4: Informal Employment Rate Cohort-Age Profiles by Education Groups

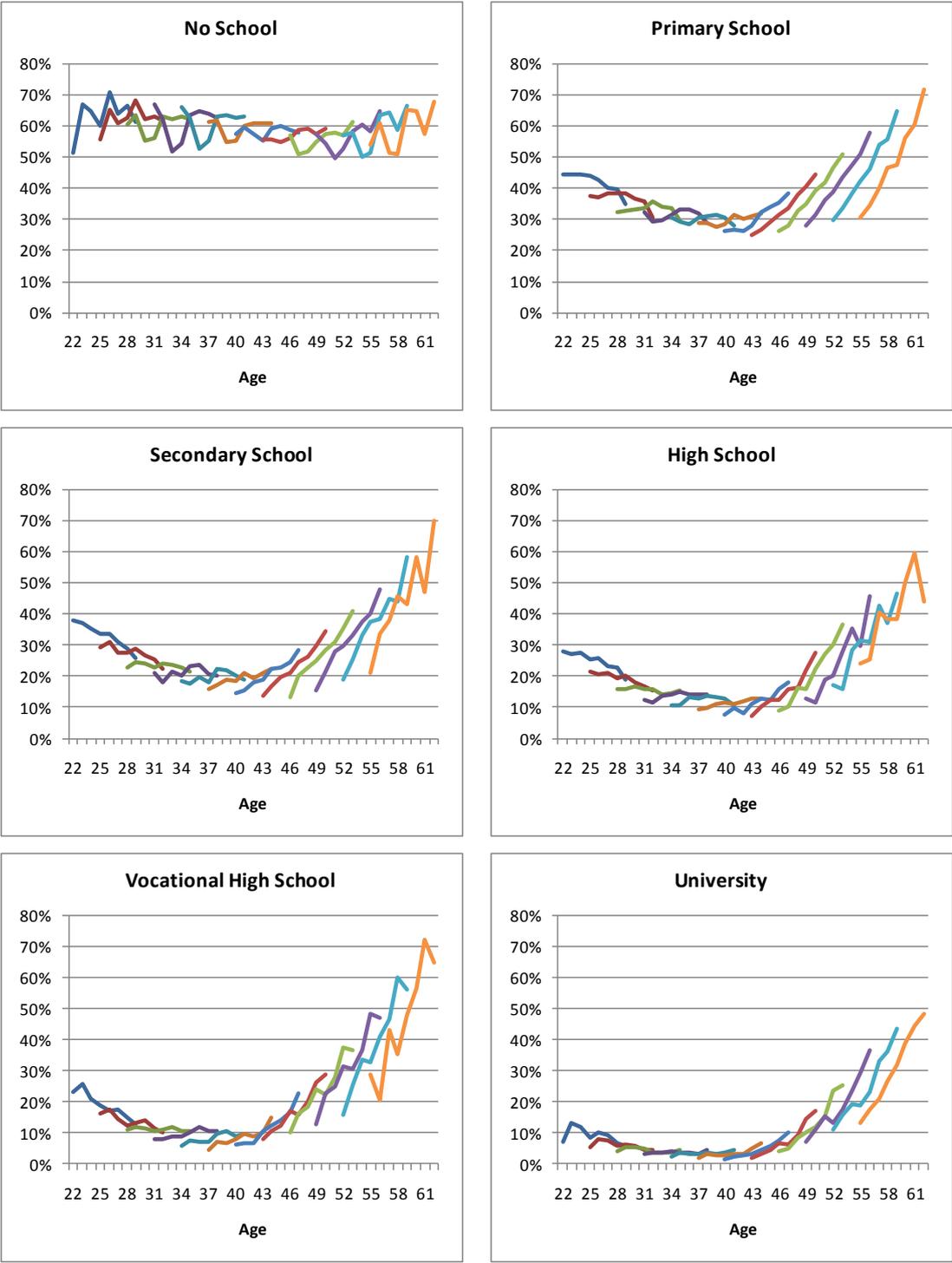


Figure 5.2.5: Share of Informal Employment in Labor Force Cohort-Age Profiles by Education Groups

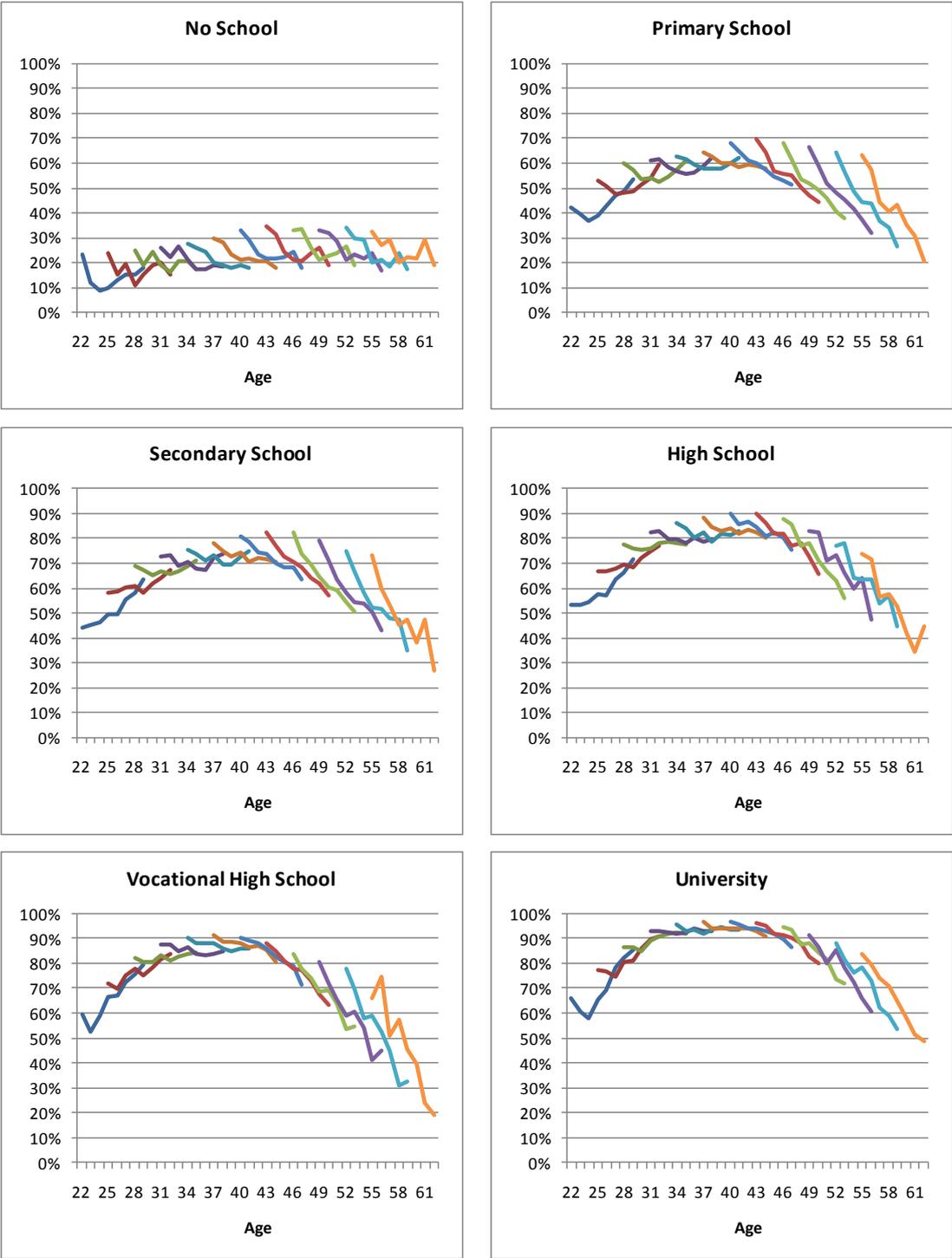


Figure 5.2.6: Share of Formal Employment in Labor Force Cohort-Age Profiles by Education Groups

As seen in Figure 5.2.7 profile of share of informal employment in population differs from the informal employment rate and the share of informal employment in labor force profiles remarkably. Profile of no school graduates exhibits a hump shape without clear level differences between the cohorts. Younger cohorts of other education groups have higher informality in population compared to older cohorts. However, this pattern decreases towards younger cohorts as education increases. Moreover, profile of each individual cohort is getting start to have positive slope towards older cohorts. So, we can expect more rapidly increasing life-cycle profiles in cohort analysis.

Share of formal employment in population profile by education groups are given in Figure 5.2.8. Compared to the share of formal employment in labor force share of formal employment in population has more rapidly decreasing profiles at older ages which is expected to be a result of decreasing labor force participation rate at older ages. Older cohorts of no school graduates have higher formality in population compared to younger cohorts. For other education groups difference between the profile of older and younger cohort decreases and the overall pattern becomes less evident as education increases.

As seen in Figure 5.2.9 like unemployment rate profiles share of unemployment in population profiles are very noisy (Figure 5.2.9). However, noise is lesser for more educated groups. Moreover, as in the case of unemployment rate profile of each single cohort peaks in 2002.

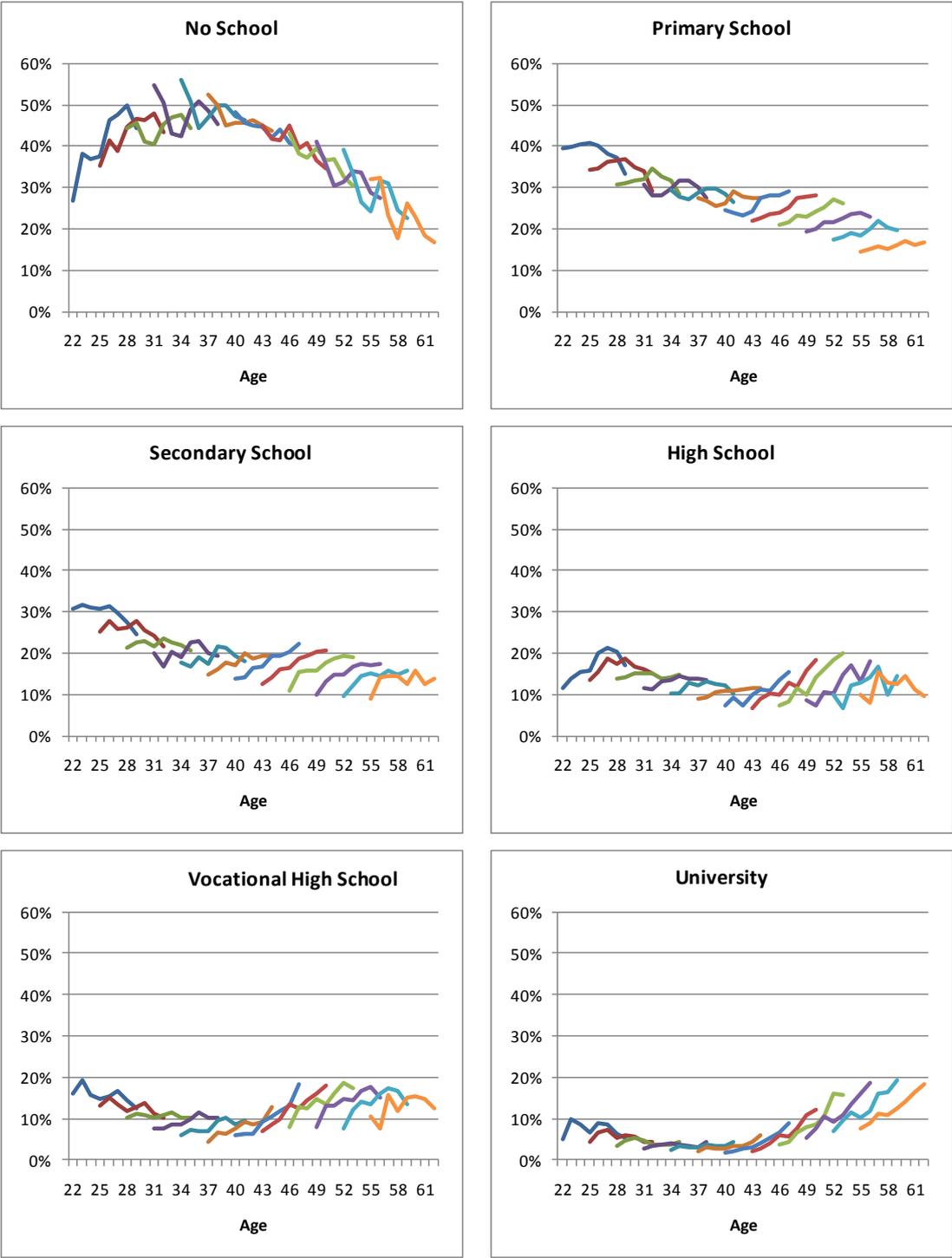


Figure 5.2.7: Share of Informal Employment in Population Cohort-Age Profiles by Education Groups

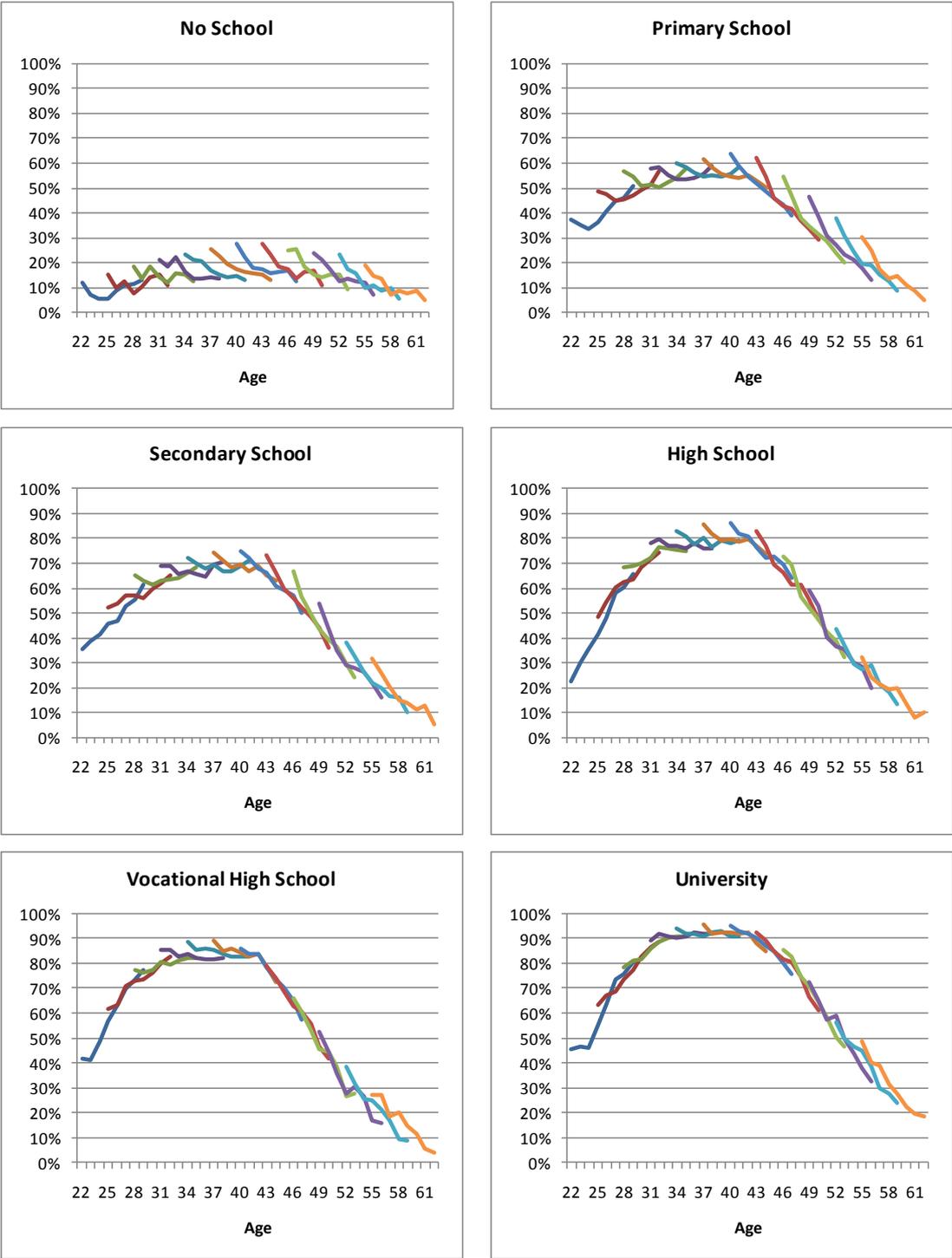


Figure 5.2.8: Share of Formal Employment in Population Cohort-Age Profiles by Education Groups

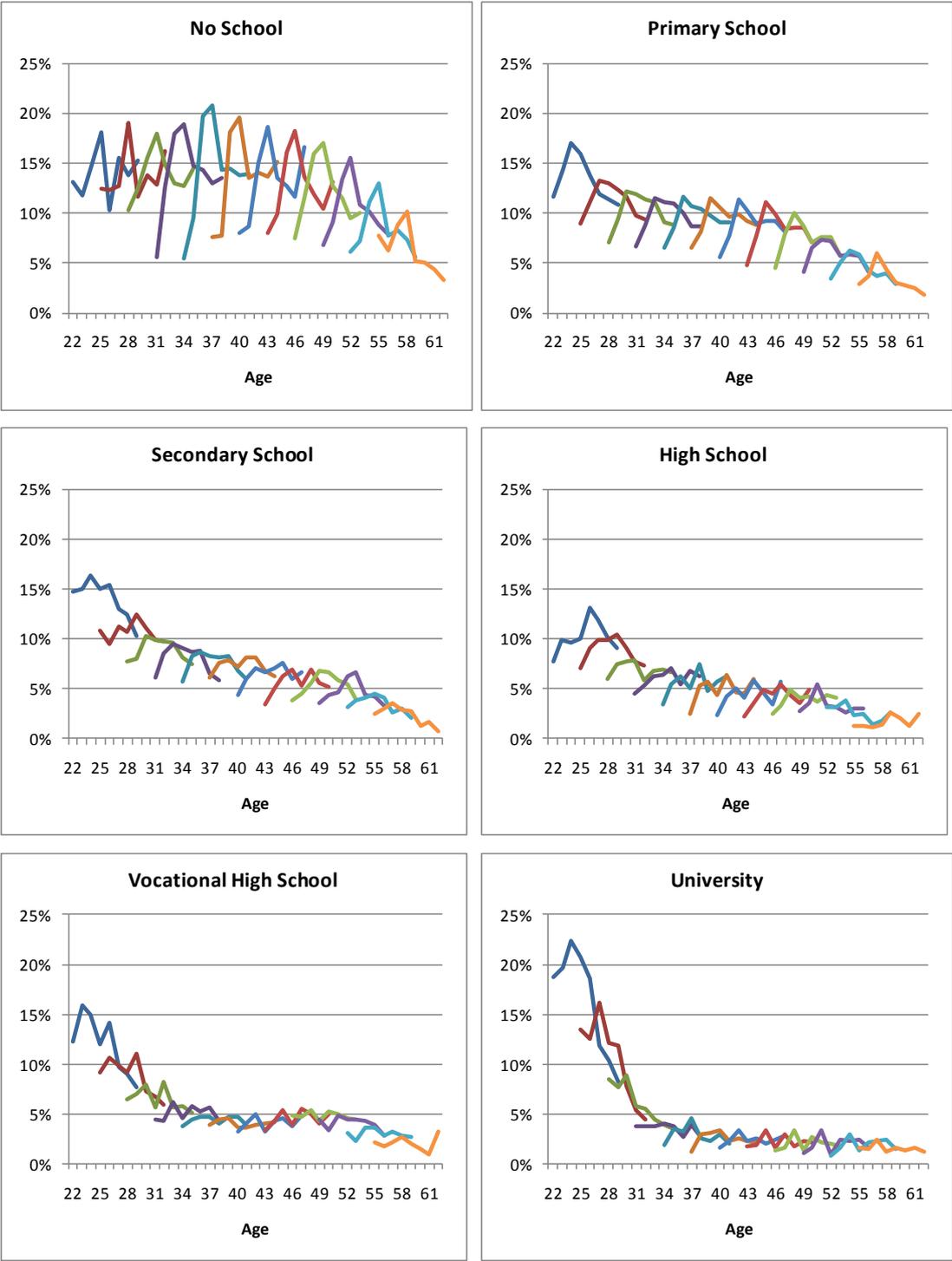


Figure 5.2.9: Share of Unemployment in Population Cohort-Age Profiles by Education Groups

5.3. Demographics

In this section demographic attributes of the cohorts are analyzed in order to help explain the labor market profiles. Results are presented both for total sample and separately for education groups. Presented demographic variables in this section are marriage rate, having children rate, average number of children, average household size, urbanization rate and average years of schooling. Children are defined as the people at age less than 17 which is taken as the labor market entry age in this study. In the data only children of household heads who are living in the same household with the household head can be identified. Therefore having children rate and average number of children profiles are based on the children living in the same household with their fathers. Method implemented to labor market variables in Appendix A is not implemented for demographic variables and so analyses on demographic variables only cover the years 2000-2005. To keep the figures more readable profile of one of every three cohorts is given and so the profile of each individual cohort coincides for 3 years.

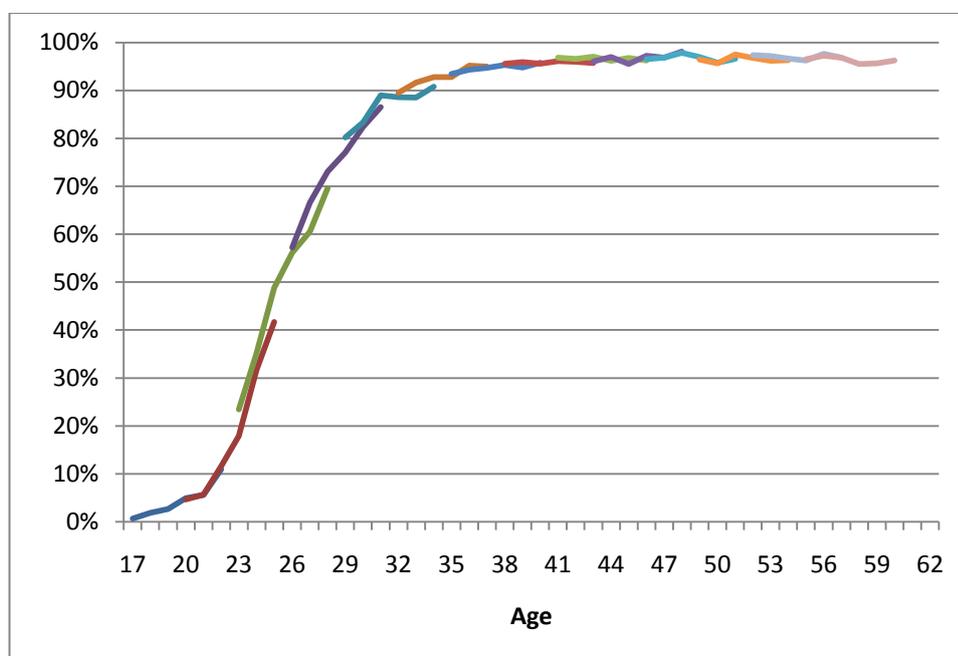


Figure 5.3.1: Marriage Rate Cohort-Age Profiles for Total Sample

Marriage rate is presented in Figure 5.3.1. As seen in the figure marriage rate is less than 6% and relatively stable until age 21 and between the ages 21-34 it increases rapidly from 6% to 93%. After mid thirties it increases very slowly and stable around 95%. Rapid increase at young ages should increase labor force participation rate as household expenses are expected to increase after marriage. Moreover, rapid increase of marriage may increase informality if people cannot afford unemployment after marriage. There may also be a negative effect of marriage on informality; people may rather choose formal sector in order to provide social security coverage to their families.

Marriage rate by education levels are given in figure 5.3.2. As seen in the figure marriage rate profile of no school graduates are very noisy. This may be due to small cell size of this group relative to other groups. More educated groups have lower marriage rate at young ages and their profile increases more slowly. However, vocational high school graduates have slightly higher marriage rate than secondary school graduate at young ages.

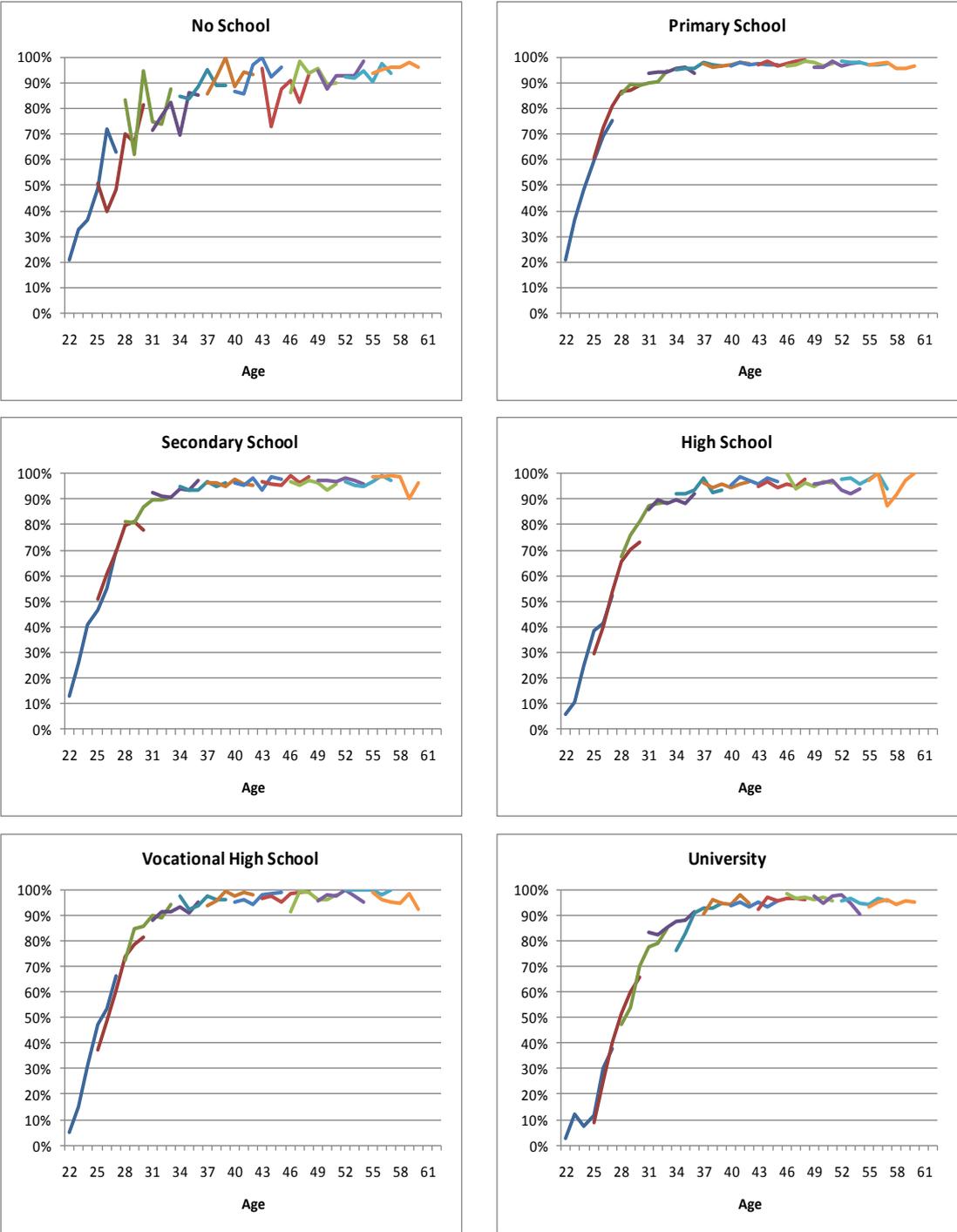


Figure 5.3.2: Marriage Rate Cohort-Age Profiles by Education Groups

Having child rate of household heads is given in Figure 5.3.3 and it exhibits a hump shaped profile. It increases rapidly until age 30, relatively stable until age 42 and

then decreases. Increasing having children rate should increase participation and formality as people will have more expenses and want to cover their children with social security. Nevertheless, having children may also affect formality negatively if people cannot afford unemployment and choose informal sector. An interesting point is the nearly perfect match of having children rate profile with labor force participation rate profile after age 42 which shows the importance of having children on the retirement decision of urban males.

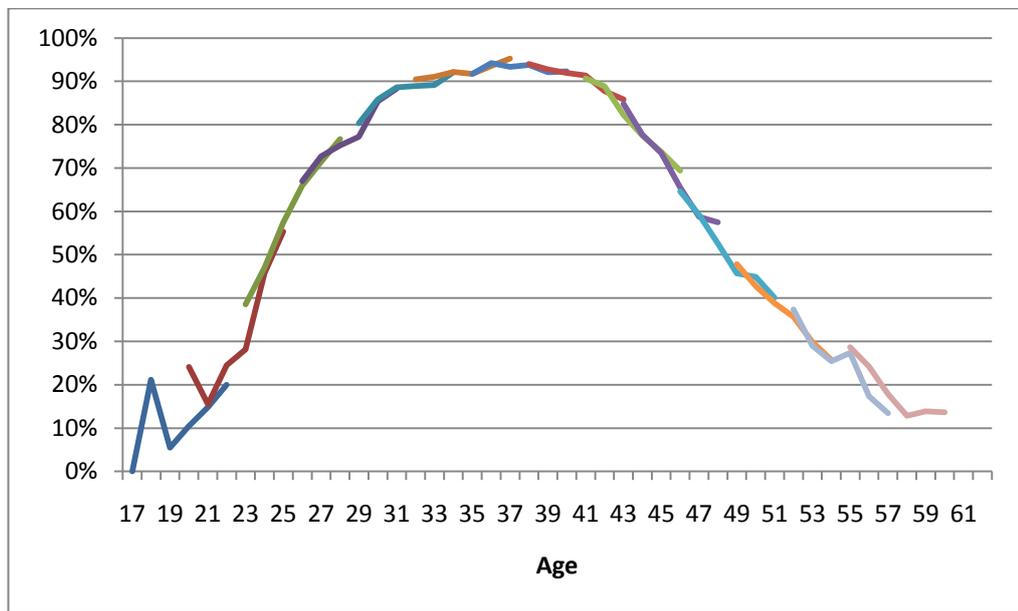


Figure 5.3.3: Having Children Rate of Household Heads for Total Sample

Having children rate for education groups separately are given in Figure 5.3.4. Although all profiles exhibit a hump shape they differ at young and middle ages. As seen in the figure, in general, having children rate decreases with education; with vocational high school graduates having a higher rate of having children compared to high school graduates. Importance of having children on participation decision is evident also for education groups separately.

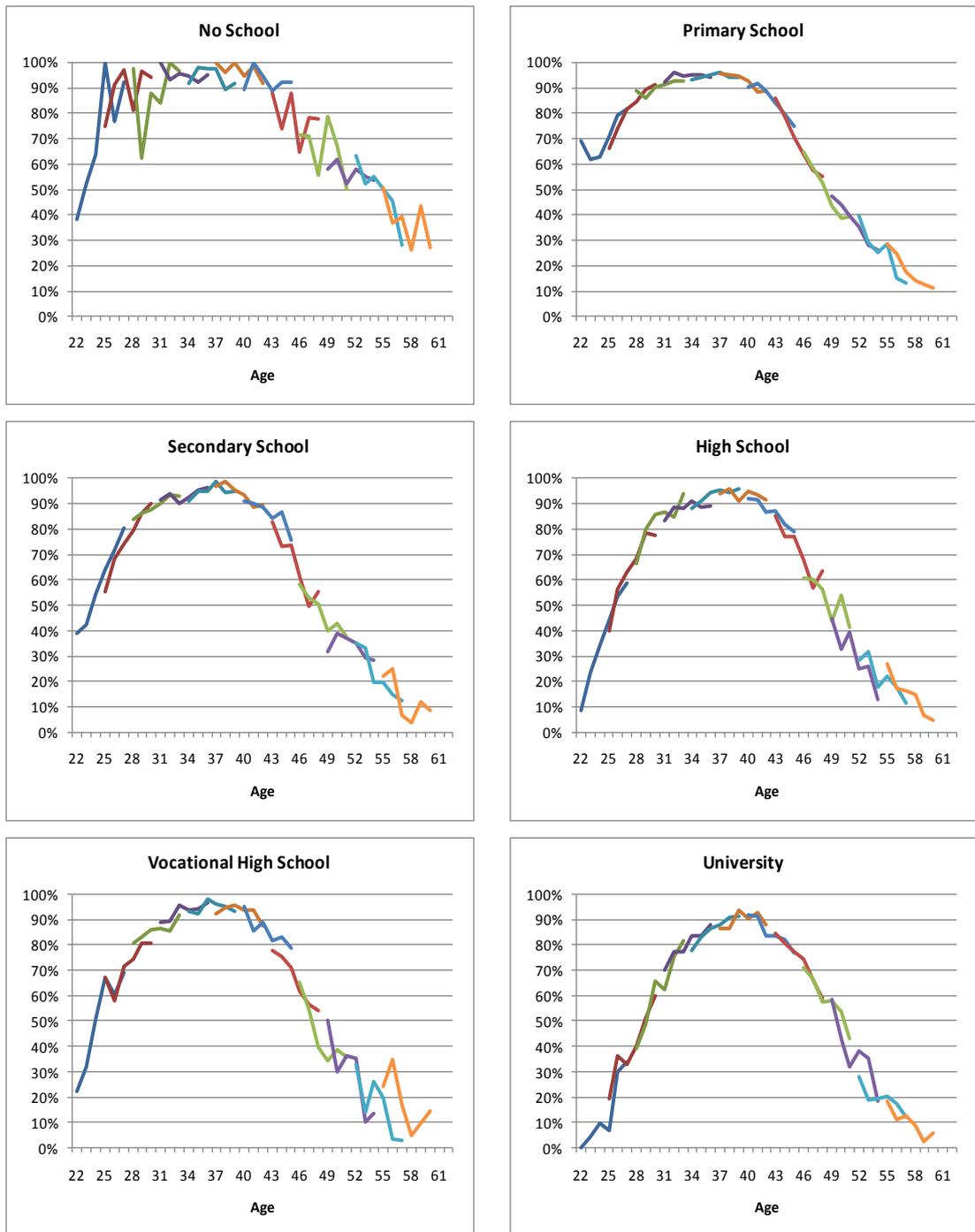


Figure 5.3.4: Having Children Rate of Household Heads by Education Groups

Average number of children of household heads for total sample and for each education group is given in Figure 5.3.5 and 5.3.6 respectively. As seen in the figures

average number of children profiles exhibit a hump shaped profile with a maximum of 2.2 for total sample. Moreover, as education increases maximum point of profiles decrease. Number of children is expected to increase labor force participation rate as the household expenses will increase. Moreover, number of children may increase informality if people cannot afford unemployment and accept less desirable jobs more easily.

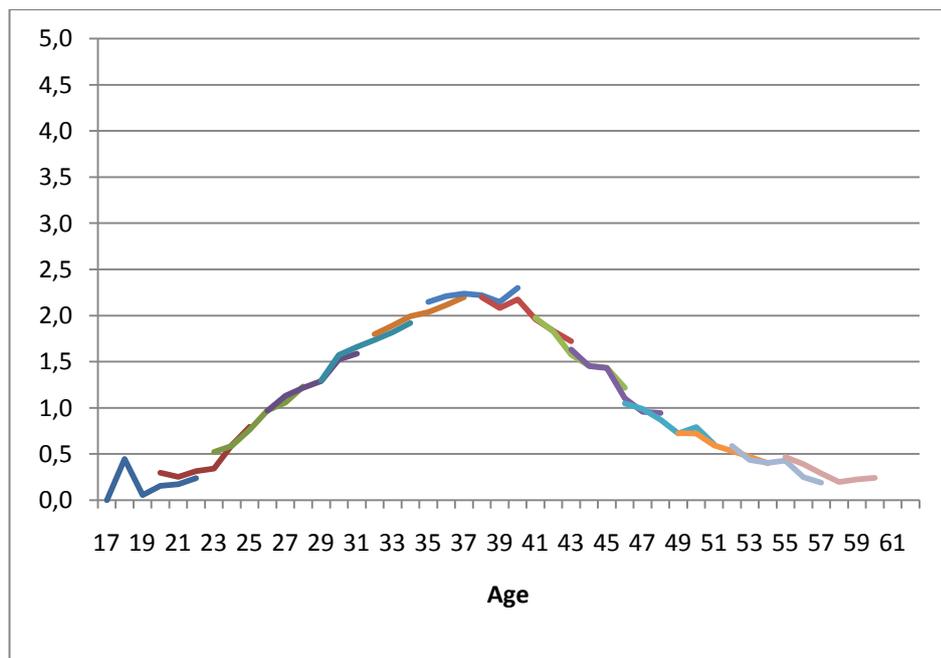


Figure 5.3.5: Average Number of Children of Household Heads for Total Sample

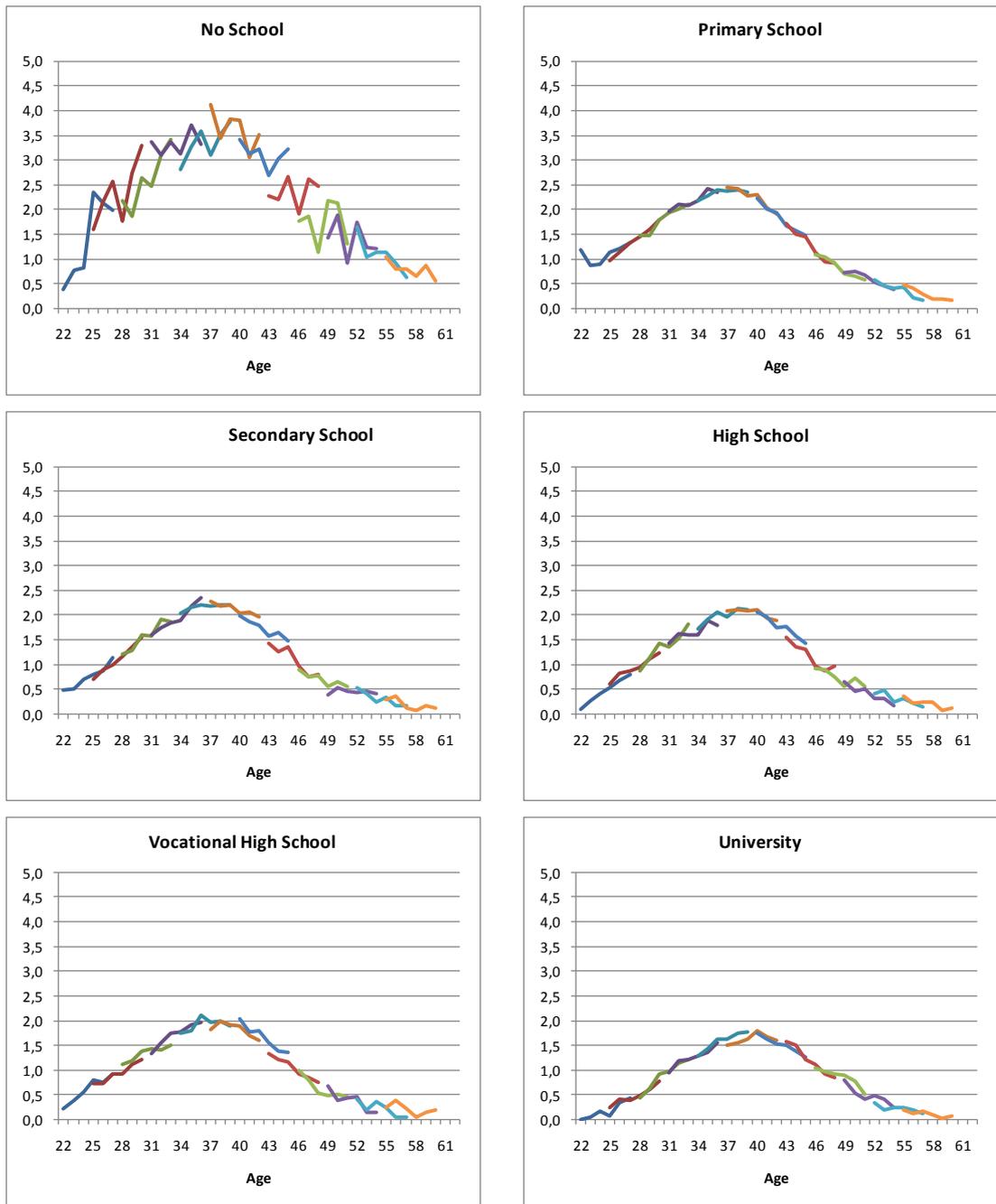


Figure 5.3.6: Average Number of Children of Household Heads by Education Groups

Average household size for total sample and for each education group is given in figures 5.3.7 and 5.3.8 respectively. As seen in the figures shape of the profiles are similar between the education groups with average household size decreasing with education. Household size decreases until age around 29, increases until ages around 38-40 which corresponds with the top point of the profile of average number of children and then decreases. As people leave their parent house and start to compose their own families average household size decreases which is expected to increase labor force participation rate of new household heads. As a new families start to have children household size increases. At older ages as children leave house, household size decreases as seen in the figure and this would decrease labor force participation rate as household expenses decrease.

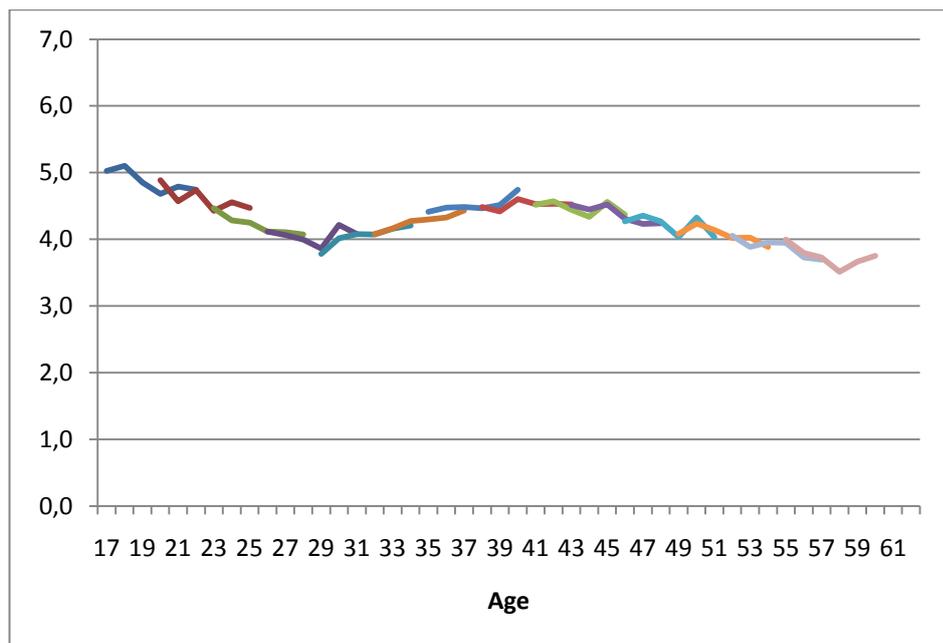


Figure 5.3.7: Average Household Size for Total Sample

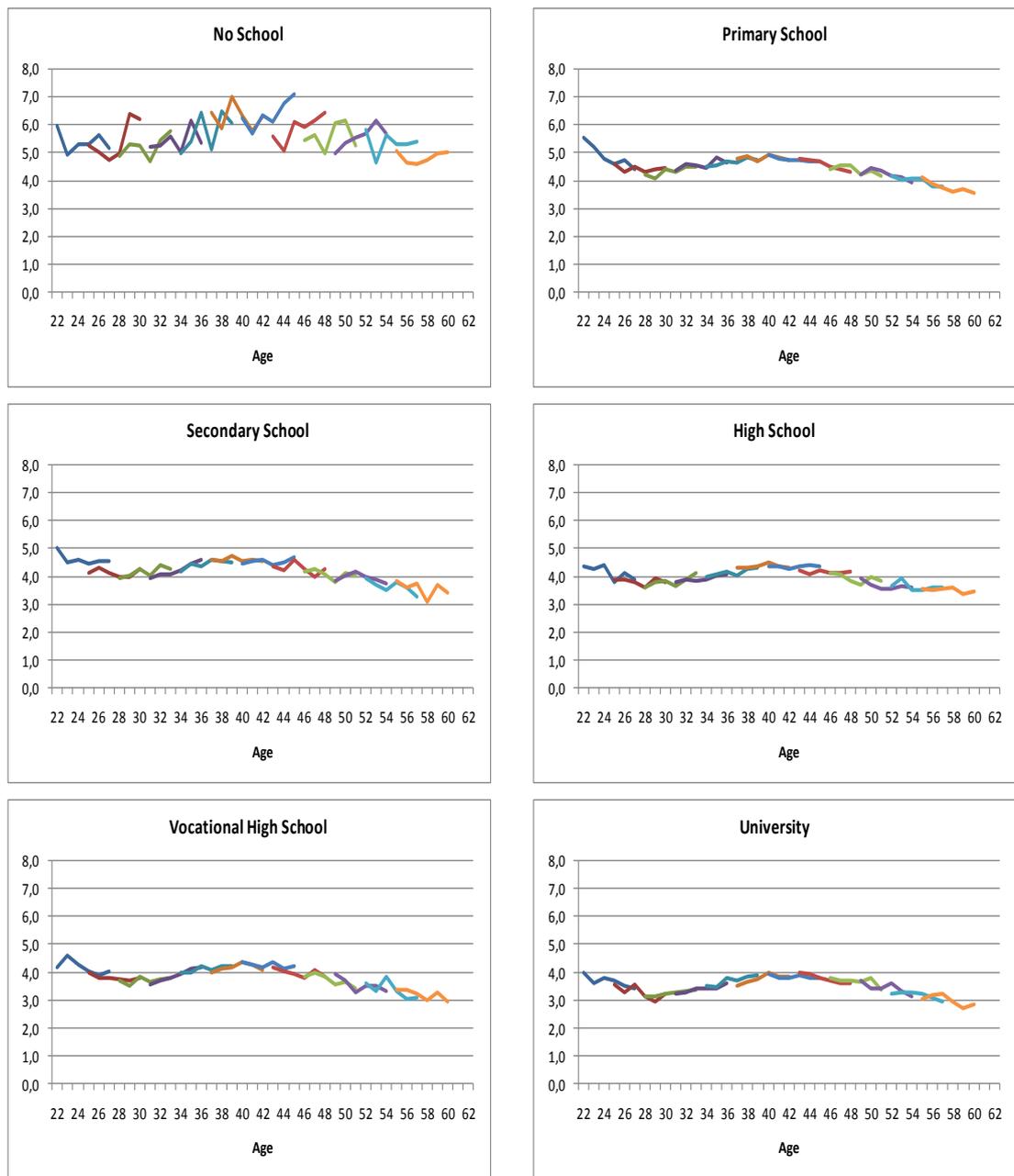


Figure 5.3.8: Average Household Size by Education Groups

In figure 5.3.9 living in urban area rate is given for all male population. As seen in the figure at the very young and very old ages profiles of younger cohorts are above the profiles of older cohorts which may show the increasing urbanization for younger cohorts. Moreover, when the individual profile of each cohort is observed; in general while profile of younger cohorts increases with age or time, profile of older cohorts

decreases. So, at young ages people may be migrating from rural to urban and at old ages from urban to rural.

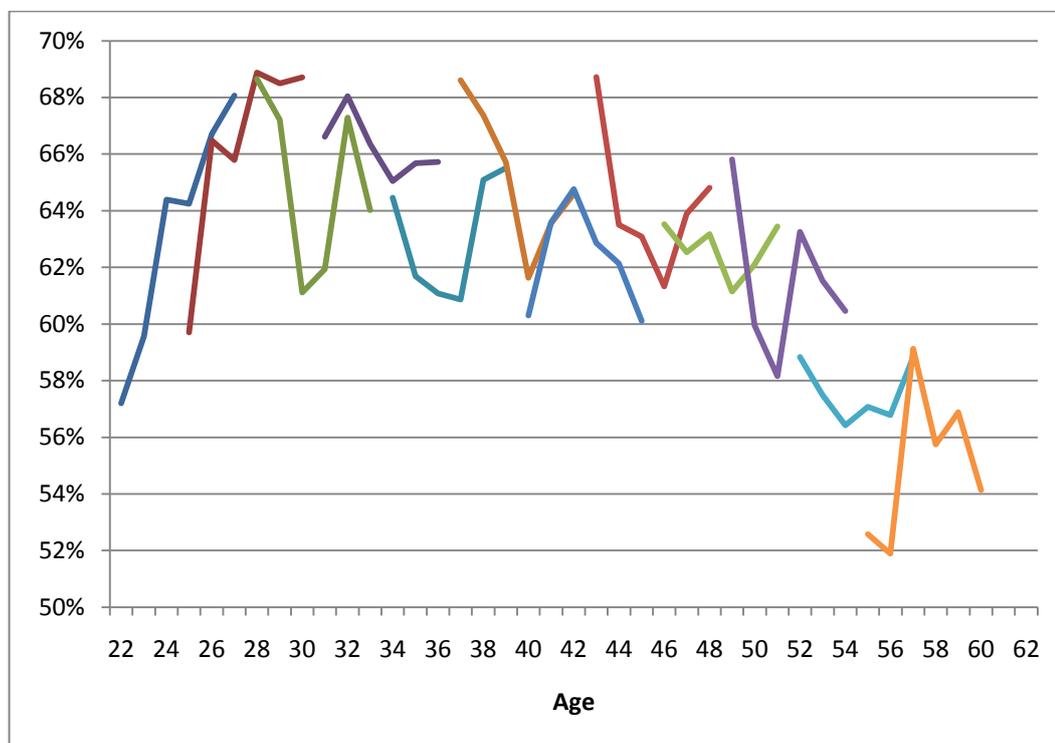


Figure 5.3.9: Urbanization Rate for All Male Population

Urbanization profile by education groups are given in figure 5.3.10. While older cohorts of no school graduates and younger cohorts of primary school graduates have an increasing profile with age or time, older cohorts of high school, vocational high school and university graduates have a decreasing profile with age or time. So, migration from rural to urban at young ages and urban to rural at old ages may be decreasing the skill level of the urban male population. Moreover, at very young and very old ages; while younger cohorts of no school and primary school graduates seem to have higher urbanization rate, younger cohorts of more educated groups seem to have lower urbanization rate. Therefore, migration of younger cohorts from rural to urban may have decreased the skill level of urban male. These two patterns are expected to decrease participation rate and increase informality.

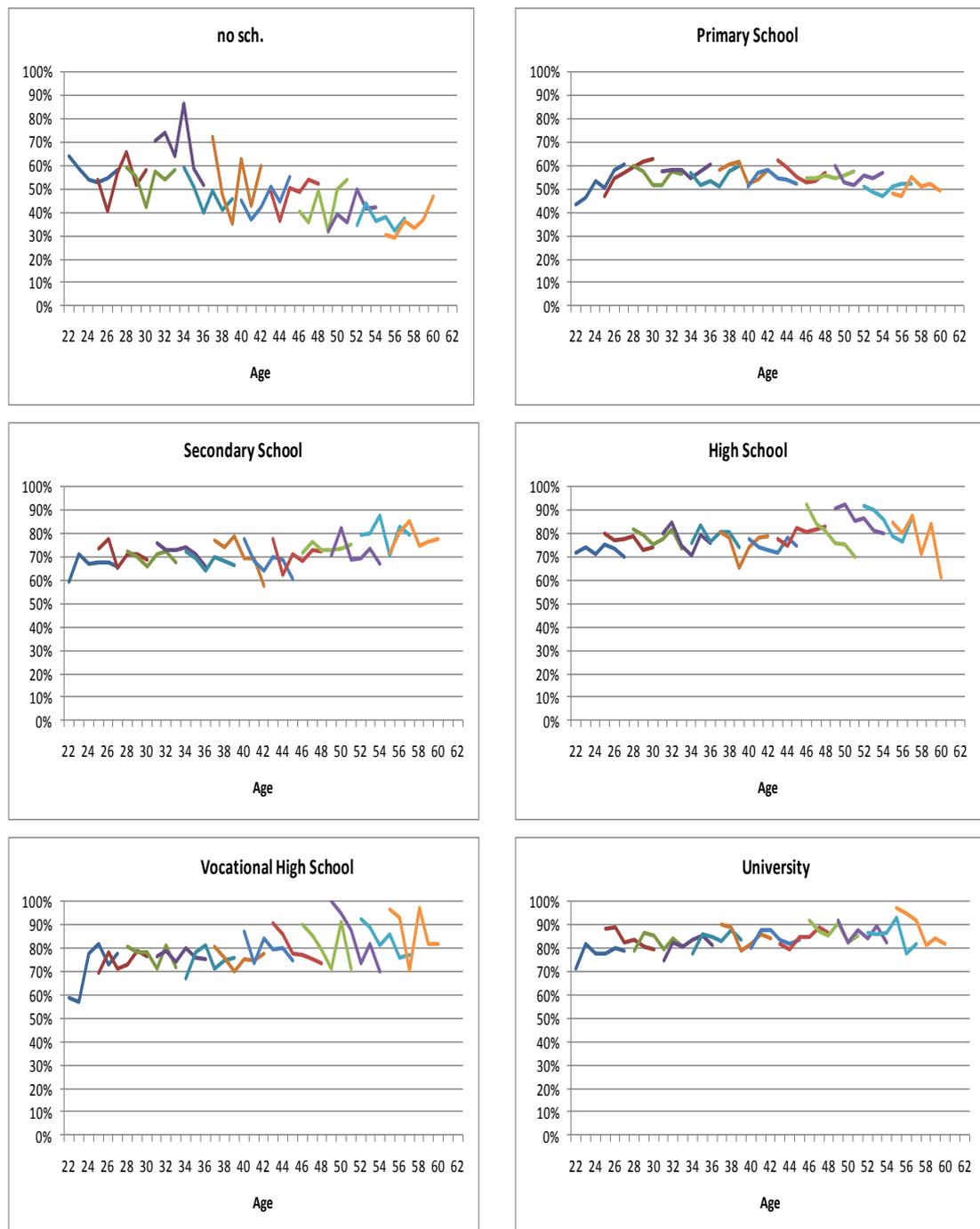


Figure 5.3.10: Urbanization Rate for All Male Population by Education Groups

Average years of schooling of urban males are given in figure 5.3.11. In the data only last successfully completed education institution of individuals are available. Therefore, I computed the years of schooling as the years needed to complete the last

graduated education institution under regular conditions. As seen in the figure average years of schooling increases towards younger cohorts. It increases from around 4.5 years to 8 years from the oldest and to the youngest cohort. Increasing education is expected to increase labor force participation and formality. However, as people continue to their education longer it would decrease participation at young ages.

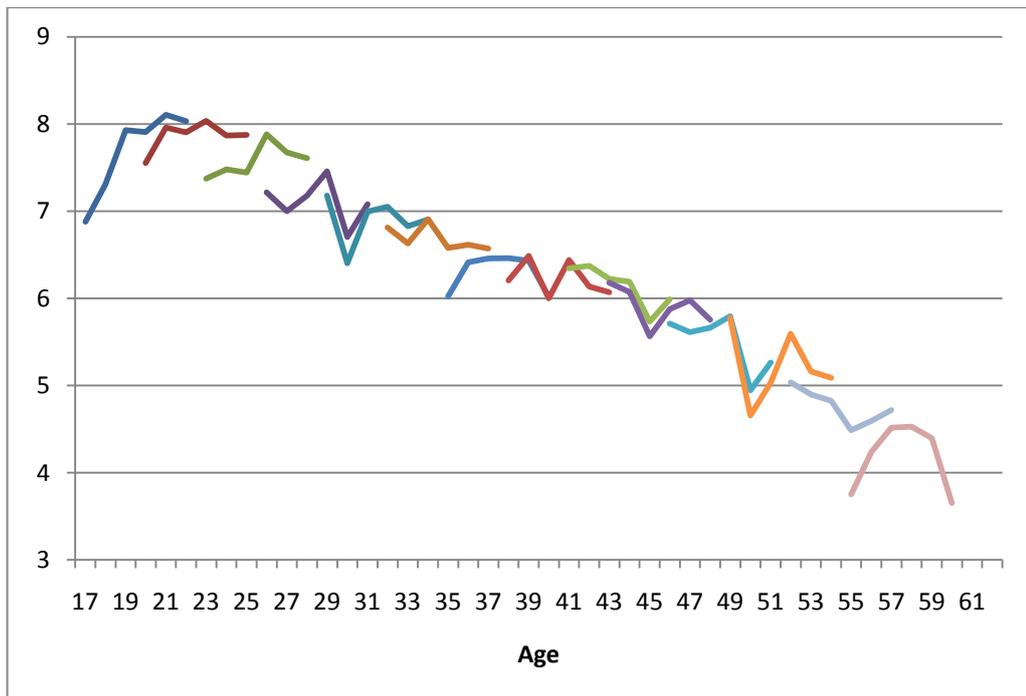


Figure 5.3.11: Average Years of Education for Total Sample

CHAPTER 6

COHORT ANALYSIS

6.1. Methodology

Until now graphical illustrations and descriptive methods are used to observe the life-cycle behavior of the variables. However, none of these methods give us the true life-cycle profiles in case of the strong cohort effects. In this chapter cohort analysis presented in Deaton (1997, p. 116) is utilized to obtain the true life-cycle profiles. Cohort analysis uses repeated cross section data and “follows cohort of individuals over time where cohorts are defined date of birth” (Deaton, 1997, p. 117). It decomposes data into age, cohort and year effects and using the age effects life-cycle profiles can be obtained.

A well known problem in cohort analysis is the identification of age, cohort and year effects separately due to the perfect linear relation between the variables. That is;

$$y = c + a$$

where “y” is year, “c” is cohort which is identified with year of birth and “a” is age.

In the literature there are various methods used to overcome the identification problem. Paxson (1996), Deaton (1997), Attanasio (1998), Parker (1999), Duval-Hernández and Romano (2009) uses a model where age, cohort and year variables are composed of dummy variables, except for the age variable of Attanasio which is specified as polynomial. In these models time dummies are assumed to be orthogonal to the time trend and average to zero. So that trend effect is reflected in age and cohort effects.

Fitzenberger et al. (2001) and Fitzenberger (2004) uses a model with age polynomial, cohort polynomial, time trend and time dummies. In these models linear cohort effect is assumed to be zero.

There are models that also use proxy for time. Beaudry and Lemieux (1999) and Beaudry and Green (2000) use a model with age, cohort and unemployment rate.

Fallick and Pingle (2007) and Balleer et al. (2009) compose a model with age, cohort and employment gap.

Using proxy is very restrictive on the time variable as it assumes a specific source of time effect. So, this method is not preferred in this paper. Moreover, in order to have more flexible model dummy variables are preferable to polynomials. So, in this paper each variable is specified as dummy variables and identification method of Deaton (1997) is used.

Formal specification of the model is:

$$P = \alpha A + \beta C + \theta Y + u$$

where P and u are the respective vectors of dependent variables and disturbances; A , C and Y are the respective matrices of age, cohort and year dummies; and α , β and θ are the respective coefficient vectors of age, cohort and year dummies. Year effect is assumed to be orthogonal to the time trend and average to zero. So that trend effects are represented in age and cohort effects.

Nine dependent variables are empirically analyzed; labor force participation rate, employment rate calculated as total number of employed people divided by total population, unemployment rate, informal employment rate calculated as total number of informal worker divided by total number of employed people, share of informal employment in labor force calculated as total number of informal worker divided by total labor force, share of formal employment in labor force calculated as total number of formal worker divided by total labor force, share of informal employment in population calculated as total number of informal worker divided by total population, share of formal employment in population calculated as total number of formal worker divided by total population, share of unemployment in population calculated as total number of unemployed divided by total population. All the dependent variables are calculated for each cohort-year cell. For example, for labor force participation rate, population in the labor force in a cohort-year cell is divided to the total population in this cell. Dependent variables are specified as logit in order to have the estimates always between 0 and 1. Let p_{ct} be one of the dependent variables for cohort “c” in year “y”. Dependent variable is specified as:

$$\ln (p_{cy} / (1 - p_{cy}))$$

Then the estimated p_{cy} is computed as:

$$e^{P_{cy}} / (1 + e^{P_{cy}})$$

Regressions are conducted both for the total sample and for the six education groups separately.

Analyses for total sample cover 8 years from 2000 to 2007, 39 cohorts who were born between the years 1955-1983 and 46 ages from 17 to 62. Analyses for education groups cover 34 cohorts who were born between the years 1955-1978 and 41 ages from 22 to 62. All cohorts are observed during the 8 years both in the analyses for total sample and for each education group.

In this chapter graphs of the predicted profiles will be presented. Results are presented initially for total sample and then for each education group. Firstly, life-cycle profiles are presented and net transition between sectors over the life-cycle is tried to be observed. Then, cohort and year profiles are presented. Finally life-cycle profiles are compared with cross section profiles.

6.2. Life-Cycle Profiles for Total Sample

Due to the logit specification of the dependent variables in the empirical model, predicted life-cycle profiles differ between the cohorts. In this section, assuming no time effect, predicted life-cycle profiles of the 1965 born cohort is presented.

As seen in Figure 6.2.1 predicted labor force participation rate exhibits a hump shaped profile. It is 30% at age 17, increases 62% until age 27 and reaches at 92%, relatively stable until age 42 and then decreases 64% until age 62 and reaches at 29%. Notice that there is increase between the ages 27-32, and decrease between ages 32-42 but the changes are very small compared to the rest of the profile. At young ages as opportunity cost of participation increases people participate into the labor force more and participation decreases as they get older and retire. Decrease in labor force participation rate at older ages corresponds with the having children rate

almost perfectly. So, an important factor for dropping out of the labor force at older ages may be children. Moreover, participation of more educated groups into labor market occurs at later ages. So, gradual participation of more educated groups may be effective at the rapid increase of labor force participation rate at young ages.

Compared to the five largest European countries EU5 given in Balleer et al. (2009, p. 42) and the USA given in Fallick and Pingle (2007), labor force participation rate in Turkey starts to decrease earlier. Participation rate in both in the EU5 and the USA starts to decrease around ages 50-55.

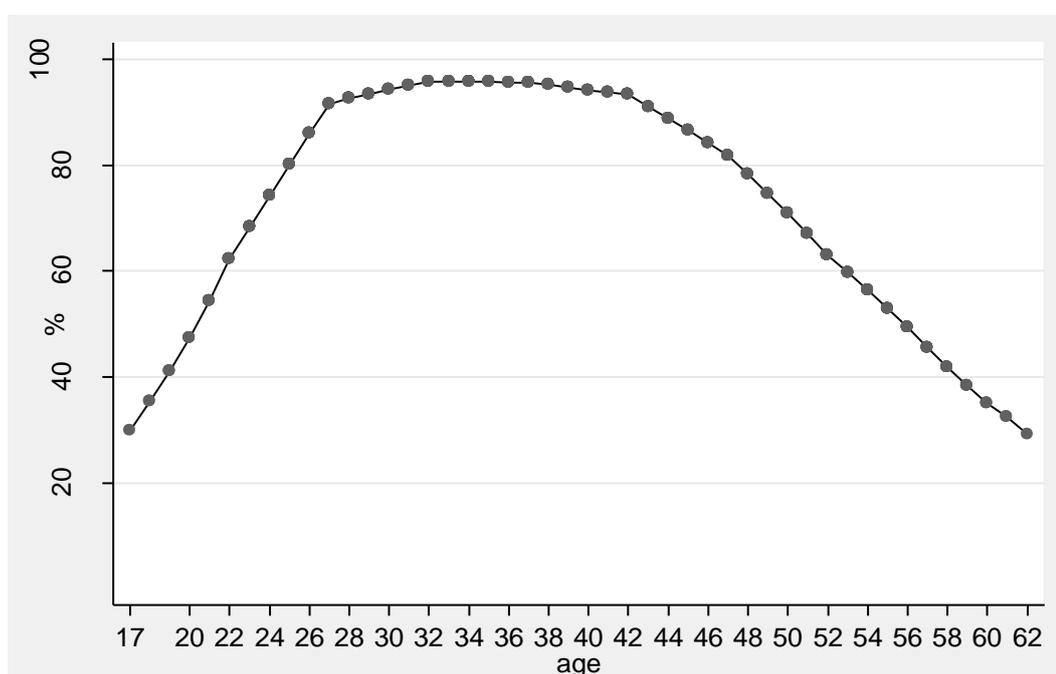


Figure 6.2.1: Predicted Labor Force Participation Rate Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

Predicted employment rate profile has a similar shape with the predicted labor force participation rate profile (Figure 6.2.2). Starting from 32% at age 17 it increases 52% until age 27 and reaches at 85%, relatively stable until age 42 and then decreases 67% until age 62 and reaches at 18%. As in the case of labor force participation rate there is a small increase between the ages 27-32 and decrease between the ages 32-

42. Besides, different from the labor force participation rate, level of employment rate is different at age 17 and 62; employment is about 13% higher at age 17.

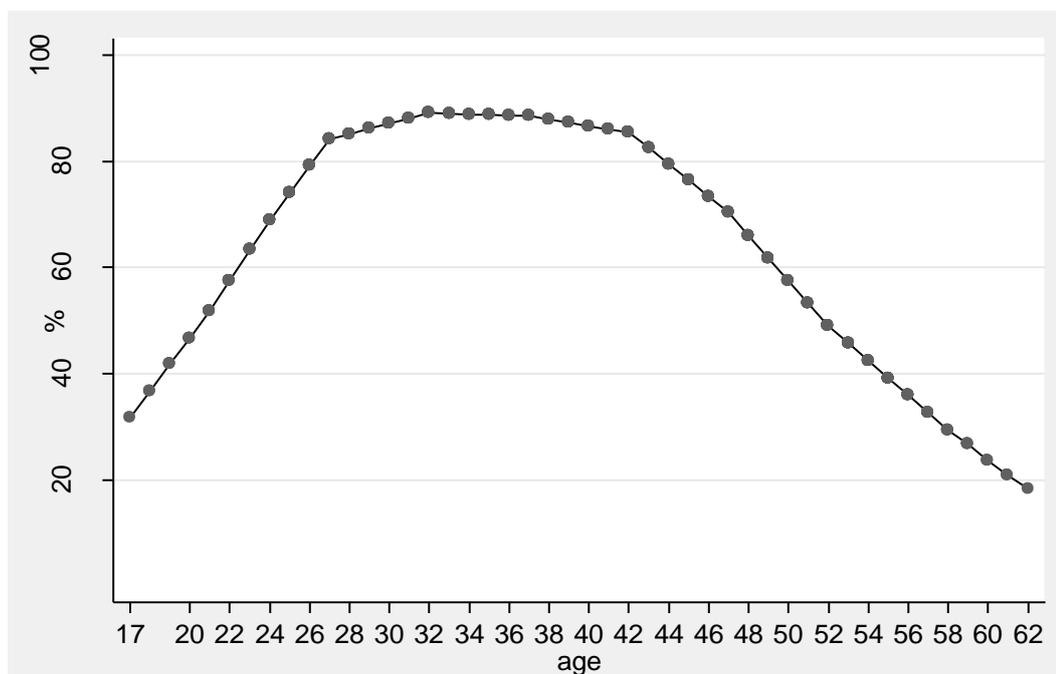


Figure 6.2.2: Predicted Employment Rate Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

When we look at the unemployment rate profile in Figure 6.2.3, differences at the start and end of the life-cycle profile of the employment rate is better understood. As seen in the figure unemployment rate at age 62 is about 10% more than at age 17. Unemployment rate is about 12% at age 17, increases 2% until age 22 and reaches at 14%, decreases 7% until age 32 and reaches at 7%. Then, it increases 15% until age 62 and reaches at 22%. Notice that the changes are slower between the ages 27-32 and 32-42. Until around age 22 there are always new groups entering the labor market as different education groups are completing their education gradually. New entrants may have longer unemployment durations as well as higher turnover rates. These should be effective in the rapid increase of unemployment rate at young ages. By the time as new entrants decrease people should be finding jobs that are also more

stable and unemployment rate starts to decrease. Unemployment rate rapidly increases also after age 42 which corresponds to the age when labor force participation rate starts to decrease rapidly. More skilled workers may be working in formal sector where retirement opportunity exists. Therefore decrease in labor force participation rate by retirement may be taking out skilled workers from the labor market more than the less skilled workers. Moreover, some of the retired workers may be staying in the labor force and looking for new jobs. These processes may be causing rapid increase of unemployment rate at older ages.

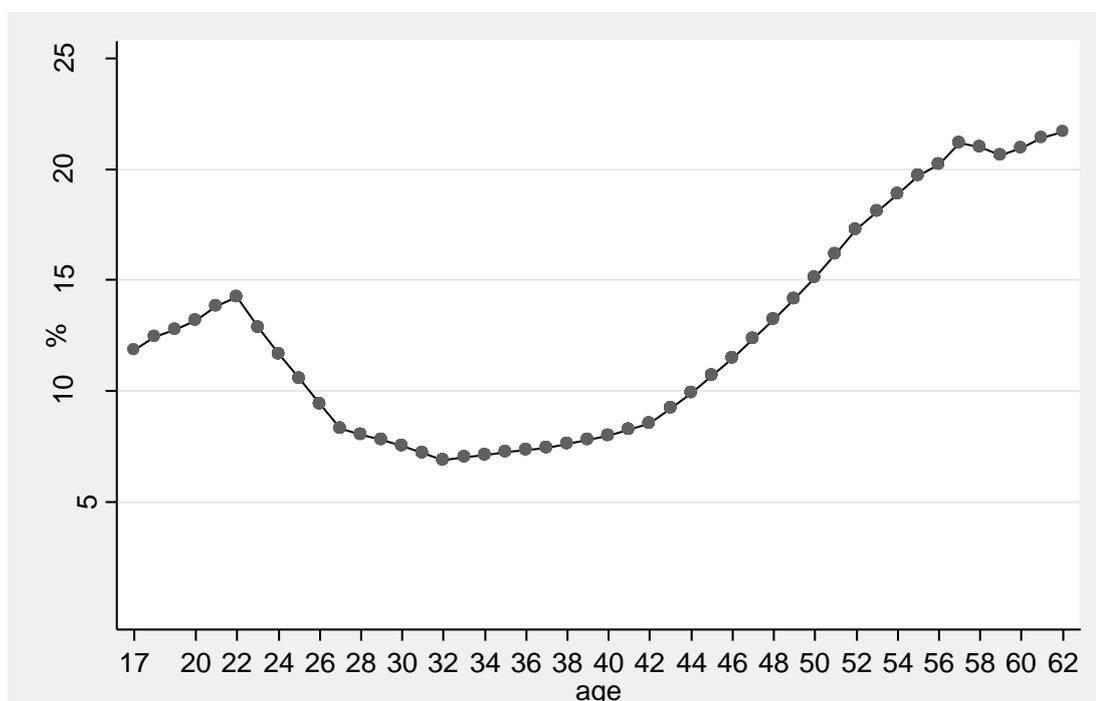


Figure 6.2.3: Predicted Unemployment Rate Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

As seen in Figure 6.2.4 informal employment rate has a U shaped profile. Starting from 62% at age 17 it decreases 37% until age 27 and reaches at 25%, it is relatively stable until age 42 and then increases 70% until age 62 and reaches at 94%. Small changes between the ages 27-32 and 32-42 occur also for informal employment rate. At younger ages as more educated people enter the labor market informal

employment rate should be decreasing. Moreover, people may be finding formal sector jobs after some experience gain which would also be decreasing informal employment rate at young ages. After age 42 when labor force participation rate starts to decrease informal employment rate increases. At older ages formal sector workers should be retiring while informal sector workers are expected to continue working. Moreover, people who retire but still continue to work do not need social security coverage due to their new jobs. These factors must be contributing to the increase in informal employment rate at older ages. In addition, as people get marry, have children and get more close to the older ages opportunity cost of not having social security coverage should be increasing and so people should be rather choosing jobs that provide social security coverage.

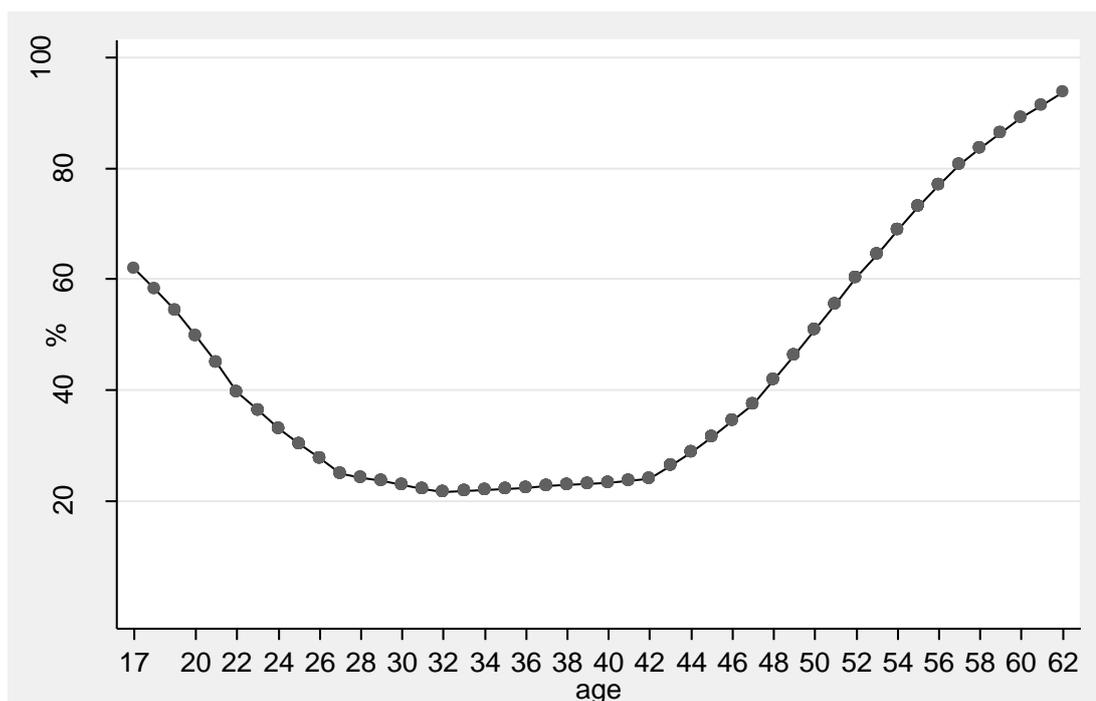


Figure 6.2.4: Predicted Informal Employment Rate Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

As given in Figure 6.2.5 share of informal employment in labor force also has a U shape. It is 54% at age 17, decreases 31% and reaches at 23% at age 27, relatively

stable until age 42 and then increases 69% and reaches at 91% at age 62. Changes between the ages 27-32 and 32-42 are again very small compared to the rest of the profile.

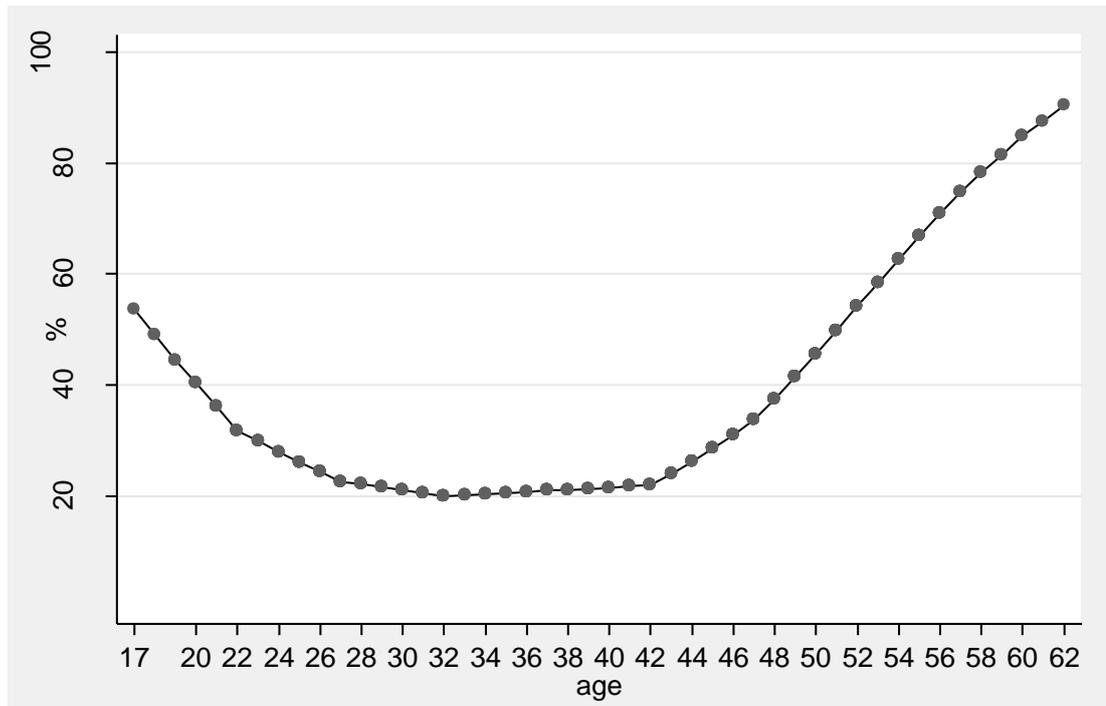


Figure 6.2.5: Predicted Life-Cycle Profile of Share of Informal Employment in Labor Force for Total Sample and 1965 Born Cohort, No Year Effect Assumed

Share of formal employment in labor force profile exhibits a hump shaped profile as given in Figure 6.2.6. It is 33% at age 17, increases 35% until age 27 and reaches at 69%, relatively stable until age 42 and then decreases 64% and reaches at 6% at age 62. Like other profiles there exist small changes between the ages 27-32 and 32-42.

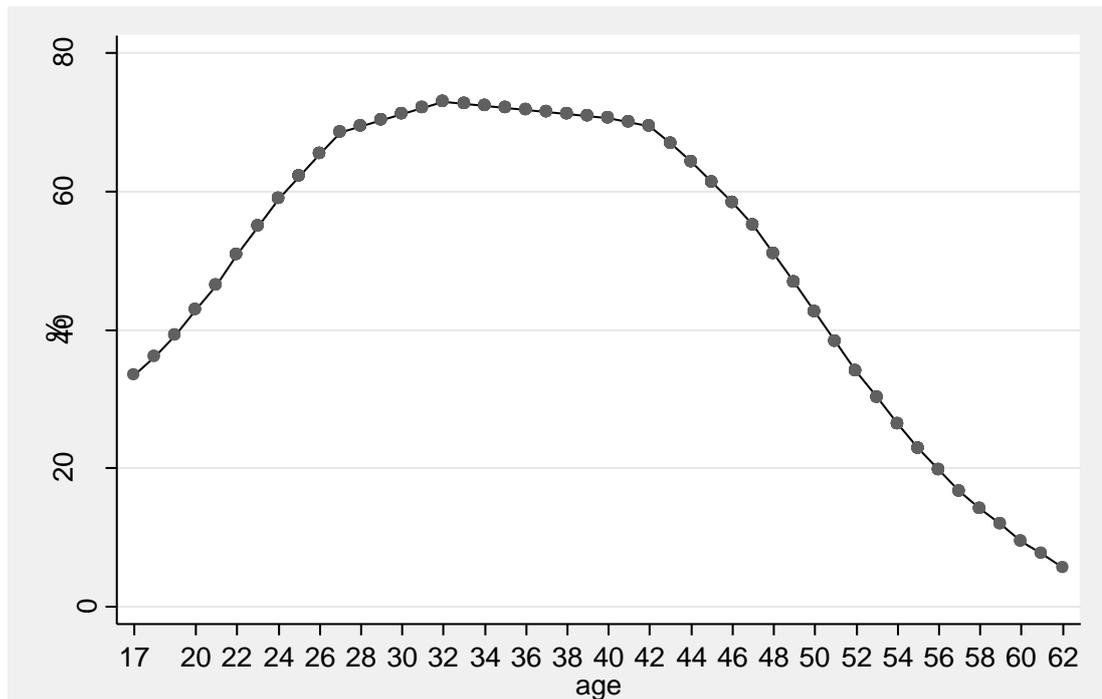


Figure 6.2.6: Predicted Share of Formal Employment in Labor Force Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

Share of informal employment in population profile is given in Figure 6.2.7. As seen in the graph it is stable at around 20% until age 42 and then increases 22% and reaches at 43% at age 62. After age 42, retired people who were working in the formal sector should be entering to the informal sector which must be increasing the share of informal employment in population at older ages.

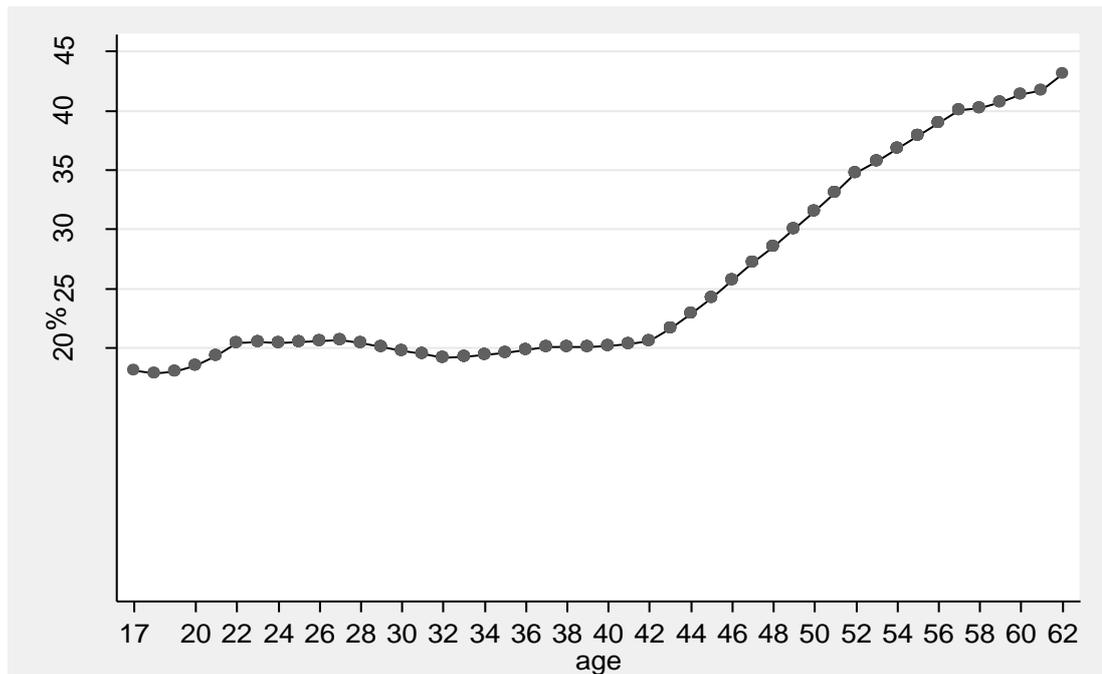


Figure 6.2.7: Predicted Share of Informal Employment in Population Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

Share of formal employment in population profile is given in Figure 6.2.8 and exhibits a hump shaped profile like the share of formal employment in labor force. It is 12% at age 17, increases 51% until age 27 and reaches at 63%, relatively stable until age 42, and then decreases 63% and reaches at 2% at age 62. As seen in the figure compared to the other profiles, changes between the ages 27-32 and 32-42 are more noticeable for the share of formal employment in population. However, still this phase can be considered as a relatively stable period compared to the rest of the profile. Notice that after age 42 as labor force participation rate decreases while share of formal employment in population decreases, share of informal employment in population increases which indicates net transition from formal employment to non-participation and informal employment.

Share of unemployment in population profile is given in Figure 6.2.9. At age 17 it is 4%, increases 5% until age 22 and reaches at 9%, decreases 2% until age 32 and

reaches at 7%, increases 4% until age 52 and reaches at 10% and then decreases 4% and reaches at 6% at age 62.

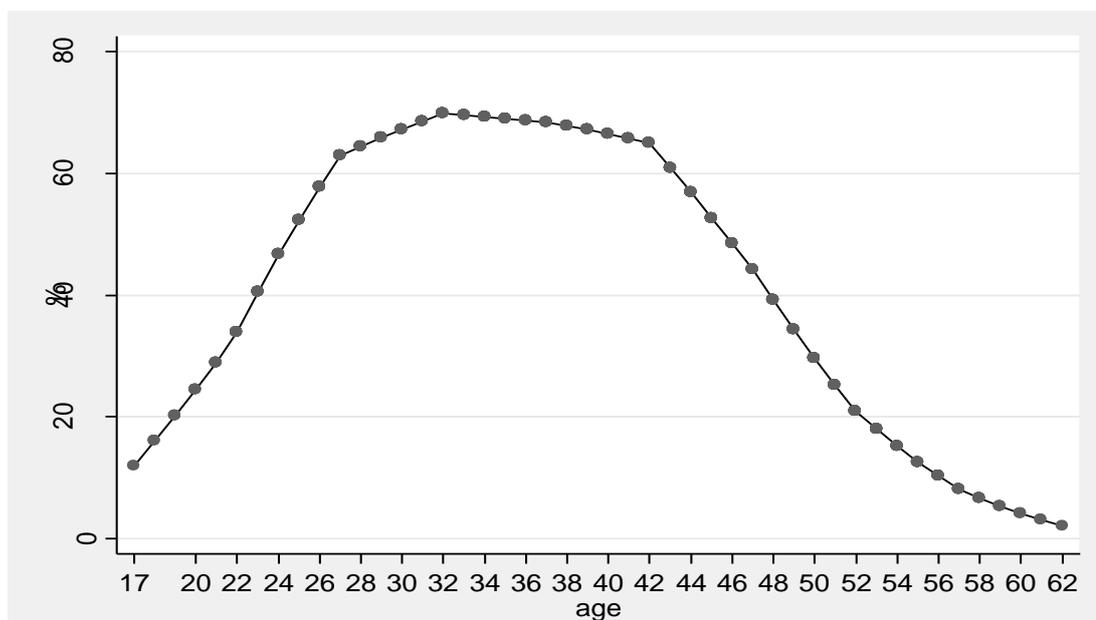


Figure 6.2.8: Predicted Share of Formal Employment in Population Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

In summary; over the life cycle participation rate, share of employment in population, share of formal employment in labor force and in population increase until age 27, relatively stable until age 42 and then decreases. On the other hand, informal employment rate and the share of informal employment in labor force moves in the opposite direction. Share of informal employment in population is stable until age 42 and then increases. Unemployment rate increases until age 22, decreases until age 32 and then increases. Share of unemployment in population changes similar to the unemployment rate over the life-cycle but it decreases after age 52.

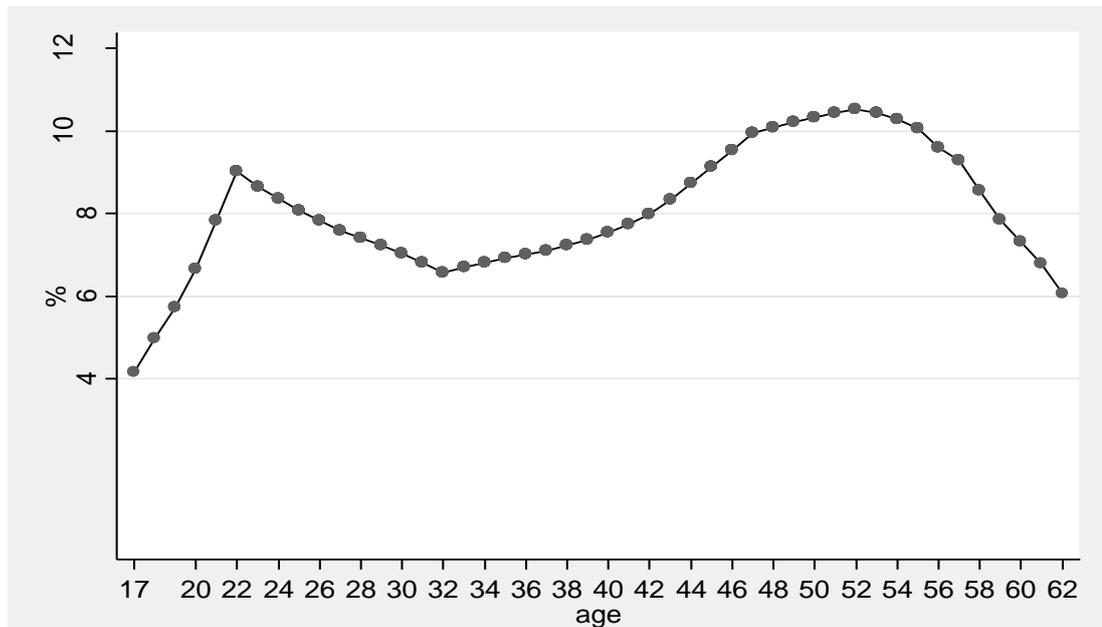


Figure 6.2.9: Predicted Share of Unemployment in Population Life-Cycle Profile for Total Sample and 1965 Born Cohort, No Year Effect Assumed

6.3. Life-Cycle Profiles for Education Groups

In this section predicted life-cycle profiles of the 1965 born cohort is presented separately for each education group, no time effect is assumed in the predicted profiles.

Predicted labor force participation rate profiles by education groups are given in Figure 6.3.1. Except for no graduates other education groups have similar profiles with the total sample; increasing until age 27, relatively stable until age 42, and then decreasing. Labor force participation rate of no school graduates increases until age 32 and then decreases; it lacks the stable phase at middle ages. Except for no school and university graduates as education level increases rise of labor force participation rate at young ages gets faster; with the profile of vocational high school graduates rising slower than high school graduates. As lower education groups graduate earlier they should be completing their participation into market earlier. After graduation, increase in the participation rate is expected to be more rapid initially and then slow down. An important portion of the high school graduates should be studying for

university entrance exams or university students. Therefore, they start from a lower level of participation. However, as university students graduate non-participant population in high school graduates decreases. Moreover, those who cannot pass the university entrance exams participate into the labor market. These factors must be contributing to the rapid increase of labor force participation rate of high school graduates at young ages. Less of vocational high school graduates are university students and study for the university entrance exams. Moreover, they are trained more market oriented compared to the high school graduates. Therefore, they start from a higher participation level and fully participate into the labor market earlier. While labor force participation rate of high school graduates continues to increase between the ages 27-32, vocational high school graduates have a more stable profile in this period. University graduates already have a high labor force participation rate after graduation. Therefore, it is reasonable that their labor force participation rate increases slower than high school and vocational school graduates at young ages. Early decrease of labor force participation rate of no school graduates may be related to their family structure and low opportunity cost of not working for this group.

Compared to Germany, labor force participation rate in Turkey peaks earlier at all education levels (Fitzenberger, 2004, p. 106). Participation rate in Germany peaks at ages around 40-45 depending on the education level. Compared to Mexico participation rate in Turkey starts to decrease earlier at all education levels (Duval-Hernández and Romano, 2009, p. 26). Participation rate in Mexico starts to decrease at ages around 55.

As seen in Figure 6.3.2 employment rate profiles exhibit a similar pattern with labor force participation rate profiles. Changes in labor force participation rate seem to be mainly driven by changes in employment.

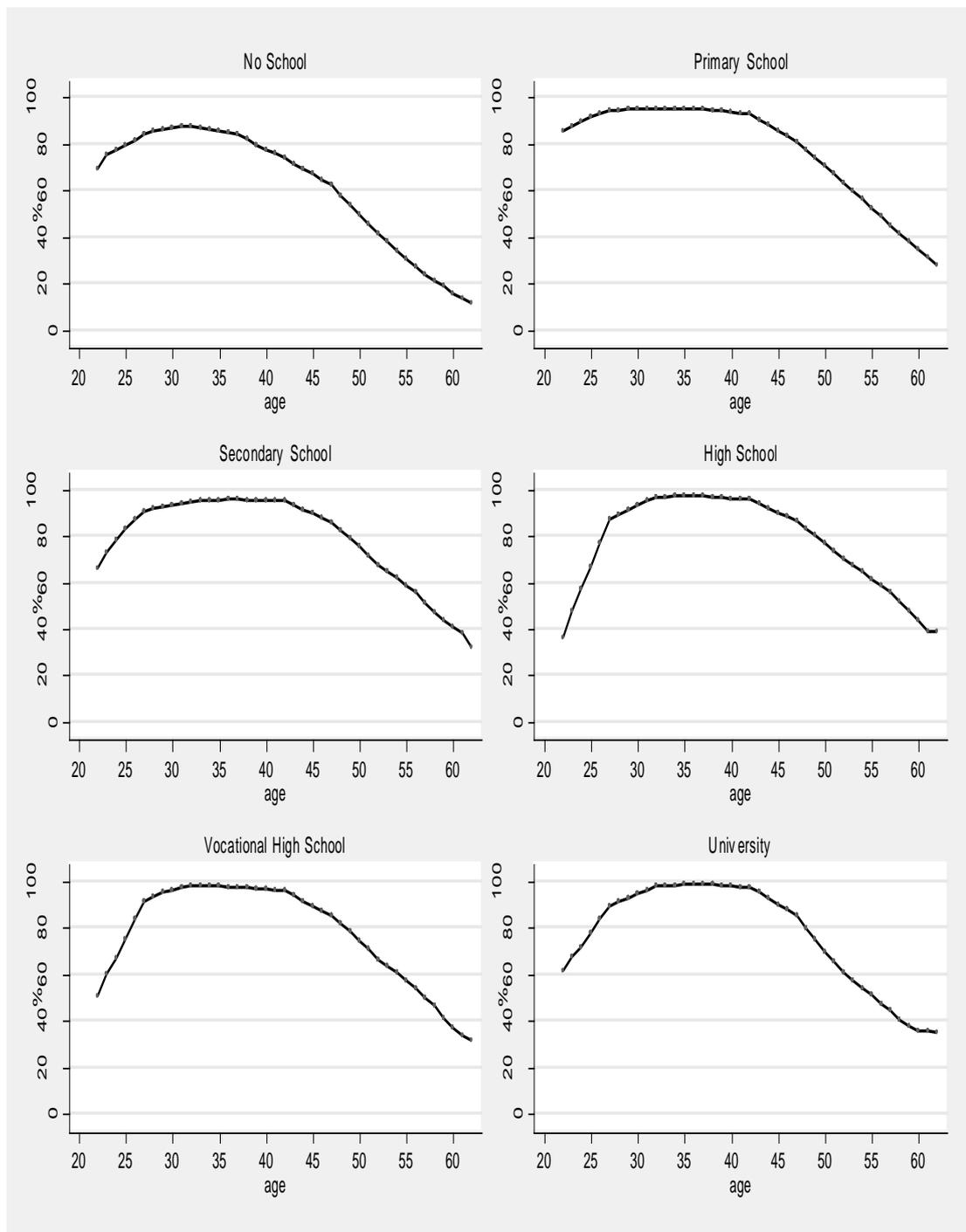


Figure 6.3.1: Predicted Labor Force Participation Rate Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

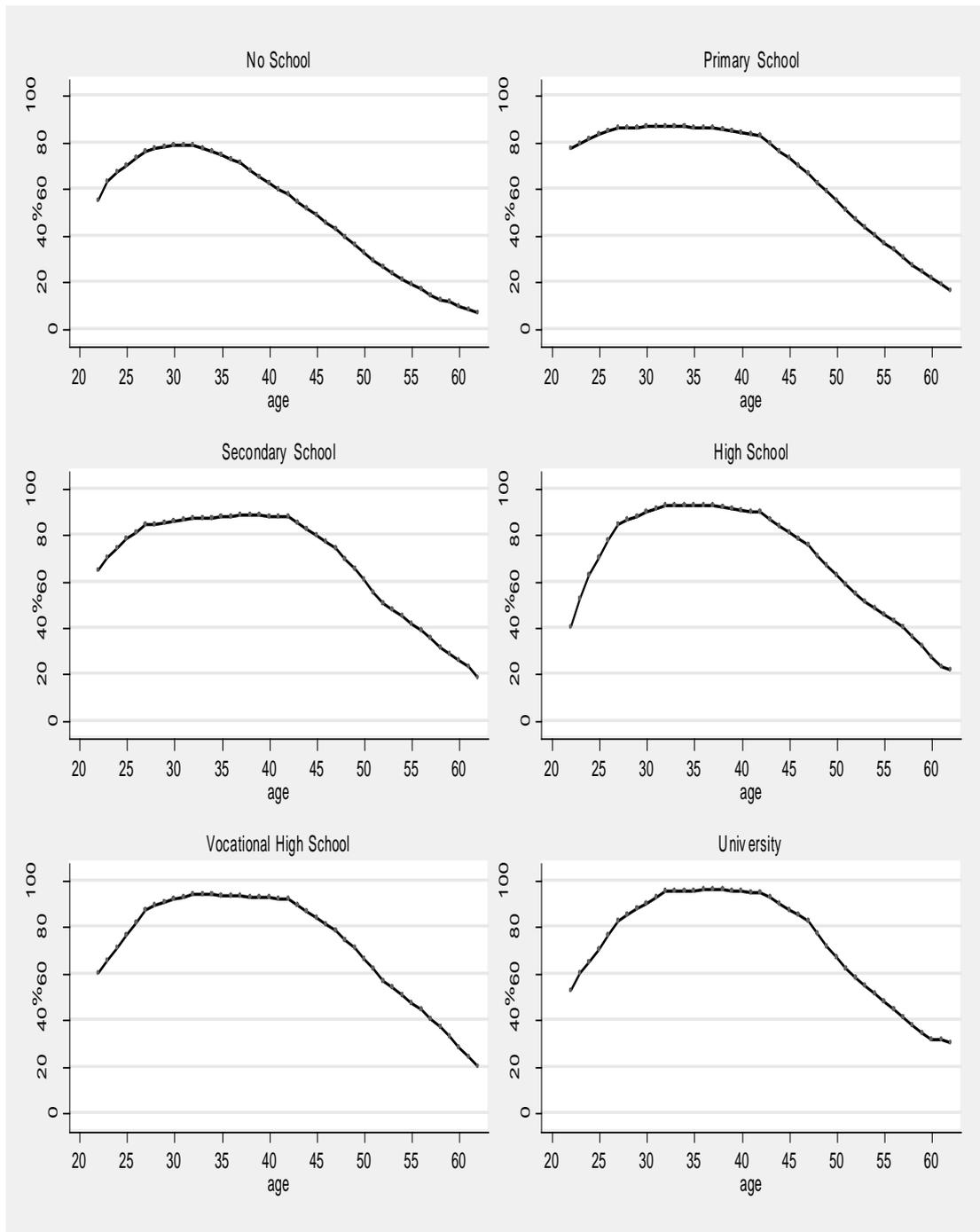


Figure 6.3.2: Predicted Employment Rate Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

As seen in Figure 6.3.3 unemployment rate profiles differ between the education groups significantly. Nevertheless, unemployment rate decreases at young ages and the decrease lasts longer as education level increases. It is relatively stable at middle ages until labor force participation rate starts to decrease except for high school and university graduates. Unemployment rate of high school graduates starts to increase at age 32; earlier than the decrease in the labor force participation rate. However, as labor force participation rate starts to decrease at age 42, increase in unemployment rate of high school graduates gets faster. Unemployment rate increases at older ages and the increase is more pronounced for low educated groups. Profile of university graduates differ from the other groups noticeably. It is very high at the start of the life-cycle but decreases very rapidly at young ages and then stays relatively stable. High unemployment rate of university graduates at young ages may stem from the sharp increase in the labor force participation rate of this group after graduation. Compared to the other groups participation rate of university graduates peaks in a shorter time after graduation.

Informal employment rate profiles by education groups are given in Figure 6.3.4. As seen in the figure except for no school graduates profiles are very similar between the education groups. It decreases slightly until age 27, relatively stable until age 42 when labor force participation rate starts to decrease and then increases rapidly. Moreover, increase at older ages is more rapid for more educated groups. As formality is higher in more educated groups, retirement is expected to be more common in more educated groups. This would decrease formality and increase informality more at older ages. Informal employment rate of no school graduates is 45% at age 22, increases 29% until age 24 and reaches at 64%. Then like the profiles of other groups it is stable until age 32 when labor force participation rate starts to decrease, after age 32 it increases. More rapid increase of informal employment rate of more educated groups at older ages is true also when no school graduates are considered.

Informal salaried sector in Mexico has a similar life-cycle profile with informal sector in Turkey but the informal employment rate in Turkey starts to increase

earlier. Informal salaried employment in Mexico starts to increase at ages around 55 (Duval-Hernández and Romano, 2009, p. 27).

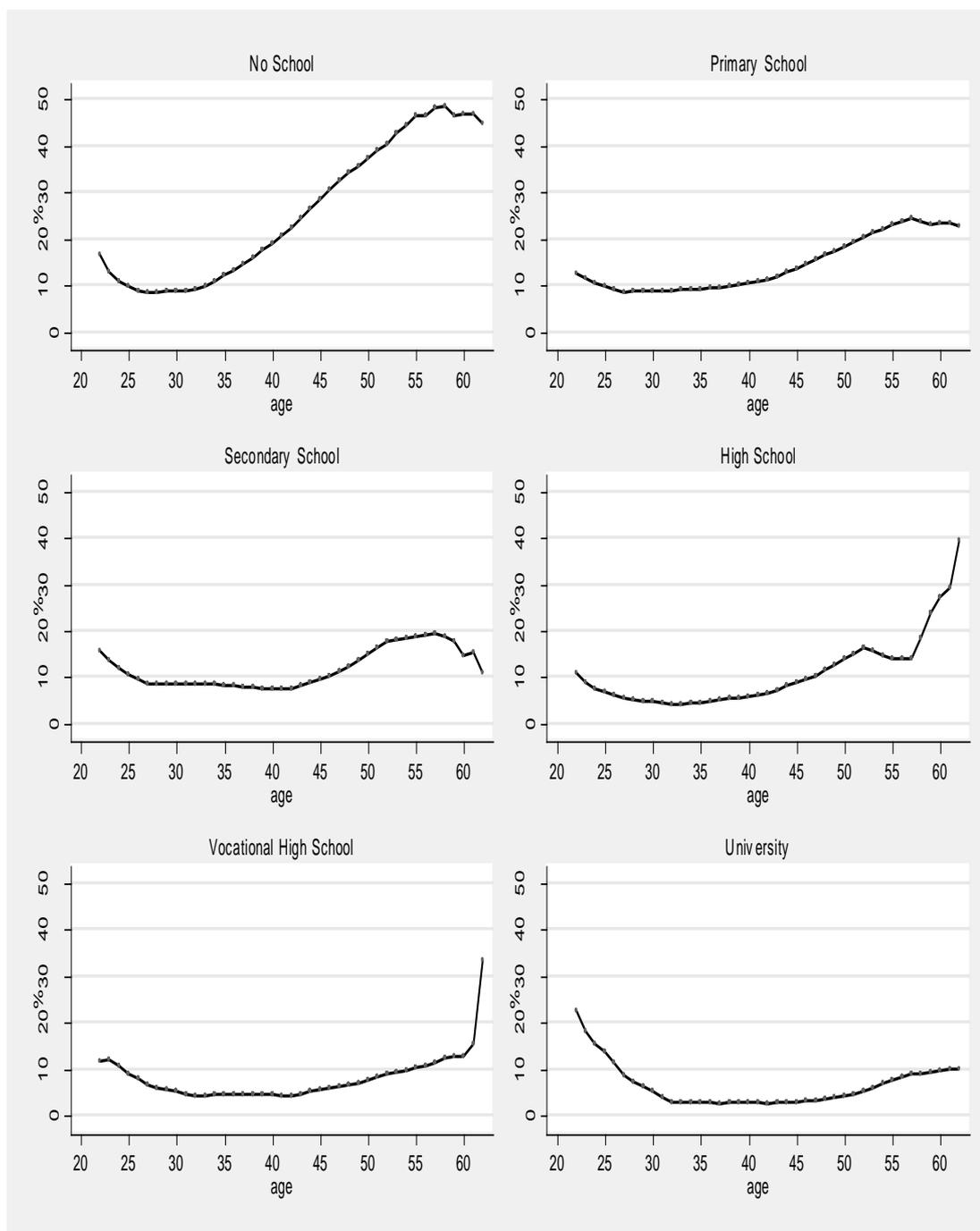


Figure 6.3.3: Predicted Unemployment Rate Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

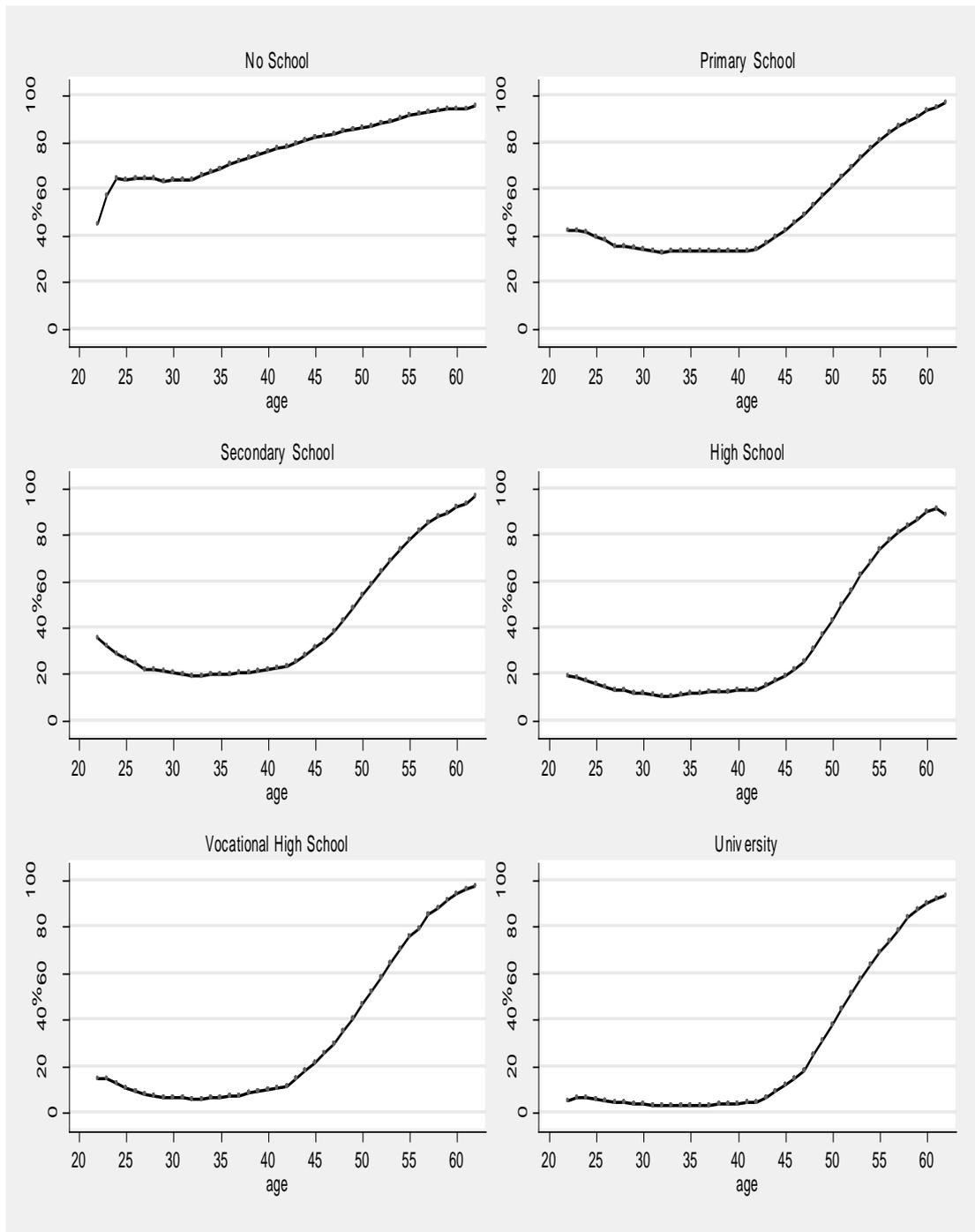


Figure 6.3.4: Predicted Informal Employment Rate Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

Share of informal employment in labor force has similar predicted profiles with informal employment rate as seen in Figure 6.3.5. However, share of informal employment in labor force of no school graduates increases until age 26 and it increases more slowly after age 32. As employment has the largest share in labor force it is expectable that informal employment rate profile is similar to the profile the share of informal employment in labor force.

Share of formal employment in labor force profile by education groups are given in Figure 6.3.6. As seen in the figure, like in the case of informality, except for no school graduates profile of other education groups are similar. It increases until age 27 for secondary school or lower educated groups and until age 32 for high school or more educated groups; relatively stable until age 42 when labor force participation rate starts to decrease and then decreases. Share of formal employment in labor force rate of no school graduates is 45% at age 22, decreases 14% until age 24, relatively stable until age 32 when labor force participation rate decreases and then decreases.

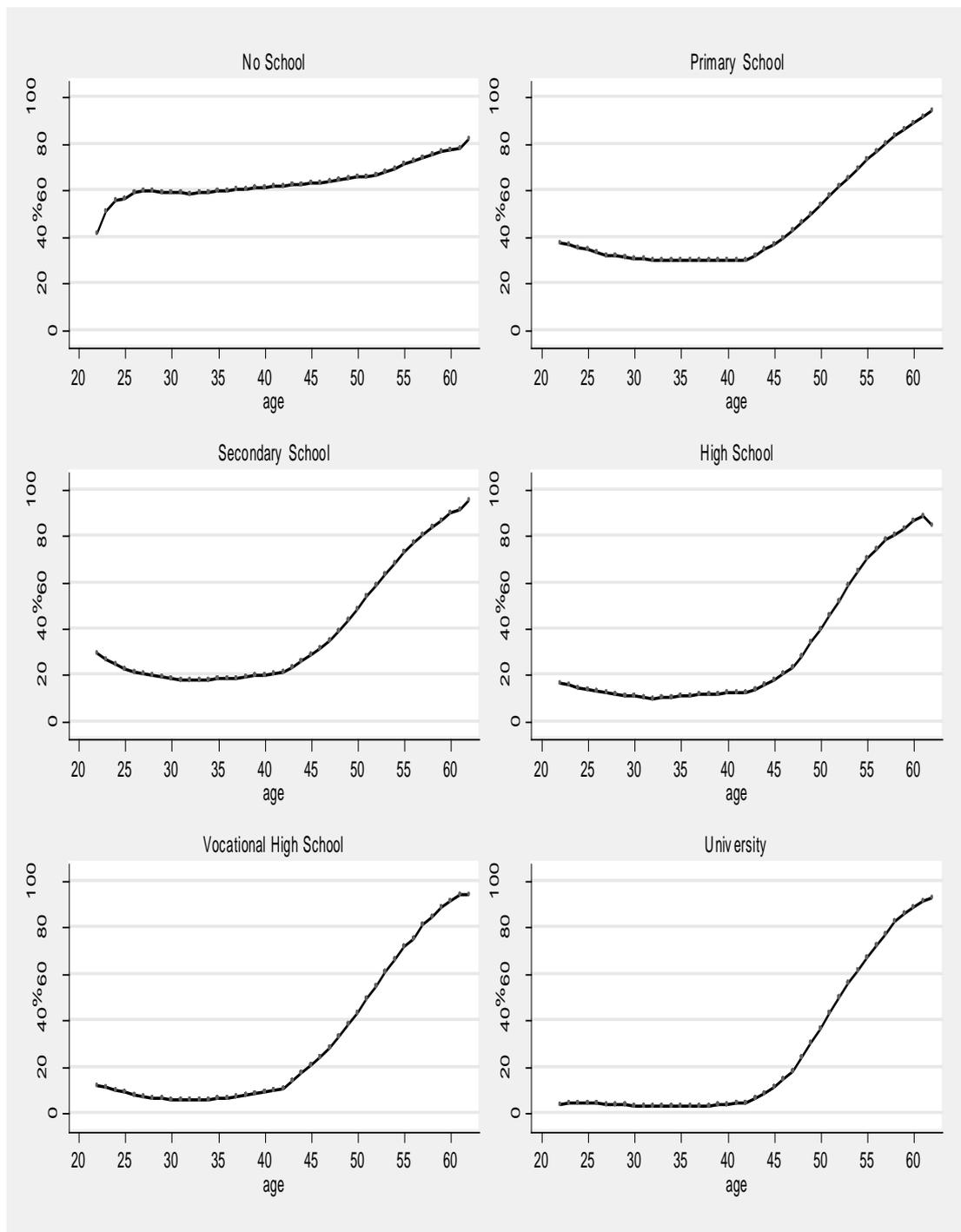


Figure 6.3.5: Predicted Share of Informal Employment in Labor Force Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

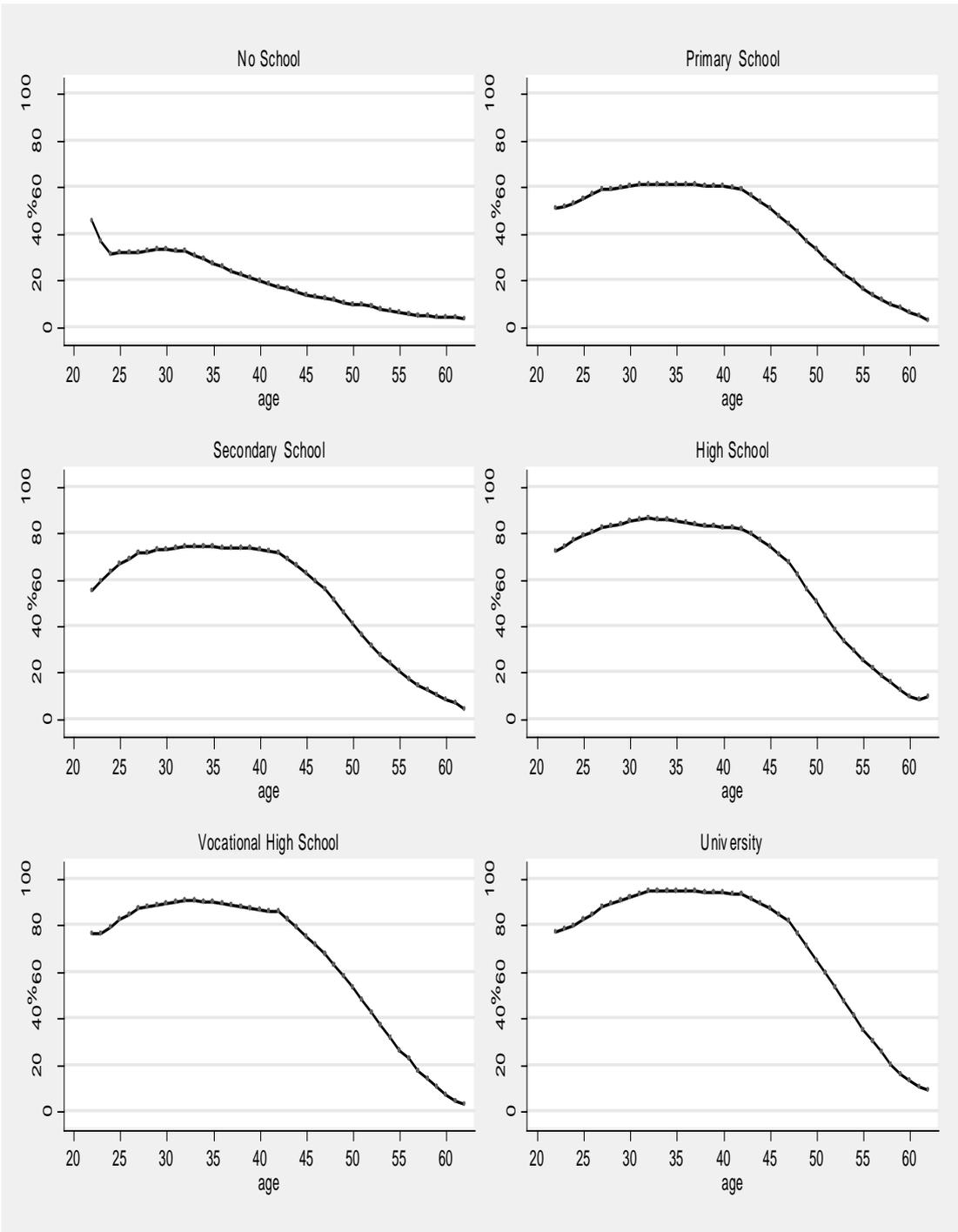


Figure 6.3.6: Predicted Share of Formal Employment in Labor Force Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

Share of informal employment in population is given in Figure 6.3.7. Although there are minor differences, profiles are similar between the education groups except for no school graduates. It is relatively stable until age 42 when labor force participation rate starts to decrease and then increases. Notice that while employment rate increases significantly between the ages 22-27, share of informal employment in population does not. So, increase of employment at younger ages supports formal employment. Profile of no school graduates increases until age 31 and then decreases as participation rate decreases. For no school graduates increase in employment at young ages also supports the informal employment. Besides, as participation rate decreases at older ages share of informal employment in population also decreases for no school graduates. Change of share of informal employment in population of no school graduates in the same way with employment rate and the labor force participation rate is expectable as most of the employment of no school graduates is in the form of informal employment.

Increase of share of informal employment in population at older ages gets faster as education increases; this pattern can be better explained with the share of formal employment in population given in Figure 6.3.8. At older ages share of formal employment in population decreases faster as education increases. So, more people may be retiring from higher educated groups and as education increases retired people may be more participating in the labor force which may occur in the form of informal employment.

As seen in the figure share of formal employment in population profiles are very similar to the employment rate profiles except for no school graduates which means that changes in employment rate is mainly driven by changes in formal employment except for no school graduates. Profile of no school graduates is at 34% at age 22, decreases 8% until age 24, increases 5% until age 29 and then decreases to 1% at age 62. Different from other education groups, share of informal and formal employment in population profiles of no school graduates are moving in a more similar pattern over the life-cycle. Increase in employment at older ages increases both formal and

informal employment and the tradeoff between the two sectors at older ages is not visible for no school graduates.

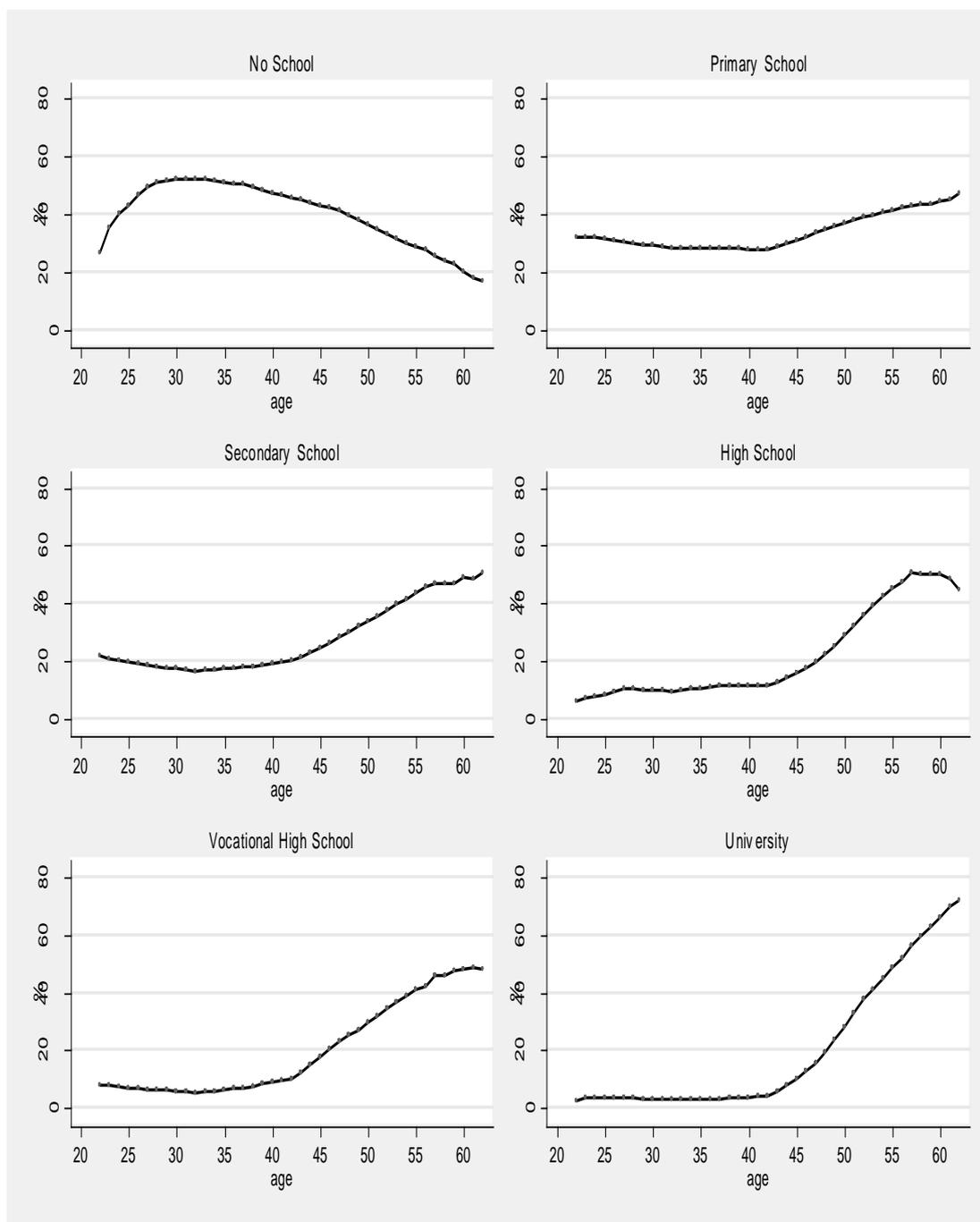


Figure 6.3.7: Predicted Share of Informal Employment in Population Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

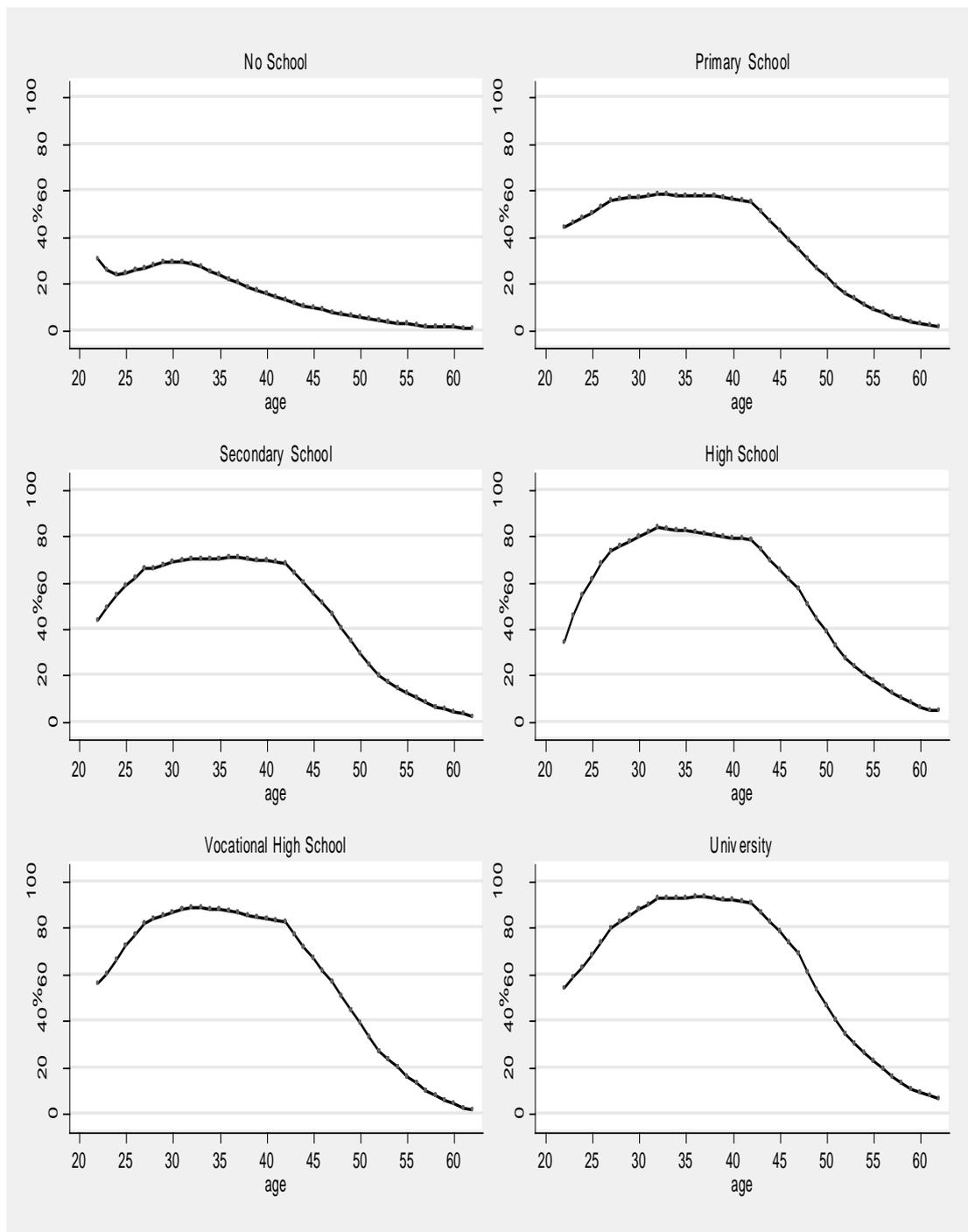


Figure 6.3.8: Predicted Share of Formal Employment in Population Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

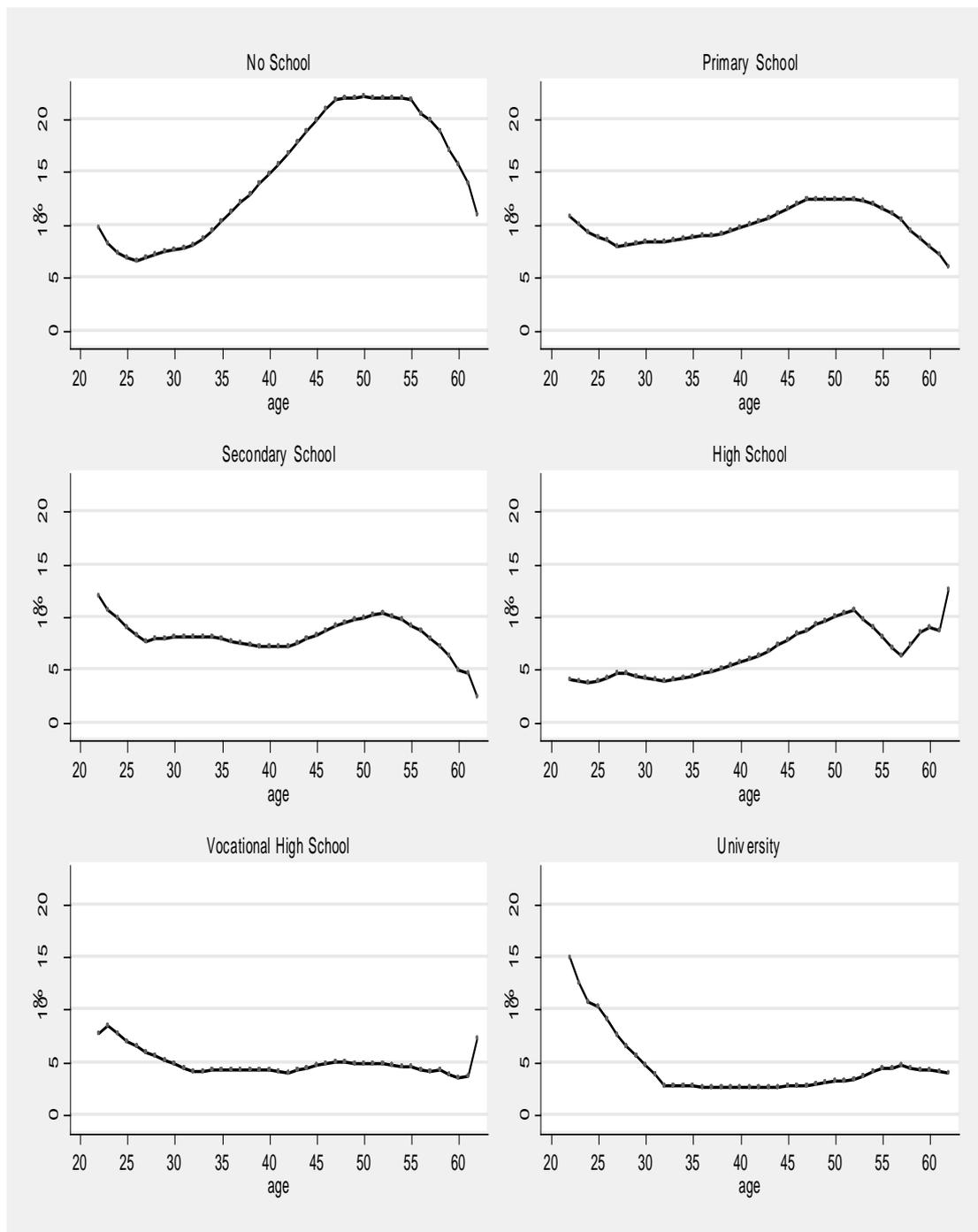


Figure 6.3.9: Predicted Share of Unemployment in Population Life-Cycle Profiles by Education Groups for 1965 Born Cohort, No Year Effect Assumed

Share of unemployment in population profiles are given in Figure 6.3.9. As in the case of unemployment rate, they also differ among the education groups significantly. They have similar patterns with unemployment rate profiles but change less at older ages compared to the unemployment rate profiles.

6.4. Net Transitions between the Sectors over the Life-Cycle

In this section changes in the predicted profiles of the 1965 born cohort which are presented in the previous section are analyzed over the life-cycle. On the predicted profiles certain critical ages over the life-cycle can be observed that separates the trends in the life-cycle. Analyzing the changes in the predicted profiles between the critical ages can be helpful to better understand the life-cycle profiles. Moreover, we can try to see net transitions between non-participation, unemployment, and formal and informal employment over the life-cycle. There may be transitions in multiple ways but only the resulting net transitions can be observed with our data and method of analysis. As the population is separated into four sectors, net inflow into a sector and net outflow from a sector does not necessarily mean that the transition occurs between the two sectors. Transition channels between the sectors cannot be observed in this analysis. Changes in the predicted profiles are firstly analyzed for total sample and then for each education group separately.

6.4.1. Net Transitions in Total Sample

Using the predicted profiles of the 1965 born cohort that are presented in the previous section seven critical ages can be determined over the life-cycle; 22, 27, 32, 42, 47, 52 and 57. Amount of change in the predicted profiles between the seven critical ages are given in Table 6.4.1.1. For example, predicted informal employment rate decreases 0.22 and the predicted share of formal employment in labor force increases 0.17 while moving from age 17 to age 22.

When age 32 is ignored, 27-42 period can be seen as a relatively stable period. Moreover, changes between ages 42-47 and 47-52, and between the ages 52-57 and

57-62 are in the same direction. So, to ease the analysis only ages 22, 27, 42 and 52 are taken as the critical ages for total sample. Changes in the predicted profiles between these critical ages are given in Table 6.4.1.2.

Table 6.4.1.1: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for Total Sample (detailed version)

	Ages							
	17-22	22-27	27-32	32-42	42-47	47-52	52-57	57-62
Informal Employment Rate	-0.22	-0.15	-0.03	0.03	0.13	0.23	0.20	0.13
Share of Formal Employment in Labor Force	0.17	0.18	0.04	-0.03	-0.14	-0.21	-0.17	-0.11
Share of Informal Employment in Labor Force	-0.22	-0.09	-0.03	0.02	0.12	0.20	0.21	0.16
Unemployment Rate	0.02	-0.06	-0.01	0.02	0.04	0.05	0.04	0.00
Share of Formal Employment in Population	0.22	0.29	0.07	-0.05	-0.21	-0.23	-0.13	-0.06
Share of Informal Employment in Population	0.02	0.00	-0.02	0.01	0.07	0.07	0.05	0.03
Share of Unemployment in Population	0.05	-0.01	-0.01	0.01	0.02	0.01	-0.01	-0.03
Employment Rate	0.26	0.27	0.05	-0.04	-0.15	-0.21	-0.16	-0.14
Labor Force Participation Rate	0.32	0.29	0.04	-0.02	-0.12	-0.19	-0.17	-0.16

According to Table 6.4.1.2 between the ages 17-22; labor force participation rate increases 0.32, share of unemployment in population increases 0.05, share of informal employment in population increases 0.02 and share of formal employment in population increases 0.22. There is net transition from non-participation to unemployment, informal employment and formal employment. In the labor force this transition causes unemployment to increase more rapidly and unemployment rate increases. Nevertheless, in the employment formal employment increases more and so informal employment rate decreases. As people complete their education and opportunity cost of non-participation increases labor force participation rate increases between the ages 17-22. However, there are always new groups entering the market.

New entrants may have higher unemployment duration and higher turnover rate which would be increasing unemployment. Most of the increase in employment occurs in the form of formal employment. As more educated groups graduate later and participate into the labor force later this should be effective in the increase of formal employment relative to informal employment.

Table 6.4.1.2: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for Total Sample

	Ages				
	17-22	22-27	27-42	42-52	52-62
Informal Employment Rate	-0.22	-0.15	-0.01	0.36	0.34
Share Of Formal Employment In Labor Force	0.17	0.18	0.01	-0.35	-0.28
Share Of Informal Employment In Labor Force	-0.22	-0.09	-0.01	0.32	0.36
Unemployment Rate	0.02	-0.06	0.00	0.09	0.04
Share Of Formal Employment In Population	0.22	0.29	0.02	-0.44	-0.19
Share Of Informal Employment In Population	0.02	0.00	0.00	0.14	0.08
Share Of Unemployment In Population	0.05	-0.01	0.00	0.03	-0.04
Employment Rate	0.26	0.27	0.01	-0.36	-0.31
Labor Force Participation Rate	0.32	0.29	0.02	-0.30	-0.34

Between the ages 22-27; increase in participation slows down, share of unemployment in population decreases 0.01, share of informal employment in population does not change and the increase in formal employment gets faster. There is net transition from non-participation and unemployment to formal employment. In the labor force with the outflow from unemployment and inflow to formal employment unemployment rate decreases. In employment with the inflow into the formal employment, informal employment rate decreases. Compared to the previous period education level of new entrants are expected to be higher in this period. This and slow down of the increase in participation must be contributing to the slight decrease in unemployment. In this period inflow into the formal sector can also be increasing due to experience gain. Moreover, as people gets older opportunity cost of

informal employment increases which encourage people to work in formal sector further. In this period also unemployment decreases and as mentioned education level of labor force increases. These factors should also be contributing to the increase of formal employment.

Ages between 27-42 are relatively stable periods.

Between the ages 42-52; labor force participation rate decreases 0.30, share of unemployment in population increases 0.03, share of informal employment in population increases 0.14 and the share of formal employment in population decreases 0.44. There is net transition from formal sector to the other sectors. In the labor force as formal employment decreases more than informal employment and also unemployment increases, unemployment rate increases. In the employment as formal employment decreases and informal employment increases informal employment rate increases. As people start to retire, formal employment decreases rapidly and this also decreases participation. Some of the retired people must be staying in the market which should be increasing unemployment and informal employment. Retired formal sector workers may also be replacing informal sector workers and so informal sector workers may also be increasing unemployment and non-participation.

Between the ages 52-62; decrease in participation gets faster, share of unemployment in population decreases 0.04, increase in informal employment and decrease in formal employment gets slower. As people get older they are less likely to stay in the labor force; this must be contributing to the decrease of participation and so unemployment. Slow down of the outflow from formal sector should also be contributing to the decrease in unemployment since compared to the previous period less people retire. With the decrease in formal employment and less increase of informal employment unemployment and informal employment rates continue to increase in this period.

6.4.2. Net Transitions in Education Groups

No School Graduates

Changes between the critical ages for no school graduates are given in Table 6.4.2.1. Between the ages 22-24; labor force participation rate increases 0.08, share of unemployment in population decreases 0.02, share of informal employment in population increases 0.13 and the share of formal employment in population decreases 0.07. There is net transition from non-participation, unemployment and formal employment to informal employment. In the labor force as unemployment decreases and informal employment increases unemployment rate decreases. In employment, informal employment rate increases.

Between the ages 24-27; net outflow from non-participation continues, net outflow from unemployment ceases, net inflow into informal sector decreases and net inflow into formal sector starts. As formal and informal employment increase, unemployment rate decreases but there is no change in informal employment rate. Increase in participation supports informal employment rather than formal employment between the ages 22-27.

Ages between 27-32 are relatively stable periods.

Between the ages 32-62; there is net outflow from formal sector which slows down with age, net outflow from informal sector and net inflow into non-participation. For unemployment, there is net inflow between the ages 32-42, no change between the ages 42-52 and net outflow between the ages 52-62. Between the ages 32-52 there is a large decrease in formal employment. Some of these retired people may stay in the labor force which results in the rise of unemployment. As people gets older less people are likely to stay in the labor market and as seen in the table there is less net outflow from formal sector. These may cause the net inflow into the unemployment cease and finally lead to net outflow from unemployment.

Table 6.4.2.1: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort
between the Critical Ages for No School Graduates

	Ages					
	22-24	24-27	27-32	32-47	47-55	55-62
Informal Employment Rate	0.19	0.00	-0.01	0.20	0.08	0.04
Share of Formal Employment in Labor Force	-0.14	0.01	0.00	-0.20	-0.06	-0.03
Share of Informal Employment in Labor Force	0.14	0.04	-0.01	0.05	0.07	0.11
Unemployment Rate	-0.06	-0.02	0.01	0.24	0.14	-0.02
Share of Formal Employment in Population	-0.07	0.03	0.02	-0.21	-0.05	-0.02
Share of Informal Employment in Population	0.13	0.09	0.03	-0.11	-0.12	-0.12
Share of Unemployment in Population	-0.02	0.00	0.01	0.14	0.00	-0.11
Employment Rate	0.12	0.09	0.03	-0.36	-0.24	-0.12
Labor Force Participation Rate	0.08	0.07	0.03	-0.25	-0.31	-0.19

Notice that different from total sample, at older ages informal employment decreases. So, there must be some other factors that cause no school graduates to drop out from labor force earlier. This may be related to low opportunity cost of not-working for no school graduates and their family structures. Low skilled workers are expected to work in manual workers where younger workers are preferred. This may be effective in the early decrease of employment for no school graduates.

Between the ages 32-52 with the decrease in employment and increase in unemployment, unemployment rate increases; between the ages 52-62 as there is net outflow from unemployment, unemployment rate decreases. For all ages between 32-62 proportional decreases in formal employment is more than informal employment and so informal employment rate increases.

Primary School Graduates

Changes between the critical ages for primary school graduates are given in Table 6.4.2.2. Between the ages 22-27 there is net transition to formal sector from other sectors. Compared to the same period of total sample there is net outflow from

informal sector. As primary school graduates complete their education earlier than other groups, they are in the market for longer and have more experience. Therefore as returns to experience they may be flowing from informal sector to formal sector.

Table 6.4.2.2: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for Primary School Graduates

	Ages				
	22-27	27-42	42-47	47-52	52-62
Informal Employment Rate	-0.07	-0.02	0.15	0.21	0.28
Share of Formal Employment in Labor Force	0.09	0.00	-0.15	-0.18	-0.23
Share of Informal Employment in Labor Force	-0.05	-0.02	0.12	0.19	0.33
Unemployment Rate	-0.04	0.03	0.05	0.05	0.02
Share of Formal Employment in Population	0.11	-0.01	-0.20	-0.19	-0.15
Share of Informal Employment in Population	-0.02	-0.02	0.06	0.06	0.08
Share of Unemployment in Population	-0.03	0.02	0.02	0.00	-0.06
Employment Rate	0.09	-0.04	-0.16	-0.19	-0.31
Labor Force Participation Rate	0.09	-0.02	-0.12	-0.18	-0.36

Ages between 27-42 are relatively stable period; changes are small compared to other periods.

Between the ages 42-62; labor force participation rate decreases and the decrease gets faster at older age groups. Share of unemployment in population decreases between the ages 42-47, does not change between the ages 47-52 and increases between the ages 52-62. Share of informal employment in population increases and the share of formal employment in population decreases between the ages 42-62. Decrease in share of formal employment in population gets slower at older age groups. As mentioned above for total sample, with retirement formal employment decreases and non-participation increases. Some of the retired people may stay in the labor force and flow into informal sector and unemployment. Moreover, as mentioned before they may replace informal workers and cause them to flow into unemployment and non-participation. However, as outflow from formal sector slows down and people get older fewer portion of the retired people should stay in the labor

force and so inflow into unemployment ceases and finally share of unemployment in population decreases. As fewer portions of the retired people stay in the market outflow from participation gets faster.

Between the ages 42-62 with the decrease in formal employment unemployment rate increases; inflow into unemployment also supports the increase between the ages 42-52. As formal employment decreases and informal employment increases informal employment rate increases.

Secondary School Graduates

Changes between the critical ages for secondary school graduates are given in Table 6.4.2.3. Between the ages 22-27 secondary school graduates exhibit the same pattern of net transition with primary school graduates. However, as secondary school graduates complete their education later and have higher education level, increase in the labor force participation rate is higher for secondary school graduates in this period. This also increases the net inflow into formal sector.

Table 6.4.2.3: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for Secondary School Graduates

	Ages			
	22-27	27-42	42-52	52-62
Informal Employment Rate	-0.13	0.01	0.41	0.32
Share of Formal Employment in Labor Force	0.17	0.00	-0.40	-0.27
Share of Informal Employment in Labor Force	-0.09	0.01	0.37	0.37
Unemployment Rate	-0.07	-0.01	0.10	-0.07
Share of Formal Employment in Population	0.22	0.02	-0.48	-0.18
Share of Informal Employment in Population	-0.04	0.02	0.17	0.13
Share of Unemployment in Population	-0.04	0.00	0.03	-0.08
Employment Rate	0.19	0.04	-0.37	-0.32
Labor Force Participation Rate	0.25	0.04	-0.28	-0.35

Ages between 27-42 are also stable for secondary school graduates. Same story with the primary school graduates also works for secondary school graduates for the net transitions in population after age 42. There is net outflow from formal sector which slows down with age, net inflow into informal sector, net inflow into non-participation which is getting faster with age. There is net inflow into unemployment between the ages 42-52 and net outflow from unemployment between the ages 52-62.

Between the ages 42-52; with the decrease in formal employment and increase in unemployment, unemployment rate decreases and with the decrease in formal employment and increase in informal employment informal employment rate increases as in the case of primary school graduates. Between the ages 52-62; informal employment rate continues to increase but with the decrease in unemployment, unemployment rate decreases.

High School Graduates

Changes between the critical ages for high school graduates are given in Table 6.4.2.4. Between the ages 22-27; labor force participation rate increases 0.51, share of unemployment in population increases 0.01, share of informal employment in population increases 0.04 and the share of formal employment in population increases 0.40. There is net transition from non-participation to the other sectors. University students should be completing their education and people who cannot pass the university entrance exams should be entering the labor force in this period. These factors must be accelerating the increase in labor force participation rate in this period. Rapid increase in participation rate increases unemployment as well as employment. Nevertheless, employment increases more and unemployment rate decreases. Besides, as most of the increase in employment stems from the increase in formal employment and informal employment rate decreases.

Table 6.4.2.4: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort
between the Critical Ages for High School Graduates

	Ages				
	22-27	27-32	32-42	42-52	52-62
Informal Employment Rate	-0.06	-0.03	0.03	0.43	0.33
Share of Formal Employment in Labor Force	0.10	0.04	-0.05	-0.43	-0.29
Share of Informal Employment in Labor Force	-0.04	-0.02	0.02	0.40	0.33
Unemployment Rate	-0.05	-0.01	0.03	0.10	0.23
Share of Formal Employment in Population	0.40	0.10	-0.05	-0.51	-0.22
Share of Informal Employment in Population	0.04	-0.01	0.02	0.24	0.09
Share of Unemployment in Population	0.01	-0.01	0.02	0.04	0.02
Employment Rate	0.44	0.08	-0.03	-0.35	-0.32
Labor Force Participation Rate	0.51	0.09	-0.01	-0.26	-0.31

Between the ages 27-32; increase in labor force participation rate slows down, share of unemployment in population and the share of informal employment in population decreases 0.01 and increase in the share of formal employment in population slows down. There is net transition to formal sector from the other sectors. Unemployment rate decreases but less rapidly than the previous period as increase in employment slows down.

Ages between 32-42 are relatively stable periods but net outflow from formal sector starts.

Similar story for primary and secondary school graduates also works for high school graduates for the net transition in population between the ages 42-62. There is net outflow from formal sector which slows down with age, net inflow into informal sector, net inflow into non-participation and unemployment which slows down with age.

For high school graduates share of unemployment in population increases at all ages between 42-62 different from the primary and secondary school graduates. Moreover, despite the smaller increase of unemployment rate of primary school graduates and decrease of unemployment rate of secondary school graduates, unemployment rate of high school graduates increases rapidly towards the end of the

life-cycle. This may be due to the fact that more of the high school graduates stay in the labor force as opportunity cost of non-participation is expected to be higher for more educated groups.

Vocational High School Graduates

Changes between the critical ages for vocational high school graduates are given in Table 6.4.2.5. Between the ages 22-27 there is net transition to formal sector from the other sectors. Pattern of change is similar to the high school graduates. However, while for vocational high school graduates there is net outflow from informal sector and unemployment, for high school graduates there is net inflow. As fewer portions of vocational high school graduates are expected to study for university entrance exams and in university they should be participating into labor force earlier which may also bring them more experience compared to the high school graduates. Moreover, they take an education which is more job market oriented. These factors may be effective in the net transition from unemployment and informal sector to formal sector. Nevertheless, high school and vocational high school graduates have similar changes in the labor force and employment.

Table 6.4.2.5: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for Vocational High School Graduates

	Ages				
	22-27	27-32	32-42	42-57	57-62
Informal Employment Rate	-0.07	-0.02	0.05	0.74	0.13
Share of Formal Employment in Labor Force	0.11	0.04	-0.05	-0.69	-0.14
Share of Informal Employment in Labor Force	-0.05	-0.01	0.05	0.71	0.13
Unemployment Rate	-0.05	-0.02	0.00	0.07	0.22
Share of Formal Employment in Population	0.26	0.07	-0.07	-0.72	-0.08
Share of Informal Employment in Population	-0.02	-0.01	0.05	0.36	0.02
Share of Unemployment in Population	-0.02	-0.02	0.00	0.00	0.03
Employment Rate	0.27	0.07	-0.02	-0.51	-0.21
Labor Force Participation Rate	0.41	0.07	-0.02	-0.46	-0.19

Between the ages 27-32; net inflow into participation slows down, net outflow from unemployment remains at the same rate, net outflow from informal employment and net inflow into formal employment slow down. There is the same pattern of net transition with the high school graduates.

Ages between 32-42 are relatively stable but net outflow from formal employment starts.

After age 42 vocational high school graduates have the similar pattern of net transition in population with the high school graduates except for the increasing net inflow into unemployment with age. There is net outflow from formal sector which slows down with age, net inflow into informal sector and net inflow into non-participation which slows down with age. Net inflow into unemployment is 0 between the ages 42-52 and 0.03 between the ages 52-62. Nevertheless, when 42-62 period is considered together there is less net inflow into unemployment and more net inflow into informal sector in vocational high school graduates compared to the high school graduates.

Between the ages 42-62, as for high school graduates, with decreasing formal employment and increasing unemployment, unemployment rate increases and with decreasing formal employment and increasing informal employment informal employment rate increases.

University Graduates

Changes between the critical ages for university graduates are given in Table 6.4.2.6. Between the ages 22-32; labor force participation rate increases 0.37, share of unemployment in population decreases 0.12 and share of formal employment in population increases 0.39. There is net transition from non-participation and unemployment to formal sector. With the net outflow from unemployment and net inflow into formal employment, unemployment rate decreases. In addition, with the net inflow into formal employment, informal employment rate decreases. Compared

to the other education groups net outflow from unemployment and the decrease in unemployment rate are highly noticeable.

Table 6.4.2.6: Changes in the Predicted Life-Cycle Profiles of 1965 Born Cohort between the Critical Ages for University Graduates

	Ages			
	22-32	32-42	42-52	52-62
Informal Employment Rate	-0.02	0.02	0.46	0.42
Share of Formal Employment in Labor Force	0.18	-0.02	-0.40	-0.44
Share of Informal Employment in Labor Force	-0.01	0.02	0.45	0.43
Unemployment Rate	-0.20	0.00	0.02	0.05
Share of Formal Employment in Population	0.39	-0.02	-0.56	-0.28
Share of Informal Employment in Population	0.00	0.02	0.33	0.35
Share of Unemployment in Population	-0.12	0.00	0.01	0.01
Employment Rate	0.42	0.00	-0.37	-0.28
Labor Force Participation Rate	0.37	-0.01	-0.37	-0.26

Ages between 32-42 are relatively stable but net outflow from formal sector starts.

Net transitions after age 42 are similar to the high school and vocational high school graduates except for the share of unemployment in population which increases at the same rate 0.01 in the both age intervals. Between the ages 42-62 there is net outflow from formal sector which slows down with age, net inflow into informal sector, net inflow into non-participation which slows down with age and net inflow into unemployment.

With the net outflow from formal sector and net inflow to unemployment, unemployment rate increases between the ages 42-62 but the increase is smaller compared to other education groups. With the net outflow from formal sector and net inflow into informal sector, informal employment rate increases.

To summarize, with its high informality rate no school graduates have very different net transition pattern than other education groups and the total sample. For other

education groups there is net outflow from non-participation and net inflow into formal employment at young ages; until age 27 for primary and secondary school graduates, until age 32 for high school, vocational high school and university graduates. In these periods there is also net outflow from informal sector and unemployment, except for high school graduates between the ages 22-27 and informal sector of university graduates between the ages 22-32. Ages between 27-42 or 32-42 are relatively stable. After age 42 there is net outflow from formal sector and net inflow into non-participation which slows down with age and net inflow into informal sector. There is also net inflow into unemployment which slows down with age and finally turns out to be negative for primary, secondary and high school graduates; stays constant with age for vocational high school graduates and increases with age for university graduates.

An important point is net transitions between formal and informal sectors. Although there is net transition from formal sector to informal sector at older ages, net transition from informal sector to formal sector is relatively limited according to the tables presented above. There is net outflow from informal sector and net inflow into formal sector between the ages 27-32 for total sample with 0.02 decrease in the share of informal employment in population; between the ages 22-27 for primary and secondary school graduates with 0.02 and 0.04 decrease in the share of informal employment in population respectively; between the ages 27-32 for high school graduates with 0.01 decrease in the share of informal employment in population and between the ages 22-32 for vocational high school graduates with 0.03 decrease in the share of informal employment in population. There is no net transition from informal sector to formal sector at no school and university graduates.

6.5 Cohort Profiles

In this section predicted cohort profiles at age 35 is presented, no time effect is assumed in the predicted profiles.

Cohort profiles for total sample are given in the Figures 6.5.1.a and 6.5.1.b. As seen in the figures there are positive cohort effects for younger cohorts at labor force

participation rate, unemployment rate, informal employment rate, share of informal employment in labor force, share of informal employment in population and share of unemployment in population. Between the oldest and youngest cohort labor force participation rate increases about 0.02, unemployment rate increases 0.07, informal employment rate increases 0.24, share of informal employment in labor force increases 0.20, share of informal employment in population increases 0.18 and share of unemployment in population increases 0.08. There are also negative cohort effects towards younger cohorts at employment rate, share of formal employment in labor force and share of formal employment in population. Between the oldest and youngest cohort employment rate decreases 0.04, share of formal employment in labor force decreases 0.31 and share of formal employment in population decreases 0.26. Increase in labor force participation rate, informal employment rate, share of informal employment in labor force, share of informal employment in population, and decrease in share of formal employment in labor force and share of formal employment in population towards younger cohorts slows down after 1965 born cohort. Employment rate increases and unemployment rate is relatively stable for cohorts younger than the 1977 born cohort.

Younger cohorts have more unemployment and informal employment, and less formal employment share in population. These cause employment rate decrease, and unemployment and informal employment rate increase towards younger cohorts. Nevertheless, these trends are slowing down towards younger cohorts and as mentioned above employment rate is increasing for cohorts younger than the 1977 born cohort.

Cohort profiles by education groups are given in Appendix B. At labor force participation rate except for no school graduates there are positive cohort effects towards younger cohorts and except for primary school graduates effects are smaller for more educated groups. There are very strong negative cohort effects for no school graduates which turn out to be positive for cohorts younger than the 1977 born cohort. As the economy grows and develops while demand for more educated labor is expected to increase, demand for less educated labor is expected to decrease.

Smaller increase in the labor force participation rate of primary school graduates and decrease in the labor force participation rate of no school graduates may stem from such a pattern of change in demand.

At employment rate there is negative cohort effect for all education groups except for the vocational high school graduates whose employment rate increases 0.006 between the oldest and youngest cohort. Negative cohort effect is strongest for the no school and then primary school graduates which may stem from the change in demand towards more educated groups.

There are positive cohort effects at unemployment rate, informal employment rate, share of informal employment in labor force and negative cohort effects at share of formal employment in labor force towards younger cohorts for all education groups. Moreover, effects get smaller with education except for unemployment rate of high school graduates and share of informal employment in labor force of no school graduates. Unemployment rate of high school graduates increases 0.004 more than secondary school graduates and share of informal employment in labor force of no school graduates increases 0.4 less than primary school graduates.

There are positive cohort effects at the share of informal employment in population which slows down with education except for no school graduates. Share of informal employment in population of no school graduates decreases towards younger cohorts which may stem from their remarkably larger decrease in employment.

There are negative cohort effects for all education groups at the share of formal employment in population and positive cohort effects at the share of unemployment in population towards younger cohorts. Effects decrease with education except for the share of unemployment in population of high school graduates which increases 0.03 more than secondary school graduates.

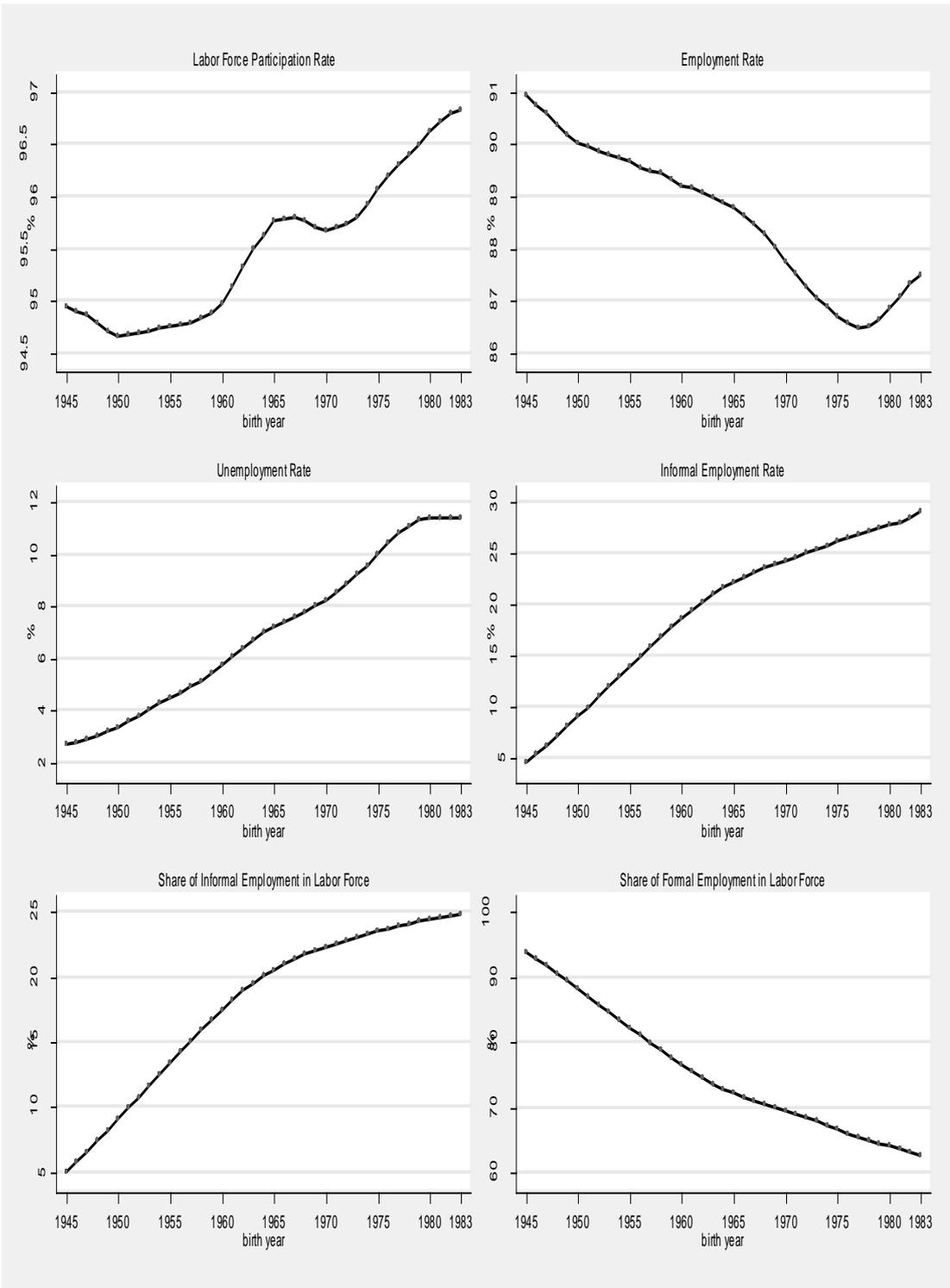


Figure 6.5.1.a: Predicted Cohort Profiles at Age 35 without Year Effects for Total Sample

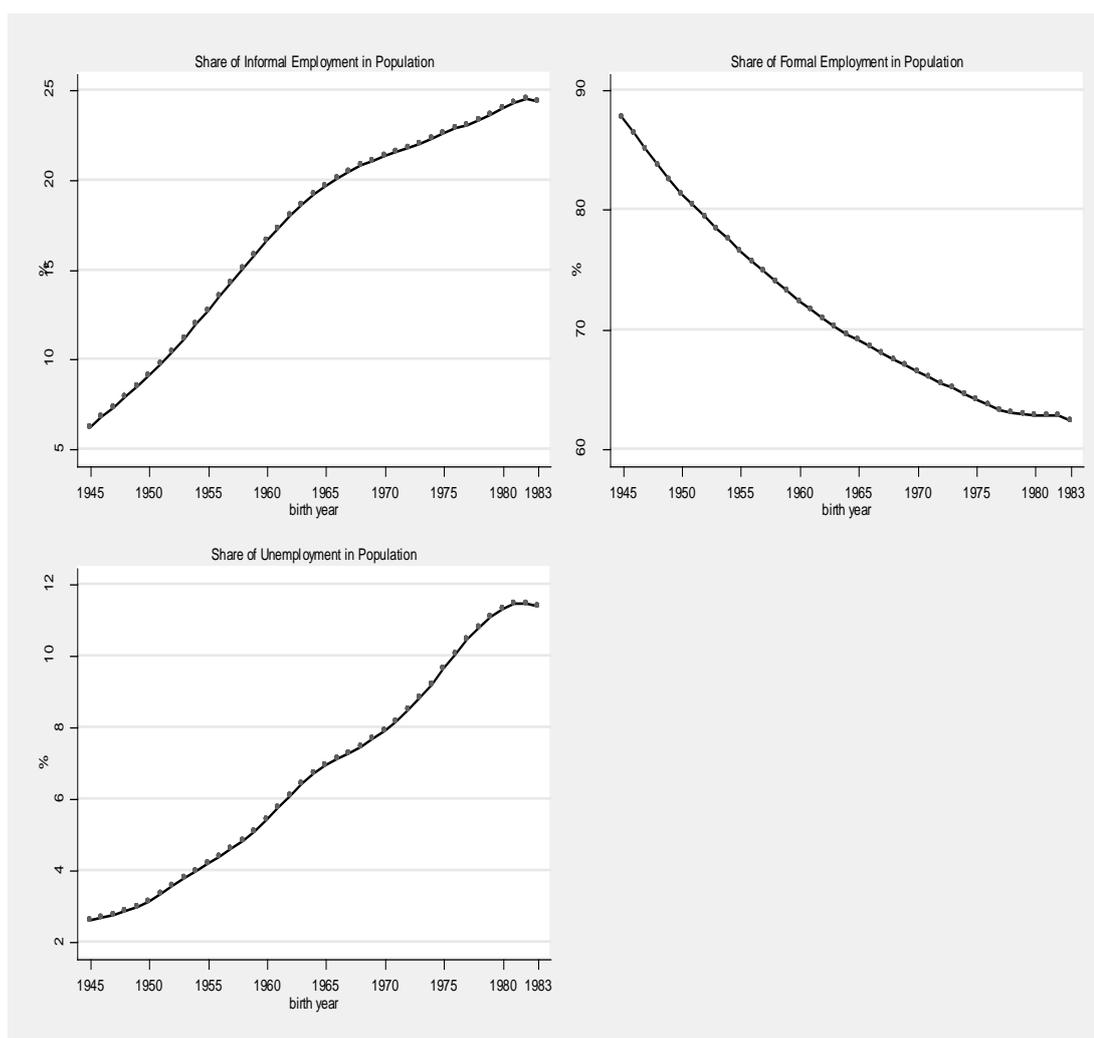


Figure 6.5.1.b: Predicted Cohort Profiles at Age 35 without Year Effects for Total Sample

In summary, except for three cases cohort effects observed for total sample is valid for all education groups with the effects are getting smaller with education. Exceptions are the 0.22 decrease in the labor force participation rate and 0.003 decrease in the share of informal employment in population of no school graduates and 0.006 increase in the employment rate of vocational high school graduates towards younger cohorts.

When the increasing education level and growth of economy is considered it is rather strange to find positive cohort effect towards younger cohorts for informal

employment and unemployment, and negative cohort effects for formal employment. One explanation may be a decrease in the skill of workers that is not captured by education. Internal migration from rural to urban may cause such a decrease in the skill levels.

Moreover, in our empirical model trend effects are captured with age or cohort effects. If there is positive trend in the informal employment and unemployment; and negative trend in the formal employment we may obtain the cohort effects observed. Aggregate labor force participation rate, employment rate, unemployment rate and informal employment rate between 1988-2007 is given in the Figures 3.4 through 3.6.

Labor force participation rate has a decreasing trend before 2000 and roughly increasing trend after 2000. So, trend after 2000 is compatible with the positive cohort effects in labor force participation rate towards younger cohorts while trend before 2000 has a opposite trend. Employment rate has decreasing trends in both periods which are compatible with the cohort effects observed. Unemployment rate has a decreasing trend before 2000 and an increasing trend after 2000. So, while trend after 2000 is compatible with the positive cohort effects in unemployment rate towards younger cohorts, trend before 2000 works in the opposite direction.

6.6 Year Profiles

In this section predicted year profiles are presented for the 1965 born cohort at age 35.

As seen in Figure 6.6.1, profiles alternate in relatively small intervals compared to the cohort and age profiles. Largest interval is for the share of formal employment in labor force which changes in a 0.049 band and smallest interval is for the labor force participation rate which changes in a 0.007 band. As we have eight years we can look at the yearly changes in Table 6.6.1.

Table 6.6.1: Change of Predicted Year Profiles of 1965 Born Cohort at Age 35
between the Years

	2000-01	2001-02	2002-03	2003-04	2004-05	2005-06	2006-07
Informal Employment Rate	0.011	0.008	-0.006	0.012	-0.006	-0.012	-0.009
Share of Formal Employment in Labor Force	-0.025	-0.023	0.011	-0.007	0.010	0.015	0.011
Share of Informal Employment in Labor Force	0.004	0.000	-0.003	0.013	-0.002	-0.009	-0.007
Unemployment Rate	0.018	0.020	-0.006	-0.007	-0.007	-0.004	-0.005
Share of Formal Employment in Population	-0.024	-0.021	0.005	0.002	0.012	0.008	0.007
Share of Informal Employment in Population	0.002	-0.001	-0.004	0.018	-0.001	-0.010	-0.011
Share of Unemployment in Population	0.017	0.018	-0.007	-0.004	-0.006	-0.005	-0.006
Employment Rate	-0.016	-0.014	0.001	0.010	0.007	0.000	0.001
Labor Force Participation Rate	-0.003	-0.001	-0.002	0.006	0.001	-0.003	-0.001

Between 2000-01 when Turkey was going to the 2001 crisis; labor force participation rate decreases 0.003, share of unemployment in population increases 0.071, share of informal employment in population increases 0.002 and share of formal employment in population decreases 0.024. So, there is net outflow from formal employment and net inflow into informal employment, unemployment and non-participation. As formal employment decreases and unemployment increases, unemployment rate increases 0.02. With the decrease in formal employment and the increase in informal employment, informal employment rate increases.

Between 2001-02 in the crisis year; net outflow from participation slows down, net inflow into unemployment gets faster, net outflow from formal sector slows down but there is also net outflow from informal sector. As a result of the decrease in employment and increase in unemployment, unemployment rate increases. Informal employment rate also increases in this period but less rapidly. Notice that in both periods largest decrease is in formal employment. In the crisis formal sector workers may be passing to informal sector and informal sector workers may be passing to unemployment.

Between 2002-03; net outflow from participation continues, net outflow from informal sector increases but there is net inflow into formal sector and net outflow from employment. With the net inflow into formal sector and net outflow from unemployment, unemployment rate decreases. Effect of the crisis seems to be continuing in informal sector in 2002. After the crisis more skilled workers are expected to be hired first which may be the reason in the increase of formal employment.

Between 2003-04; labor force participation rate starts to increase, net inflow into formal sector slows down but there is also net inflow into informal sector and the share of unemployment in population decreases. With the increase of employment and decrease of unemployment, unemployment rate decreases. Moreover, with the large increase in informal employment, informal employment rate increases.

Between 2004-07; increase in participation gets slower and there is net outflow between 2005-07. There is increasing net outflow from formal sector and decreasing net inflow into formal sector and also net outflow from unemployment. With the decrease in unemployment and increase in formal employment, unemployment rate decreases and with the decrease in informal employment, informal employment rate increases.

The crisis should to be effecting formal employment more. Between 2000-02 while there is net outflow from formal sector, there is net inflow into informal sector between 2000-01 and net outflow less than formal sector between 2001-02. Formal employment may be replaced with informal employment in the crisis. On the other hand, between 2003-04 while formal employment increases informal employment decreases. Therefore formal sector should also be recovering earlier after crisis.

Nevertheless, between 2000-04 share of formal employment in population decreases 0.039, share of unemployment in population increases 0.024 and the share of informal employment in population increases 0.014. Overall the crisis may be causing a shift from formal employment to informal employment and unemployment. After 2004 formal employment increases, informal employment and unemployment decreases.

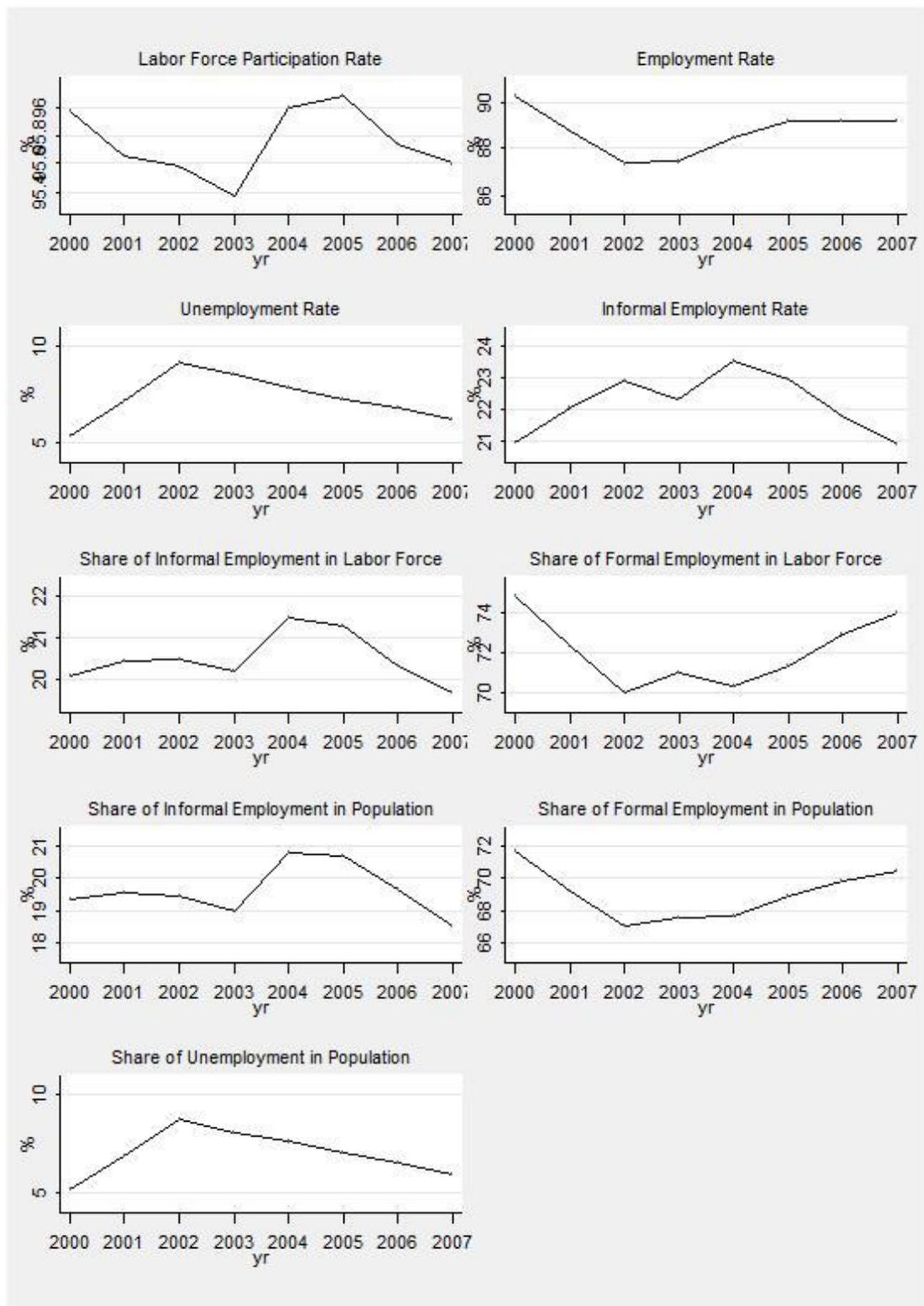


Figure 6.6.1: Predicted Year Profiles of 1965 Born Cohort at Age 35 for Total Sample

Year profiles by education groups are given in Appendix C. Except for no school graduates education groups have similar labor force participation rate profiles with the total sample; decreasing until 2003, increasing until 2005 and then decreasing. Interval of variation is decreasing with education, with vocational high school and high school graduates having similar intervals. Different from other groups, labor force participation rate of no school graduates increases between 2001-03. This may be due to added worker effect as in the crisis income of no school graduates is expected to decrease more.

Employment rate profiles are in general similar to the total sample profile, decreasing between 2002-03 and increasing until 2005 with the variation interval getting smaller with education. Note that while profile of other education groups deeps in 2002 and increases in 2003, profile of no school graduates deeps in 2003. No school graduates may be recovering later in the crisis.

Unemployment rate profiles differ between the education groups with variation interval decreasing with education except for university graduates who have higher volatility than vocational school graduates. No school graduates and primary school graduates have similar profiles; increasing between 2002-03 and then decreasing. Secondary school graduates have a hump shaped profile peaking in 2004. High school, vocational high school and university graduates have similar profiles; peaking in 2002 and then decreasing with some volatility.

Informal employment rate profiles also differ between the education groups with variation decreasing with education except for secondary school graduates who have higher volatility than primary school graduates. Except for no school graduates, one of the common points of the profiles is the increases in 2002 which may stem from the increase in the share of informal employment in population and decrease in the share of formal employment in population in 2002. Another common point is the increase in 2004 which may stem from the increase of the share of formal employment in labor force in 2004.

Except for no school graduates share of informal employment in labor force profiles peaks in 2002 and 2004. Besides, variation interval decreases with education except

for secondary school graduates who have higher volatility than primary school graduates. Increase in 2002 may be due to the fact that in the crisis formal workers may be passing to the informal sector which is also consistent with the share of formal employment in population. On the other hand, increase in 2004 may be due to the late recovery of informal sector after the crisis.

Share of formal employment in labor force profile is generally similar among the education groups; decreasing until 2002-03, and then increasing with some volatility. Besides, variation interval decreases with education except for university graduates who have higher volatility than vocational school graduates. Notice that while profile of other education groups deeps in 2002 and then increases, profile of no school graduates and primary school graduates deeps in 2003 and then increases. Similar to the case of employment rate effect of the crisis on lower education groups may be lasting longer.

Share of informal employment, formal employment and unemployment in population have very similar profiles with the share of informal employment and formal employment in population and the unemployment rate respectively with the variation interval decreasing with education except for the university graduates who have higher variation than vocational school graduates.

6.7. Life-Cycle and Cross Section Profiles

In this section predicted life-cycle profiles obtained from the cohort analysis will be compared to the cross section age profiles in order to observe to what extent cross section profiles reflect the true life-cycle profiles. Cross section age profiles are obtained as in Jappelli and Pagano (1994); regressing dependent variables on age and year dummies without using cohort dummies so that no cohort effect is assumed. Since there is no perfect linear relation between age and year no identification assumption is made on year dummies. Due to the logistic specification of the dependent variables used in the cohort analysis predicted profiles differ between the cohorts. Therefore in the figures life-cycle profiles of both the oldest and youngest cohorts are given and the profiles are predicted for the year 2007.

As seen in Figure 6.7.1 life-cycle and cross section profiles are very similar for labor force participation rate as there are very small cohort effects in the labor force participation rate. Cross section profile fits the profile of youngest cohort at young ages while it fits the profile of oldest cohort at old ages. So, cross section profile shows the change in labor force participation rate at young ages relatively smaller compared to the changes at old ages.

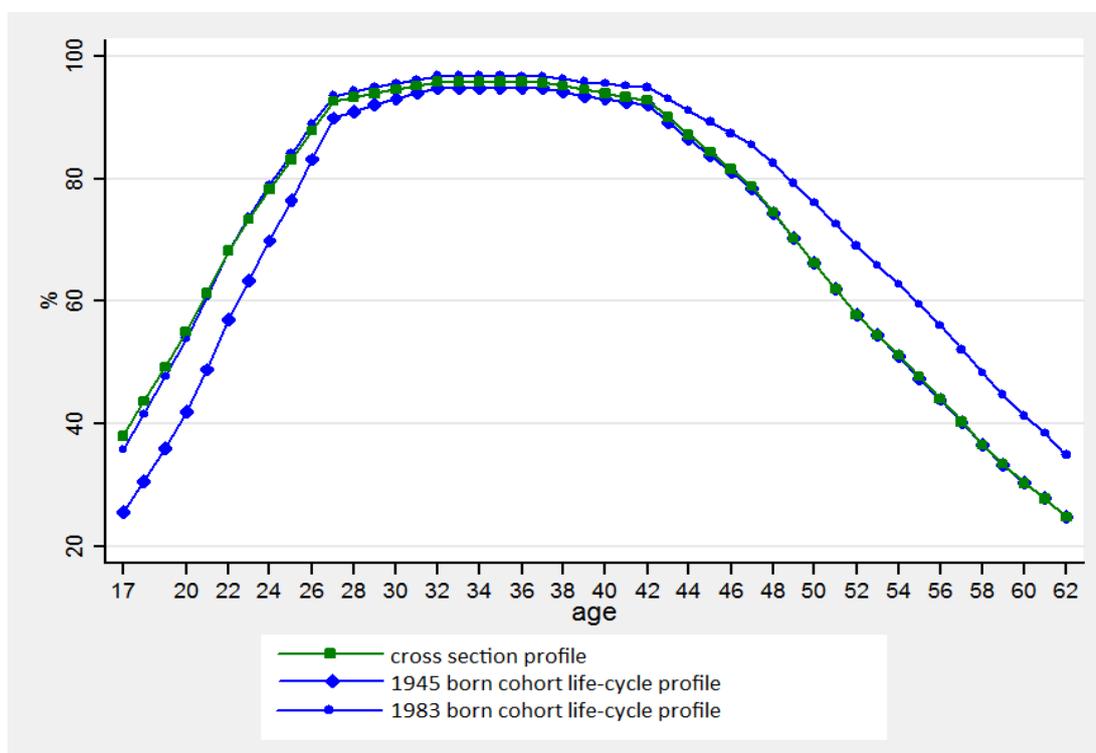


Figure 6.7.1: Predicted Life-Cycle and Cross Section Labor Force Participation Rate Profiles for Total Sample

Employment rate profiles given in Figure 6.7.2 are very similar between life-cycle and cross section. Nevertheless, cross section profile decreases slower at older ages due to the positive cohort effects towards older cohorts.

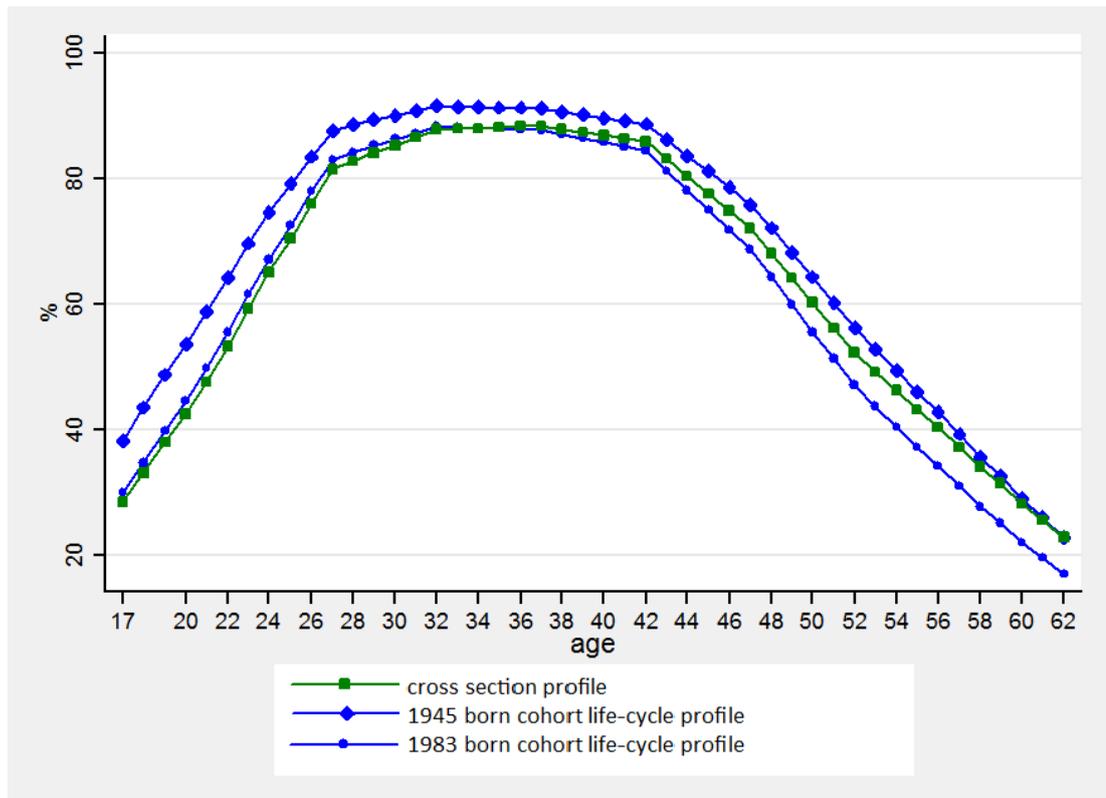


Figure 6.7.2: Predicted Life-Cycle and Cross Section Employment Rate Profiles for Total Sample

As seen in Figure 6.7.3 unemployment rate profile differs between the life-cycle and cross section profiles substantially. Due to the negative cohort effects towards older cohorts cross section profile shows a faster decrease after age 22 and slower increase at old ages. Between the ages 22-32 life-cycle profiles decrease 0.10 and 0.03 while cross section profile decreases 0.14. After age 32 while life-cycle profiles decrease 0.19 and 0.06, cross section profile decreases 0.01. Moreover, while life-cycle profiles dip at age 32 and then increases, cross section profile decreases until age 42 and then increases.

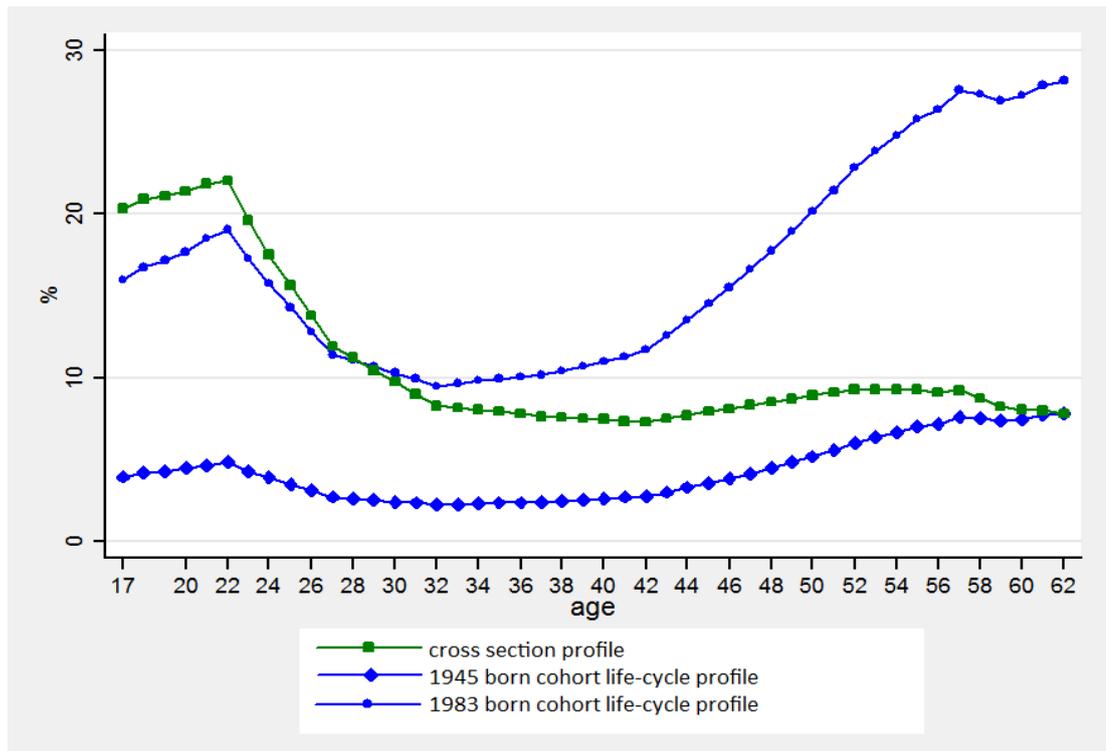


Figure 6.7.3: Predicted Life-Cycle and Cross Section Unemployment Rate Profiles for Total Sample

Informal employment rate profiles are given in Figure 6.7.4. While life-cycle profiles deep at age 32 and then starts to increase slightly, cross section profile continues to decrease until age 42 and then increases. Moreover, cross section profile decreases more rapidly at young ages and slowly at old ages. While life-cycle profiles decrease 0.42 and 0.16 between the ages 17-32, cross section profile decreases 0.50. Between the ages 32-62 while life-cycle profiles increase 0.68 and 0.66, cross section profile increases 0.44.

As seen in Figure 6.7.5 share of informal employment in labor force profiles are similar to the informal employment rate profiles. While life-cycle profiles deep at age 32 and then start to increase slightly, cross section profile continues to decrease until age 42. Moreover, cross section profile decreases more rapidly at young ages and increases more slowly at old ages due to the negative cohort effects towards older cohorts. Between the ages 17-32 life-cycle profiles decrease 0.35 and 0.14

while cross section profile decreases 0.42. While life-cycle profiles increase 0.69 and 0.60 between the ages 32-62, cross section profile increases 0.41.

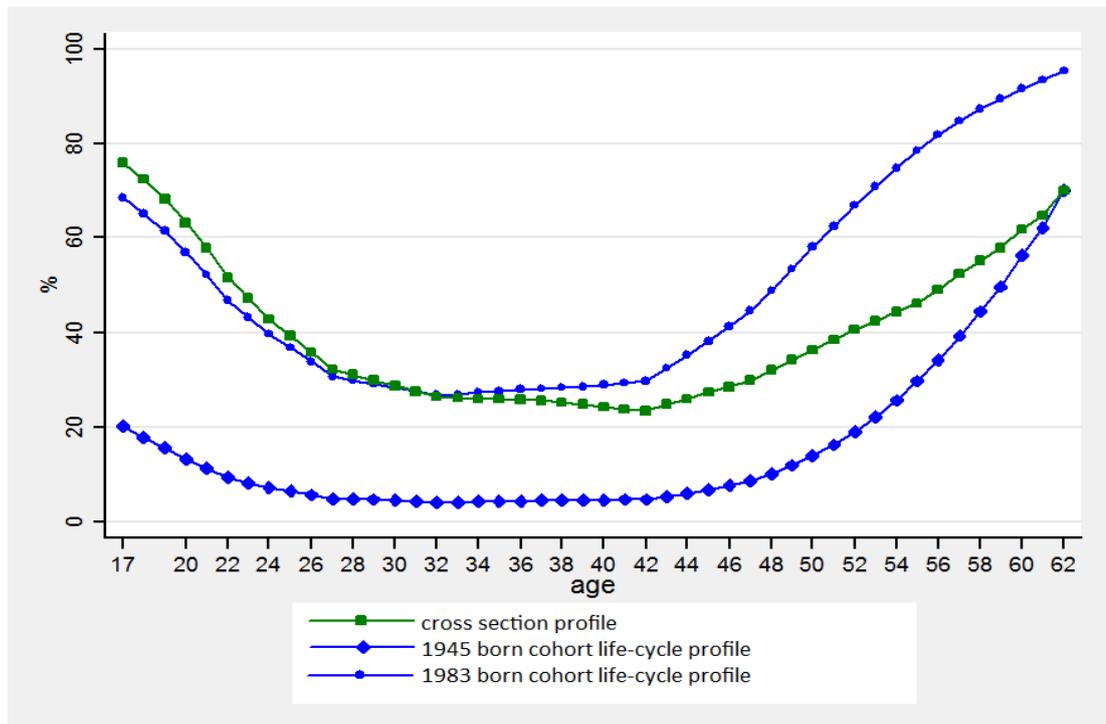


Figure 6.7.4: Predicted Life-Cycle and Cross Section Informal Employment Rate Profiles for Total Sample

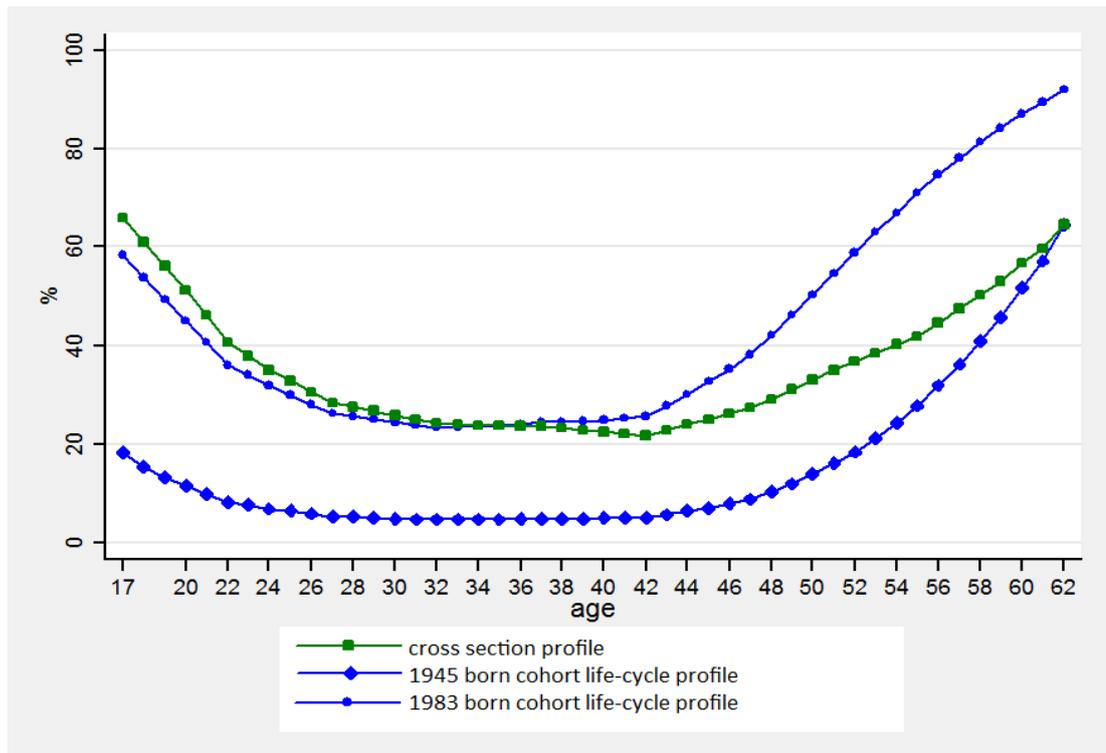


Figure 6.7.5: Predicted Life-Cycle and Cross Section Share of Informal Employment in Labor Force Profiles for Total Sample

Share of formal employment in labor force profiles are given in Figure 6.7.6. While life-cycle profiles increase until age 32 and then starts to decrease slightly, cross section profile increases until age 42. Moreover, cross section profile increases more rapidly at young ages and decreases more slowly at old ages. Between the ages 17-32 life-cycle profiles increase 0.39 and 0.18 while cross section profile increases 0.48. Between the ages 32-62 while life-cycle profiles decrease 0.67 and 0.62, cross section profile decreases 0.40.

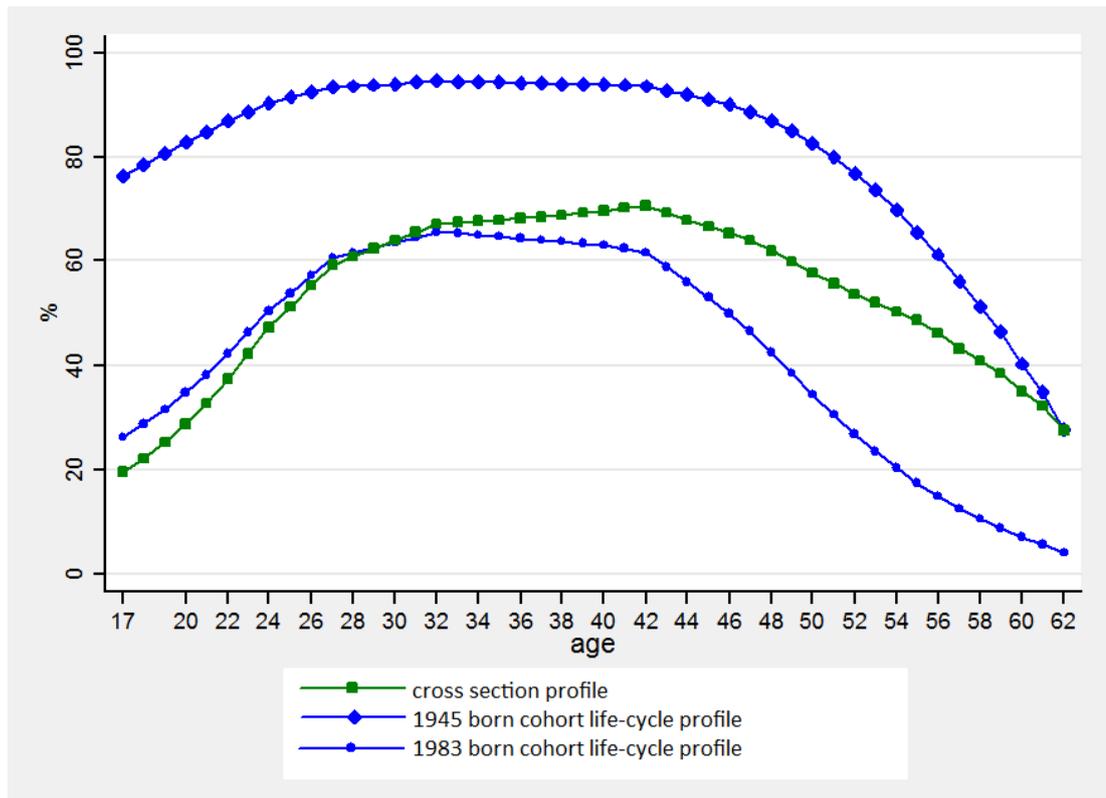


Figure 6.7.6: Predicted Life-Cycle and Cross Section Share of Formal Employment in Labor Force Profiles for Total Sample

Share of informal employment in population profiles also differ between life-cycle and cross section (Figure 6.7.7). Life-cycle profiles are relatively stable until age 42 and then increase. On the other hand, cross section profile decreases until age 42, increases slightly until age 49 and then decreases. Between the ages 17-42 while life-cycle profiles increase 0.03 and 0.01, cross section profile decreases 0.07. While life-cycle profiles increase 0.24 and 0.10 between the ages 42-64, cross section profile decreases 0.03.

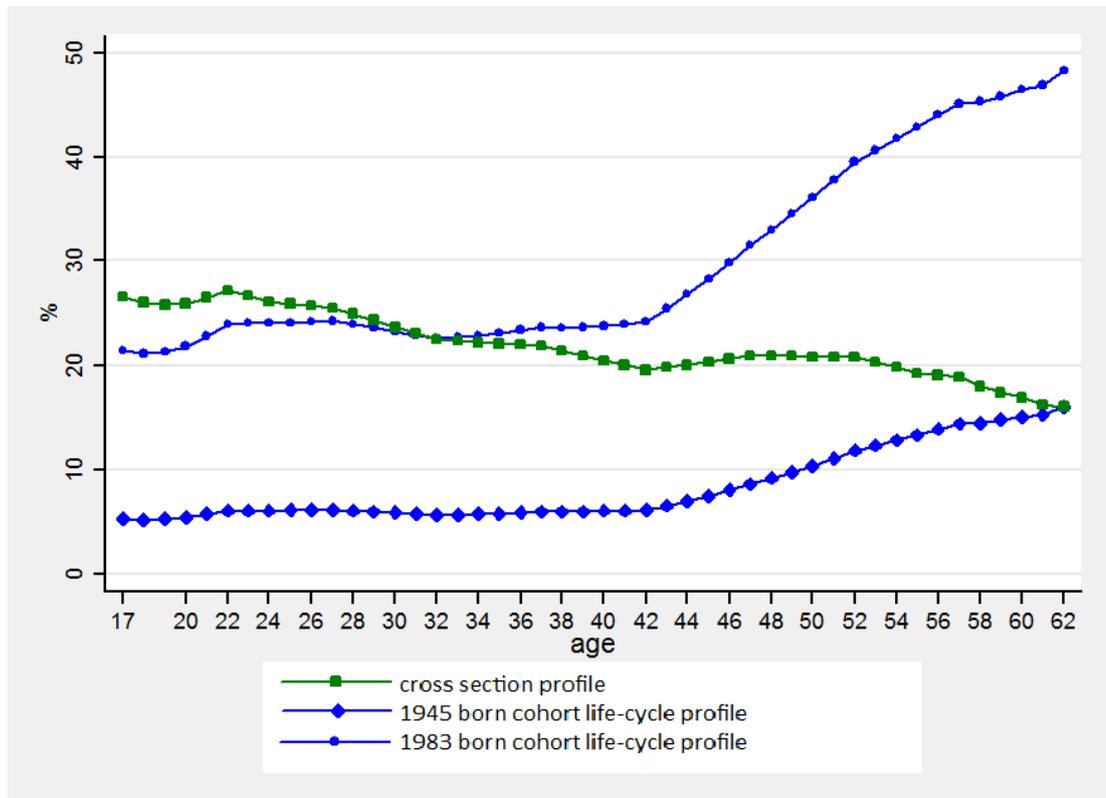


Figure 6.7.7: Predicted Life-Cycle and Cross Section Share of Informal Employment in Population Profiles for Total Sample

Share of formal employment in population profiles are given in Figure 6.7.8. Life-cycle profiles peak at age 32 and then decreases while cross section profile continues to increase until age 42 and then decreases. Furthermore, cross section profile decreases more slowly compared to the life-cycle profiles at old ages. Between the ages 17-32 life-cycle profiles increase 0.550 and 0.570 while cross section profile increases 0.574. Between the ages 32-42 while life-cycle profile decreases 0.63 and 0.82, cross section profile decreases 0.58.

Share of unemployment in population profiles are given in Figure 6.7.9. As in the case of unemployment rate cross section profile does not reflect the increase at older ages and so does not represent the true life-cycle profile.

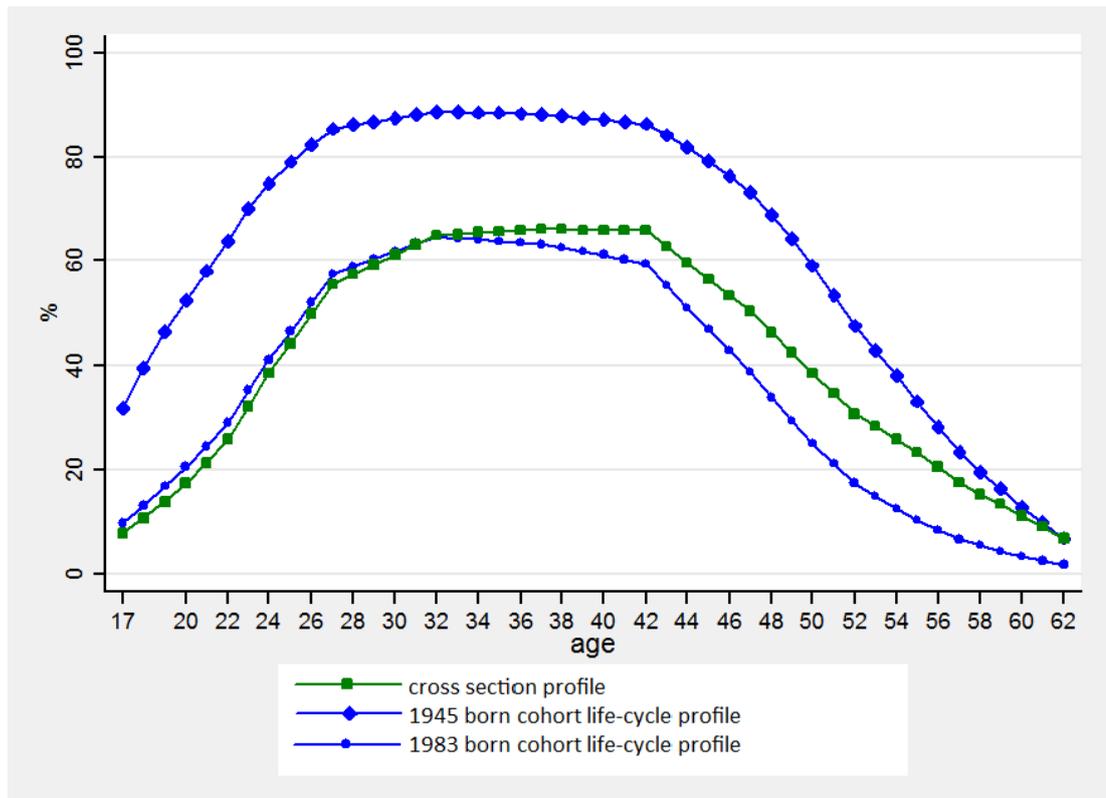


Figure 6.7.8: Predicted Life-Cycle and Cross Section Share of Formal Employment in Population Profiles for Total Sample

Life-cycle and cross section age profiles by education groups are given in Appendix D. At labor force participation rate except for no school graduates other education groups have similar profiles with total sample. Different from the other groups, at no school graduates life-cycle profile of older cohort is above the life-cycle profile of younger cohort as there are negative cohort effects towards younger cohorts. While the life-cycle profiles of no school graduates increases until age 32 and then decreases, cross section profile of no school graduates increases until age 37 and then decreases. Moreover, in the cross section profile increase at young ages is faster and decrease at older ages is slower than the life-cycle profiles. Another noticeable point with the profiles is that life-cycle and cross section profiles of the university graduates are almost identical compared to the other groups as a result of the smaller cohort effects of the university graduates.

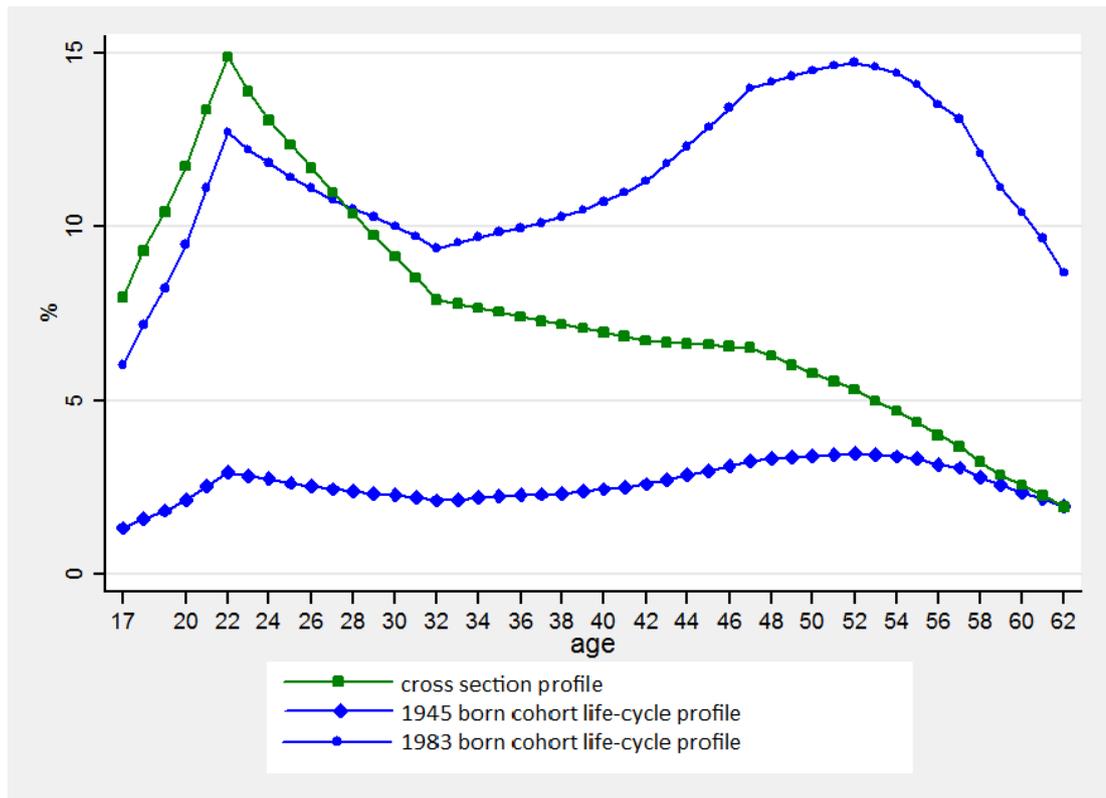


Figure 6.7.9: Predicted Life-Cycle and Cross Section Share of Unemployment in Population Profiles for Total Sample

Employment rate profiles by education groups are also similar to the total sample. Difference between the life-cycle and cross section profiles is most noticeable for no school graduates as they have the largest cohort effects. Since cohort effects of secondary and vocational high school graduates are less than other groups their life-cycle and cross section profiles are almost identical.

For all education groups cross section profile of unemployment rate and share of unemployment in population overestimates the decrease at young ages and underestimates the increase at older ages. Difference between the life-cycle and cross section profiles is smallest for university graduates as the cohort effect for this group is smallest.

Informal employment rate, share of informal employment in labor force and the share of informal employment in population profiles are similar to the profiles for

total sample except for no school graduates. Cross section profiles overestimate the decrease until age 32 and underestimate the increase after age 32. For no school graduates, at informal employment rate and share of informal employment in population cross section profile overestimates the decrease until age 27 and underestimates the increase after age 27. At the share of informal employment in population of no school graduates while cross section profile underestimates the increase until age 37, it is very similar to the life-cycle profiles after ages 37.

Share of formal employment in labor force and share of formal employment in population profiles are similar to the profiles of total sample. Cross section profile overestimates the increase until age 27 for no school graduates and until age 32 for the other education groups and underestimates the decrease after age 27 for no school graduates and after age 32 for other education groups.

Except for labor force participation and employment rate, life-cycle and cross section profiles differ significantly for total sample. When education groups are analyzed separately they have similar differences between the life-cycle and cross section profiles with the total sample except for no school graduates. Since, different from other education groups no school graduates have negative cohort effects at labor force participation rate towards younger cohorts life-cycle participation rate profile of older cohort is above the younger cohort at no school graduates. Moreover, due to the large cohort effects in labor force participation and employment rates for no school graduates participation and employment rate life-cycle and cross section profiles differ remarkably for no school graduates.

CHAPTER 7

CONCLUSION

In this thesis life-cycle labor force participation, unemployment and informal employment profiles of urban male population in Turkey are examined. To obtain the life-cycle profiles cohort analysis is utilized using 2000-2007 Household Labor Force Survey micro level data of State Institute of Statistics. More specifically life-cycle profiles of labor force participation rate, unemployment rate, employment rate, share of formal and informal employment in labor force and population and share of unemployment in population are examined empirically. Analyzes are conducted for total sample and six education groups separately.

From the cross section analysis it is clear that informal employment rate is higher for less educated groups. Besides, high school graduates have higher informal employment rate than vocational high school graduates. No school graduates have significantly higher informal employment and unemployment rates and lower labor force participation and employment rates.

Our findings from the cohort analyses show that over the life-cycle there are certain periods of ages that the variables show certain trends. For total sample labor force participation rate increases between the ages 17-27, relatively stable between the ages 27-42 and then decrease between the ages 42-62. In the same age intervals, informal employment rate moves just in the opposite directions. Unemployment rate increases between the ages 17-22, decreases between the ages 22-32 with a steeper slope until age 27 and then increases until age 62 with a more flat slope until age 42. Nevertheless, life-cycle profiles differ between the education groups depending on the variable and the education level.

Between the life-cycle and cross section profiles significant differences are observed both for total sample and for each education groups separately. For total sample except for the labor force participation and employment rates cross section profiles are far from representing the true life-cycle profiles. Particularly while life-cycle

profile of unemployment rate increases significantly after age 32, cross section profile exhibits a relatively stable profile. Moreover, cross section profile does not reflect the rapid increase in informal employment rate at older ages.

Moreover, while there are positive cohort effects at labor force participation, informal employment and unemployment, there are negative cohort effects at employment and formal employment for total sample. Extent of the cohort effects also differ between the education groups depending on the variable.

According to our findings informality decreases with education clearly. To extend formality education should be extended as in the case of most the problems. Moreover, high school graduates have higher informality than vocational high school graduates. Policies that aim to extend vocational training while encouraging the students that have high tendency for higher education to study in the university can help to decrease informal employment. Share of informal employment in population is relatively stable until age 42 and then increases. So, if policies focusing on to decrease informality among young people and new entrants are implemented, it can be expected that the informality will decrease more rapidly. Increase of informality at older ages corresponds with the decrease in participation rate which should be showing the effect of retirement. Although working of retired people in informal sector may not affect their welfare this may create an increasing trend for informality of other workers. Policies that encourage the hiring of non-retired people after middle ages may help to decrease informality.

This research can be extended in different aspects. A theoretical model that models the labor market choice of individuals taking into account the sector transitions over the life-cycle can be constructed. Transitions between the sectors can be further analyzed focusing on the movements of individual workers. Nonetheless, panel data is needed for such a study. Moreover, positive cohort effects in informality and unemployment towards younger cohorts can be examined further.

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APPENDIX A
DERIVING SINGLE AGE VALUES FROM GROUPED AGE DATA

We have two data sets of the same micro level data Household Labor Force Survey of State Institute of Statistics. First dataset covers the years 2000-2005 and ages are single coded but variables to identify the labor market status of the individuals are absent. Second data set covers the years 2000-2007 and has all the variables to identify the labor market status of individuals but ages are grouped into five years intervals.

In the second the dataset we implemented the method explained below to find the values of variables for single ages and controlled the performance of the method using first dataset.

To able to use the single ages from the first dataset two datasets are merged for the years 2000-2005 controlling for 33 variables covering personal characteristics, employment, unemployment and inactivity, information on past work experience and information on situation one year before.

In the second dataset ages between 15-65 are grouped into 11 groups of five years intervals as:

g_{17} : 15-19, g_{22} : 20-24, ..., g_i , ..., g_{62} : 60-64

where g is for group indexed with the mid age of the group i : 17, 22, ..., 62.

Let $P_{g_{it}}$ denote the analyzed variable such as labor force participation rate for group i at time t where t : 2000, 2001, ..., 2007.

Let P_{at} denote the analyzed variable for age a at time t where a : 17,18, ..., 62.

It is assumed that:

$$P_{at} = P_{(i+k)t} = (5-k)/5 * P_{g_{it}} + k/5 * P_{g_{(i+5)t}} \quad \text{where } a = i + k \text{ and } k: 0, \dots, 5$$

For example:

$$P_{17, 2000} = Pg_{17, 2000}$$

$$P_{18, 2000} = 4/5 * Pg_{17, 2000} + 1/5 * Pg_{22, 2000}$$

$$P_{19, 2000} = 3/5 * Pg_{17, 2000} + 2/5 * Pg_{22, 2000}$$

$$P_{20, 2000} = 2/5 * Pg_{17, 2000} + 3/5 * Pg_{22, 2000}$$

$$P_{21, 2000} = 1/5 * Pg_{17, 2000} + 4/5 * Pg_{22, 2000}$$

$$P_{22, 2000} = Pg_{22, 2000}$$

Empirical model used in the paper is implemented to the both real and derived values of the total sample for the period 2000-2005. In the regressions logit specification of the dependent variables are used and variables are regressed on age, cohort and year dummies; details of the regression method are discussed in Methodology. Coefficients obtained from the regressions that use real and derived data are compared to observe the performance of the method. Age coefficients obtained from the both regressions that use real and derived data are presented in Figure A.1 through Figure A.8, cohort coefficients are presented in Figure A.9 through Figure A.16 and year coefficients are presented in Figure A.17 through Figure A.23. Regression results that use real data are also given in Table A.1. As can be seen in the figures coefficients of the regression that use derived data approximate the real coefficients reasonably well. Although it misses some minor changes catches the basic life-cycle trends in all variables and coefficients.

Age Coefficients

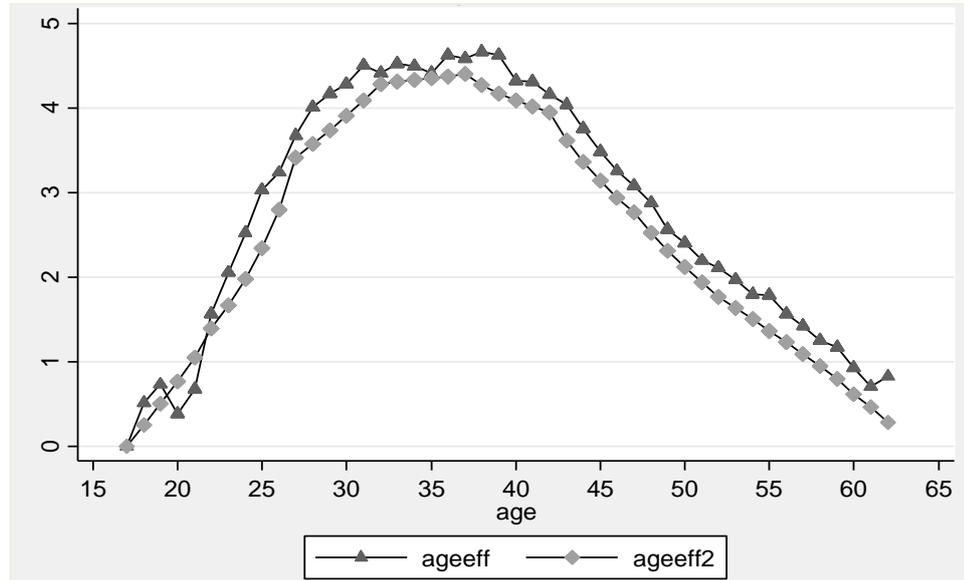


Figure A.1: Labor Force Participation Rate Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

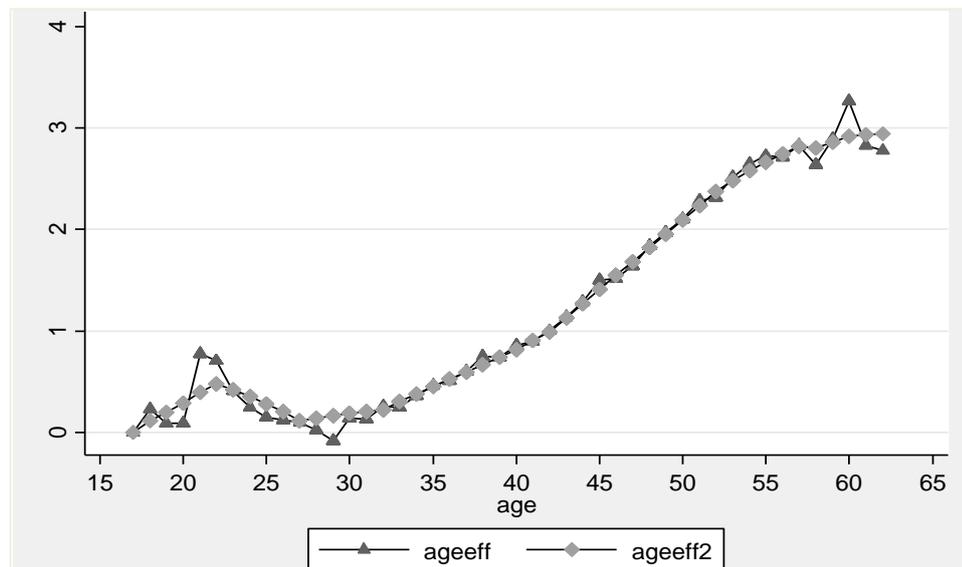


Figure A.2: Unemployment Rate Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

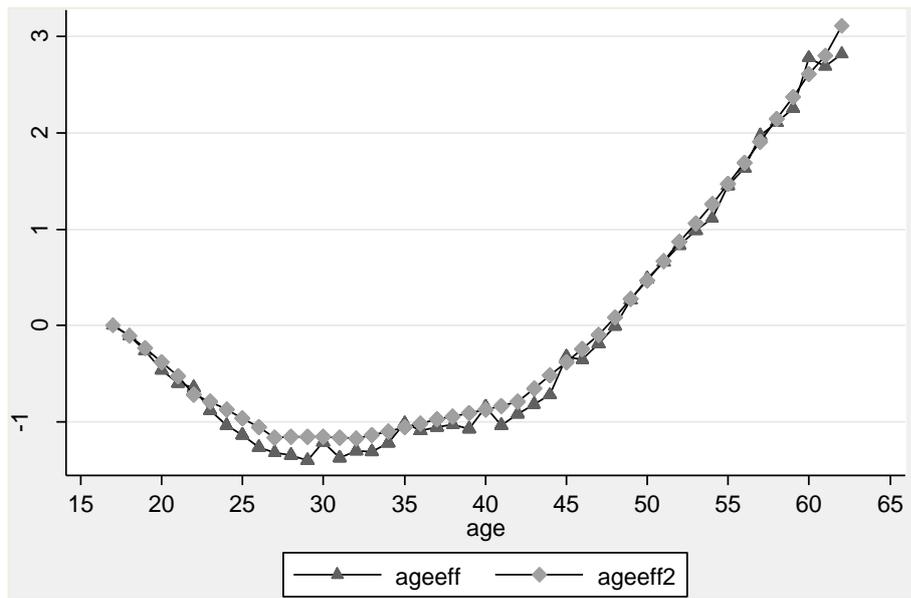


Figure A.3: Informal Employment Rate Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

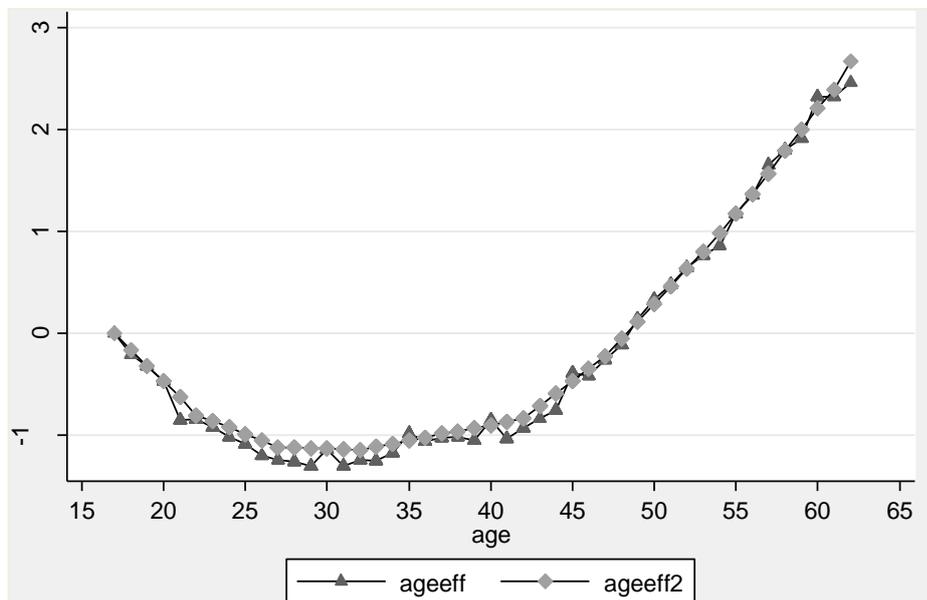


Figure A.4: Share of Informal Employment in Labor Force Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

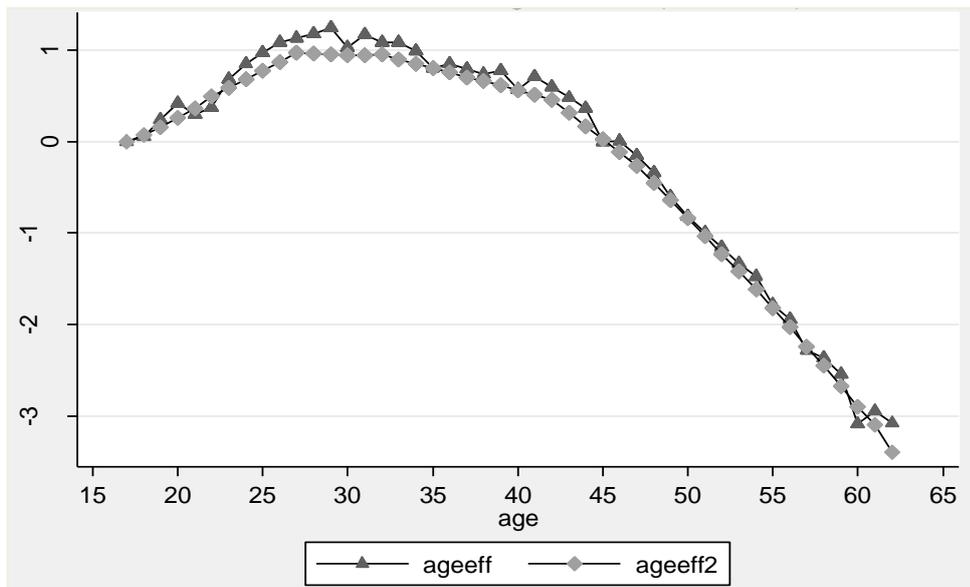


Figure A.5: Share of Formal Employment in Labor Force Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

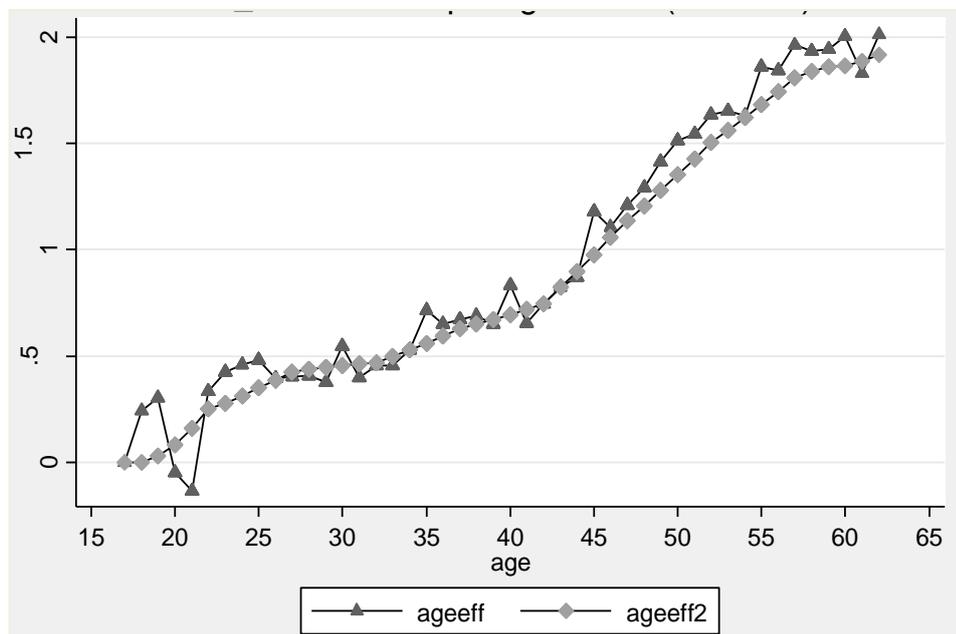


Figure A.6: Share of Informal Employment in Population Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

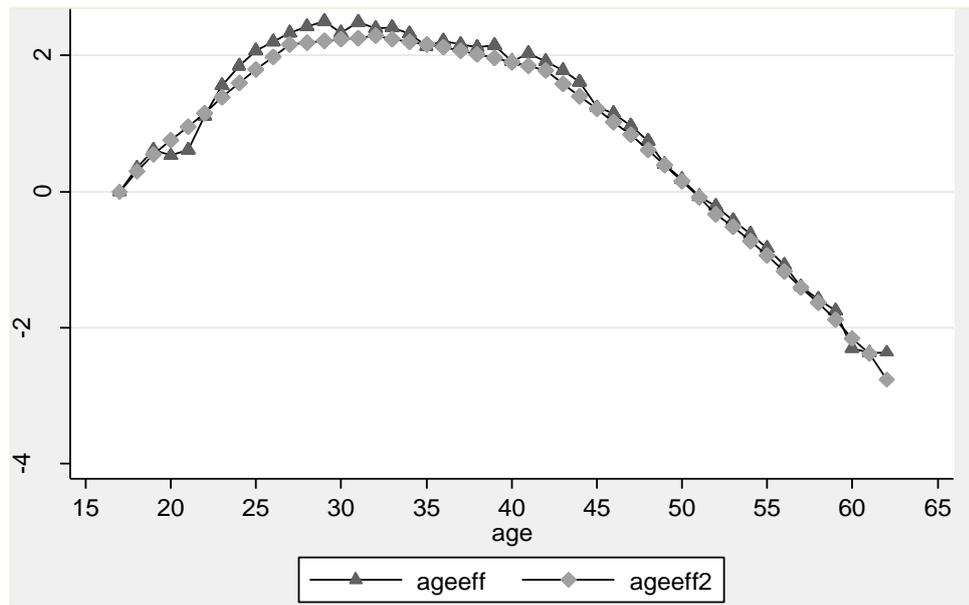


Figure A.7: Share of Formal Employment in Population Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

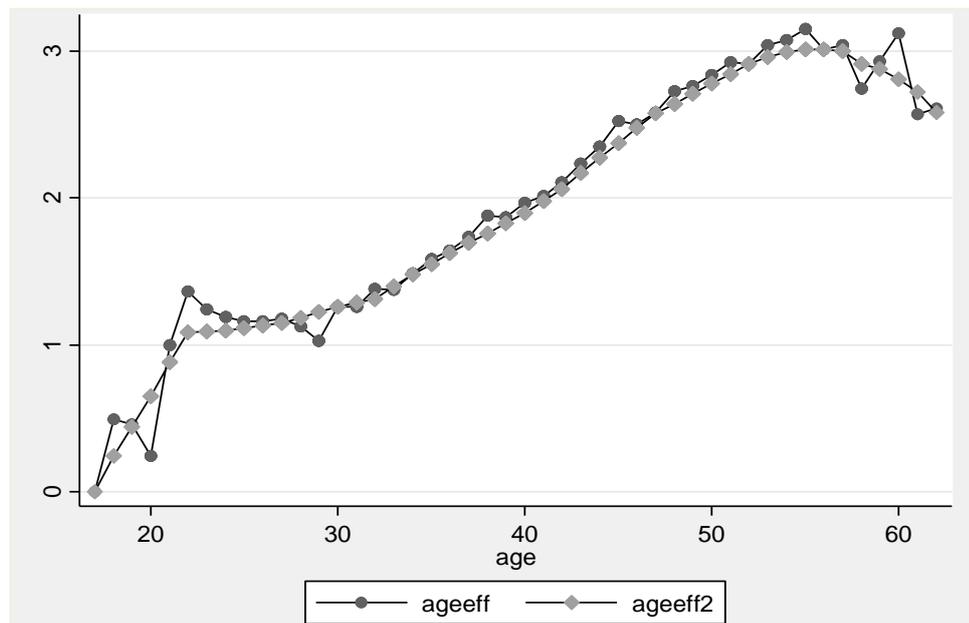


Figure A.8: Share of Unemployment in Population Age Coefficients Obtained Using Real (ageeff) and Derived (ageeff2) Data

Cohort Coefficients

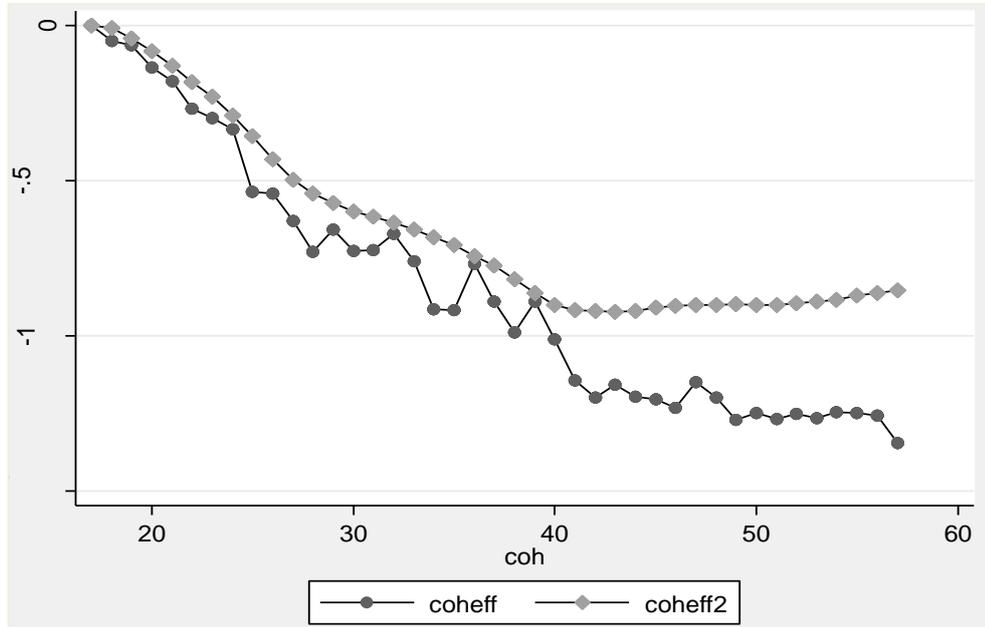


Figure A.9: Labor Force Participation Rate Cohort Coefficients Obtained Using Real (coheff) and Derived (coheff2) Data

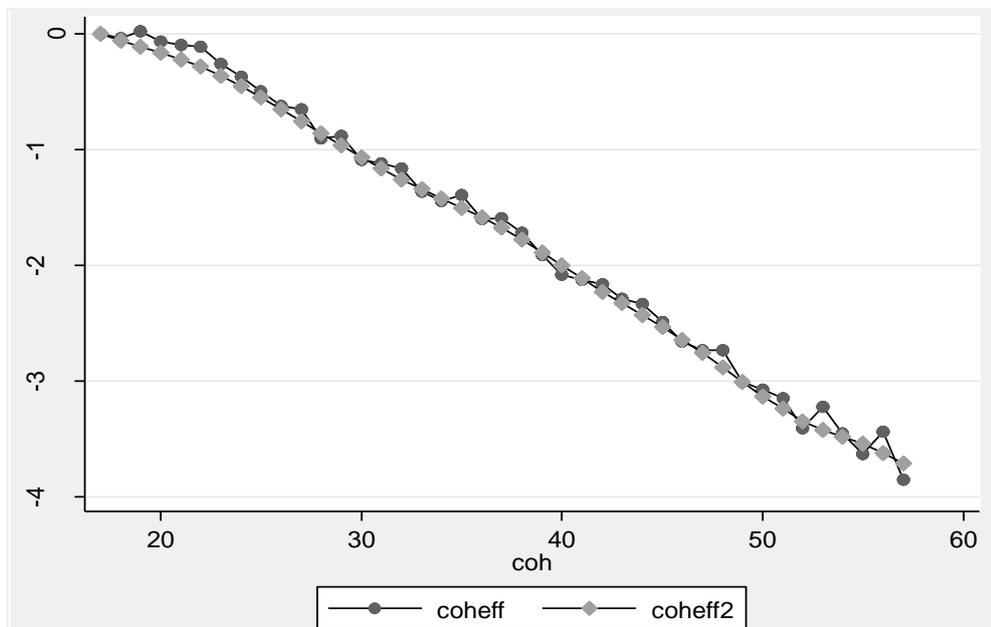


Figure A.10: Employment Rate Cohort Coefficients Obtained Using Real (coheff) and Derived (coheff2) Data

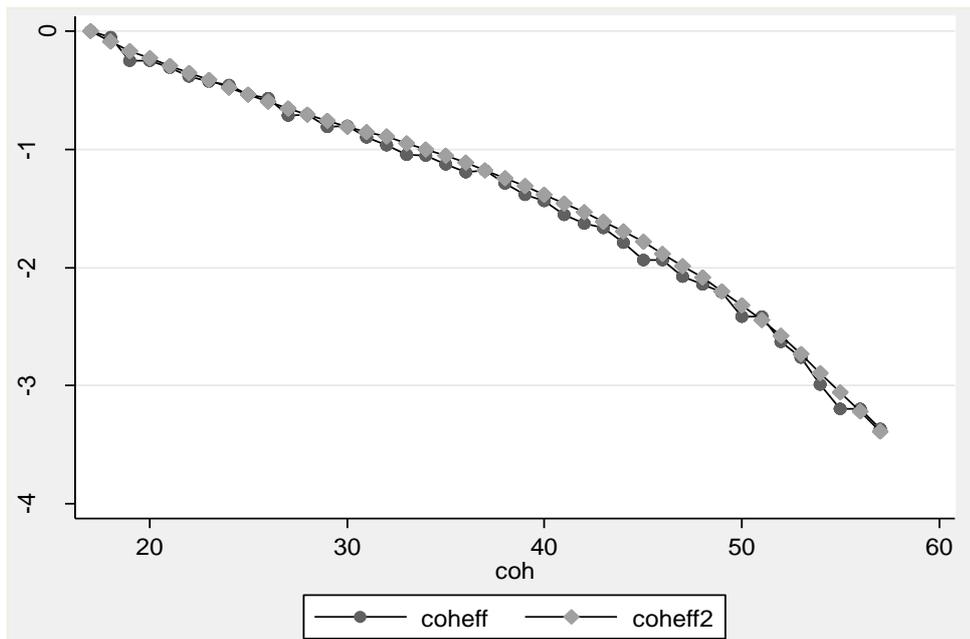


Figure A.11: Informal Employment Rate Cohort Coefficients Obtained Using Real (coeff) and Derived (coeff2) Data

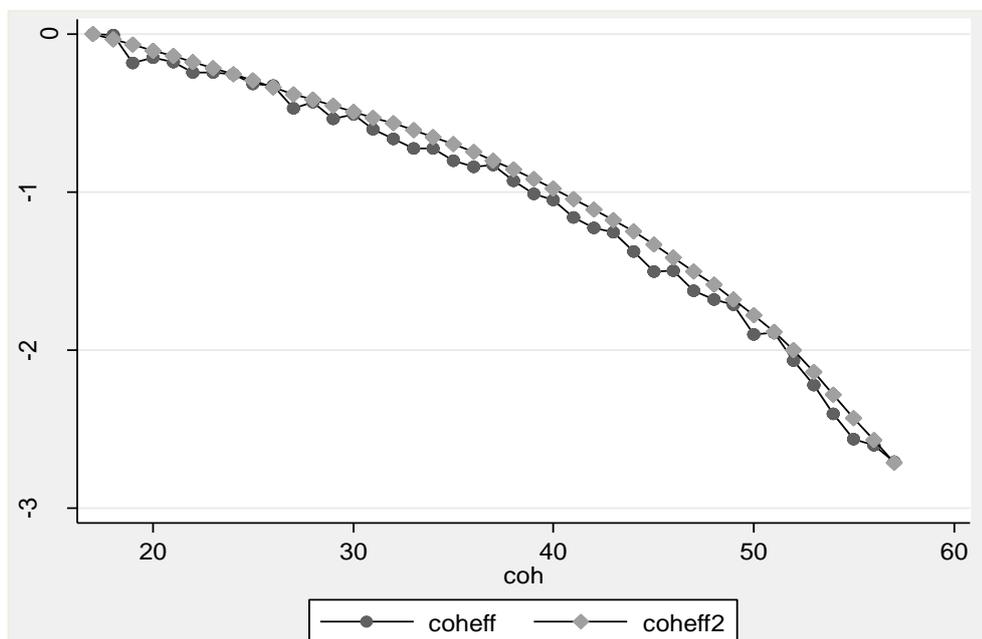


Figure A.12 Share of Informal Employment in Labor Force Cohort Coefficients Obtained Using Real (coeff) and Derived (coeff2) Data

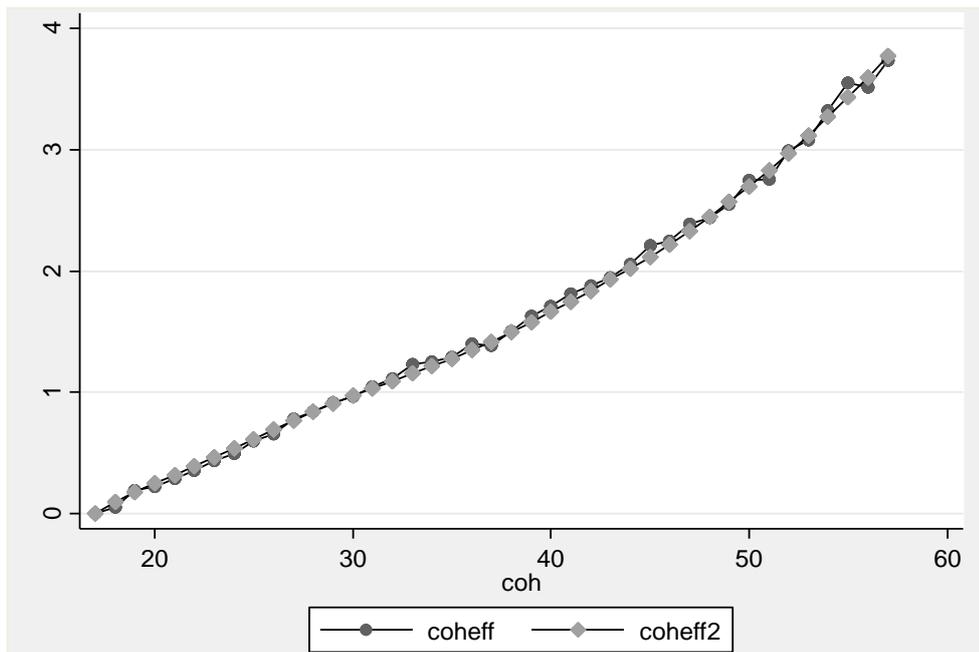


Figure A.13: Share of Formal Employment in Labor Force Cohort Coefficients
Obtained Using Real (coeff) and Derived (coeff2) Data

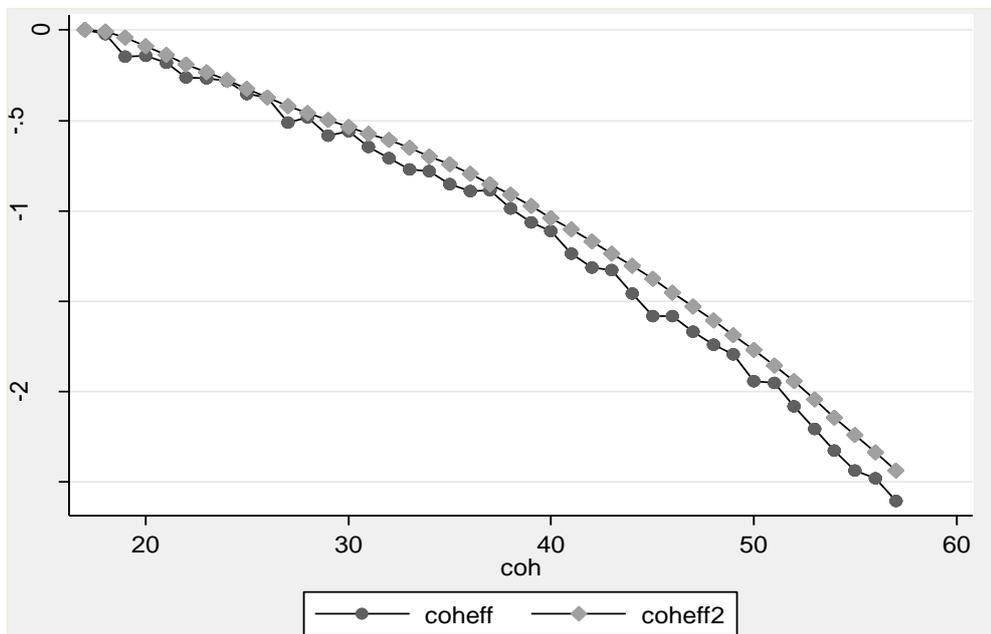


Figure A.14: Share of Informal Employment in Population Cohort Coefficients
Obtained Using Real (coeff) and Derived (coeff2) Data

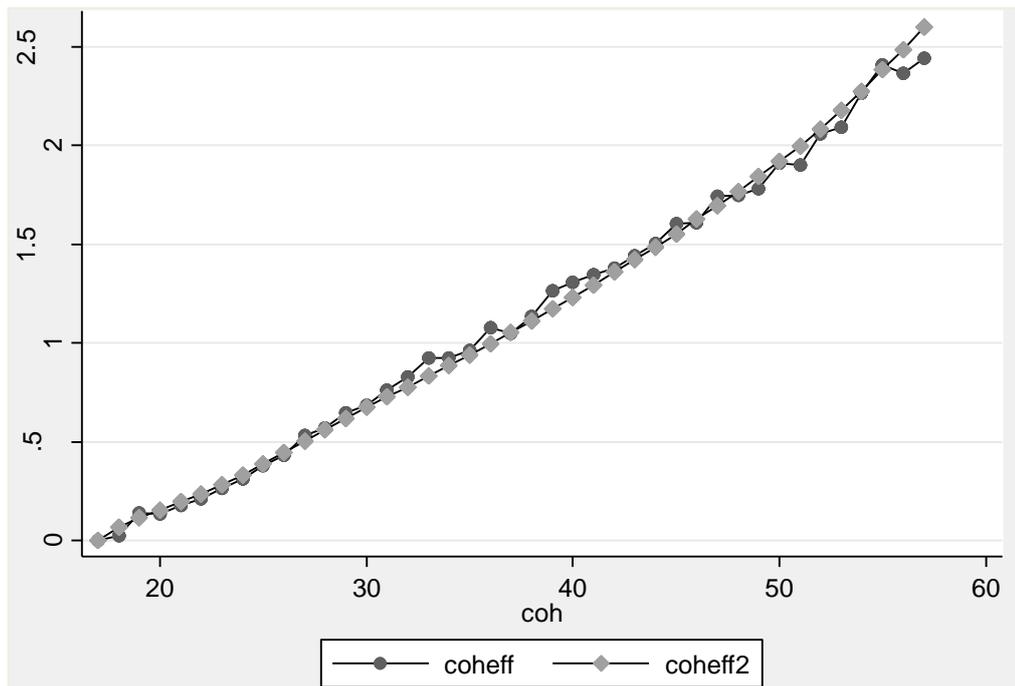


Figure A.15: Share of Formal Employment in Population Cohort Coefficients Obtained Using Real (coeff) and Derived (coeff2) Data

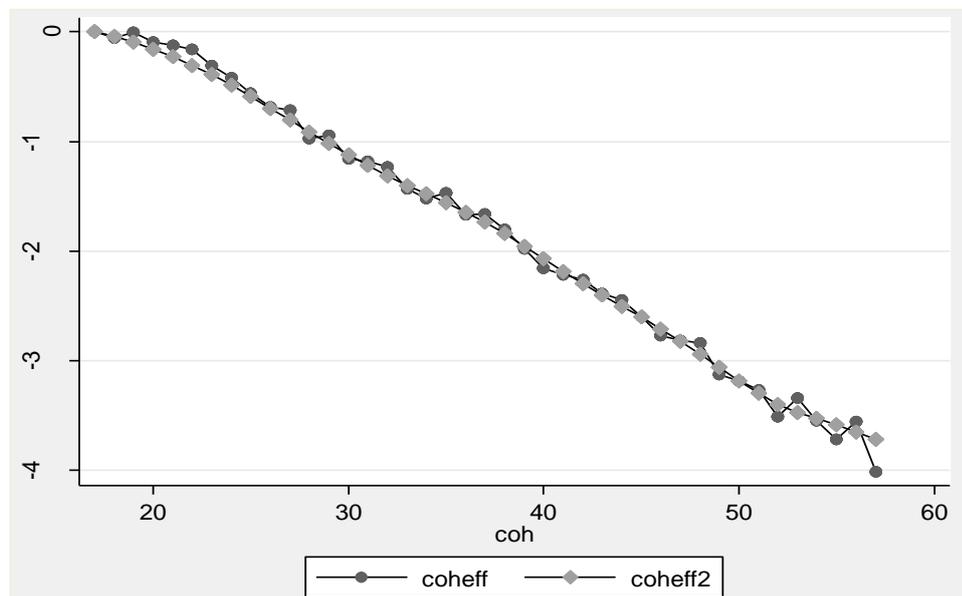


Figure A.16: Share of Unemployment in Population Cohort Coefficients Obtained Using Real (coeff) and Derived (coeff2) Data

Year Coefficients

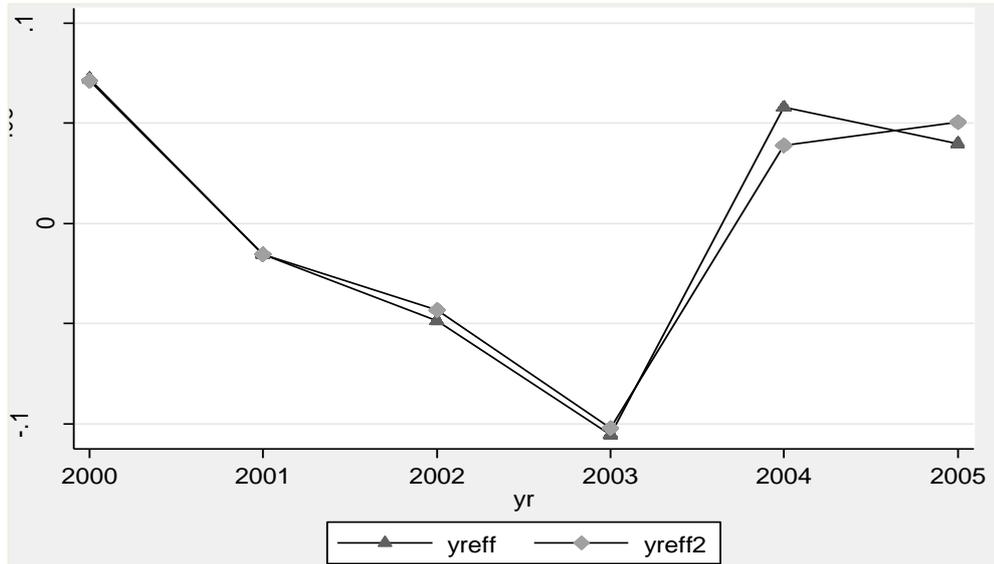


Figure A.17: Labor Force Participation Rate Year Coefficients Obtained Using Real (yreff) and Derived (yreff2) Data

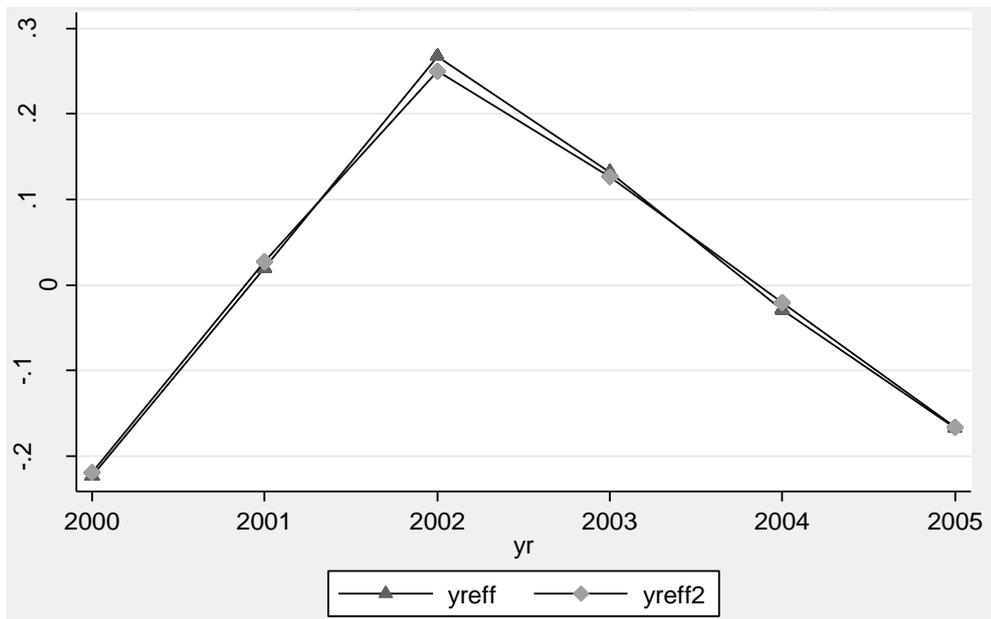


Figure A.18: Unemployment Rate Year Coefficients Obtained Using Real (yreff) and Derived (yreff2) Data

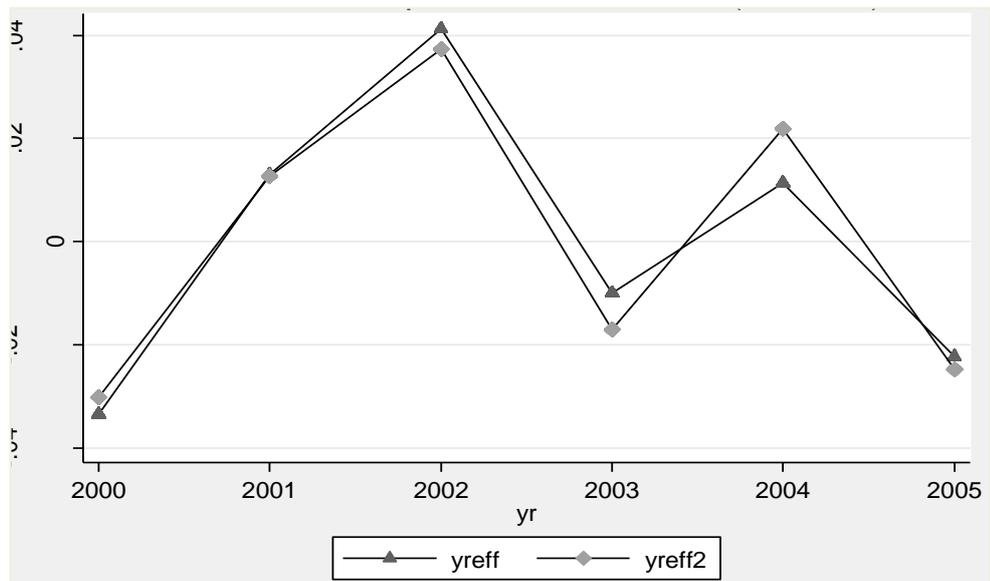


Figure A.19: Informal Employment Rate Year Coefficients Obtained Using Real (yreff) and Derived (yreff2) Data

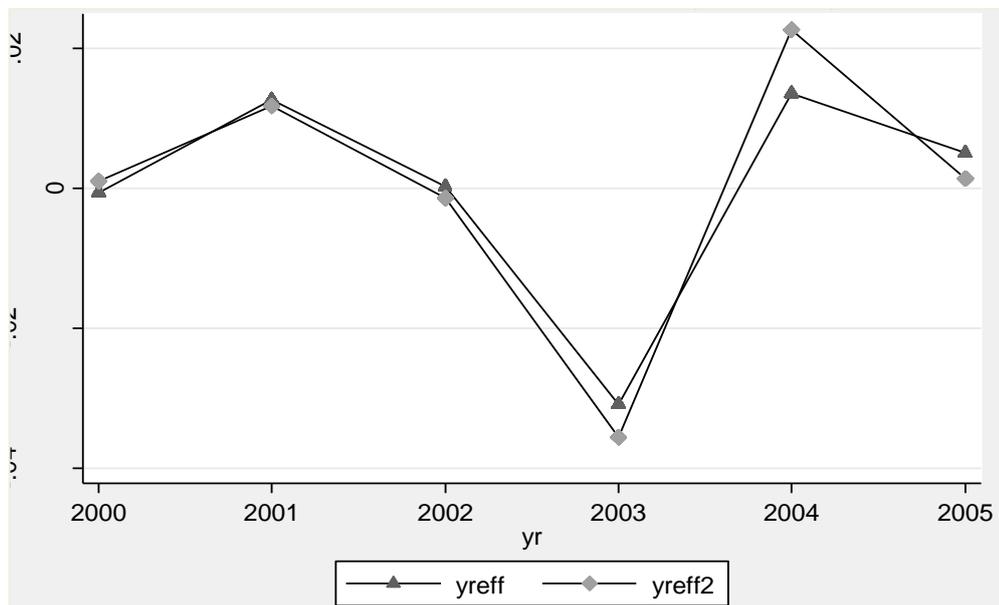


Figure A.20: Share of Informal Employment in Labor Force Year Coefficients Obtained Using Real (yreff) and Derived (yreff2) Data

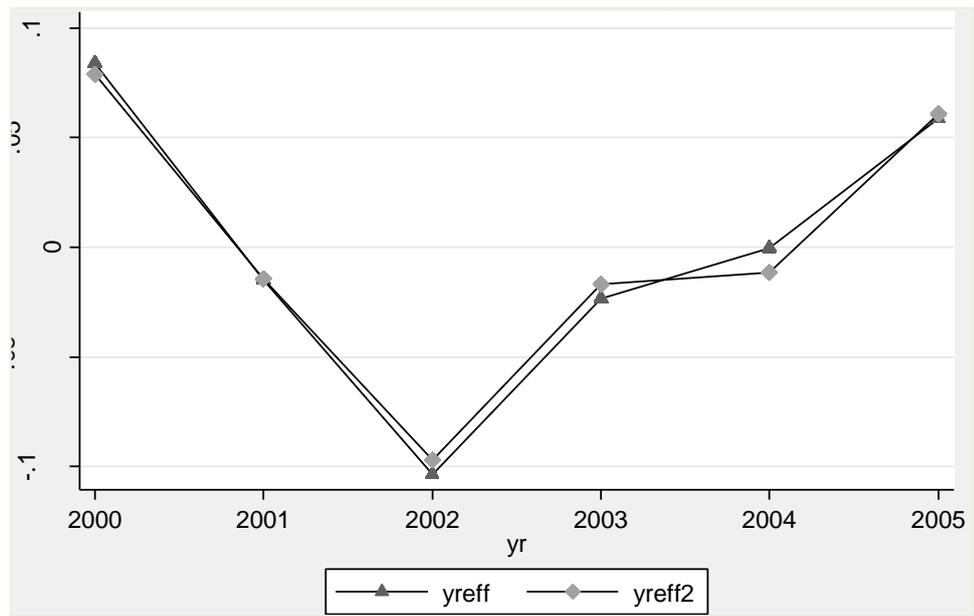


Figure A.21: Share of Formal Employment in Labor Force Year Coefficients
Obtained Using Real (yreff) and Derived (yreff2) Data

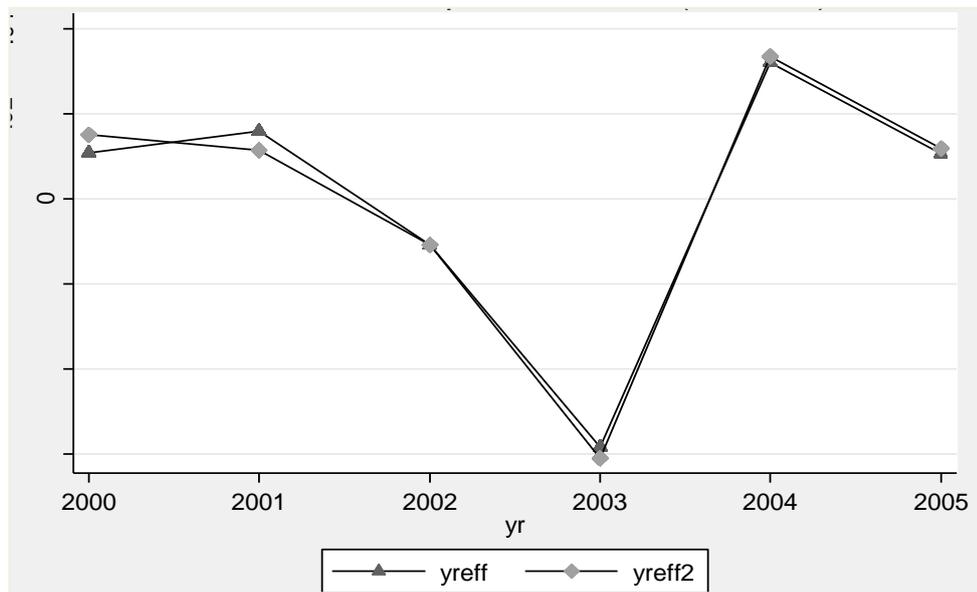


Figure A.22: Share of Informal Employment in Population Year Coefficients
Obtained Using Real (yreff) and Derived (yreff2) Data

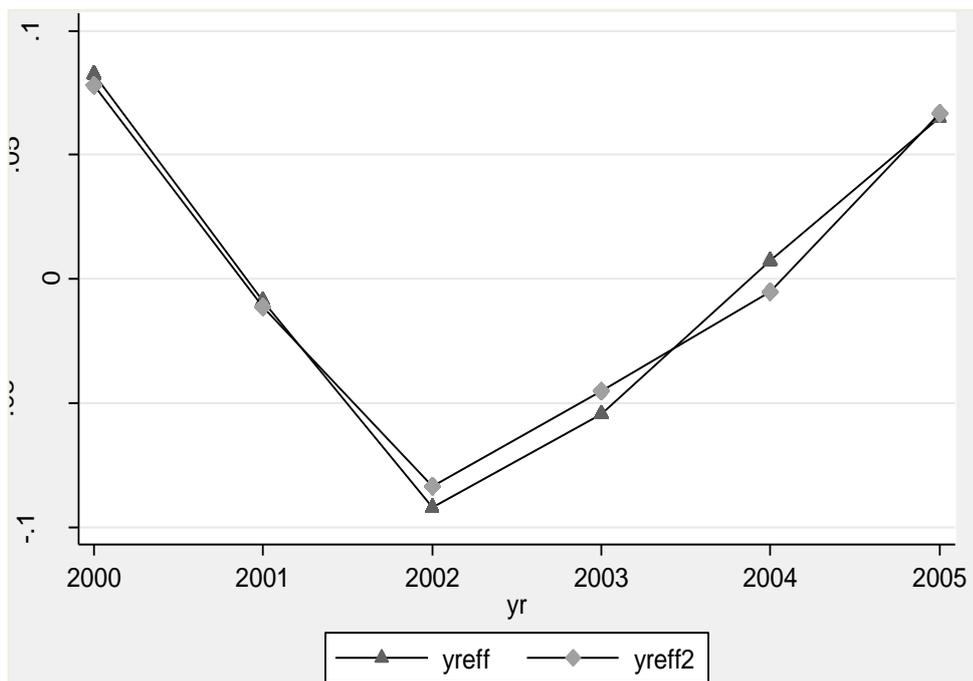


Figure A.23: Share of Formal Employment in Population Year Coefficients Obtained Using Real (yreff) and Derived (yreff2) Data

Table A.1: Regression Results of Dependent Variables on Age, Cohort and Year Dummies Using 2000-2005 Real Values

	Labor Force Participation Rate	Unemployment Rate	Informal Employment Rate	Share of Informal Employment in Labor Force	Share of Formal Employment in Labor Force	Share of Informal Employment in Population	Share of Formal Employment in Population	Share of Unemployment in Population
age18	0.52 (3.67)**	0.232 -1.19	-0.103 -0.78	-0.213 -1.86	0.051 -0.4	0.241 (2.34)*	0.347 (3.00)**	0.032 (2.99)**
age19	0.733 (5.38)**	0.094 -0.5	-0.265 (2.08)*	-0.326 (2.96)**	0.24 (1.98)*	0.303 (3.05)**	0.612 (5.50)**	0.032 (3.05)**
age20	0.389 (2.91)**	0.094 -0.51	-0.459 (3.67)**	-0.475 (4.39)**	0.416 (3.50)**	-0.05 -0.51	0.528 (4.83)**	0.016 -1.55
age21	0.675 (5.09)**	0.775 (4.25)**	-0.597 (4.82)**	-0.858 (8.00)**	0.297 (2.53)*	-0.135 -1.4	0.609 (5.63)**	0.087 (8.57)**
age22	1.566 (11.87)**	0.705 (3.89)**	-0.643 (5.21)**	-0.845 (7.92)**	0.371 (3.17)**	0.335 (3.49)**	1.116 (10.36)**	0.135 (13.33)**
age23	2.054 (15.00)**	0.408 (2.17)*	-0.879 (6.86)**	-0.927 (8.37)**	0.677 (5.57)**	0.427 (4.28)**	1.553 (13.89)**	0.116 (11.09)**
age24	2.524 (18.13)**	0.25 -1.31	-1.031 (7.92)**	-1.017 (9.03)**	0.853 (6.91)**	0.459 (4.52)**	1.847 (16.25)**	0.109 (10.24)**
age25	3.026 (21.37)**	0.148 -0.76	-1.134 (8.56)**	-1.087 (9.49)**	0.968 (7.71)**	0.482 (4.67)**	2.069 (17.89)**	0.105 (9.68)**
age26	3.236 (22.46)**	0.124 -0.63	-1.266 (9.40)**	-1.207 (10.36)**	1.079 (8.44)**	0.394 (3.75)**	2.208 (18.77)**	0.105 (9.54)**
age27	3.676 (25.09)**	0.096 -0.48	-1.315 (9.60)**	-1.247 (10.53)**	1.127 (8.67)**	0.402 (3.77)**	2.333 (19.50)**	0.106 (9.43)**
age28	4.004 (26.88)**	0.027 -0.13	-1.346 (9.66)**	-1.267 (10.51)**	1.174 (8.88)**	0.409 (3.76)**	2.424 (19.93)**	0.101 (8.81)**
age29	4.165 (27.52)**	-0.082 -0.4	-1.401 (9.90)**	-1.308 (10.68)**	1.246 (9.28)**	0.378 (3.43)**	2.51 (20.31)**	0.094 (8.08)**
age30	4.277 (27.83)**	0.14 -0.67	-1.207 (8.40)**	-1.145 (9.21)**	1.03 (7.55)**	0.547 (4.88)**	2.335 (18.61)**	0.111 (9.41)**
age31	4.505 (28.88)**	0.13 -0.61	-1.376 (9.43)**	-1.307 (10.36)**	1.171 (8.46)**	0.399 (3.51)**	2.493 (19.57)**	0.11 (9.21)**
age32	4.415 (27.90)**	0.256 -1.18	-1.304 (8.81)**	-1.247 (9.74)**	1.083 (7.71)**	0.454 (3.94)**	2.403 (18.59)**	0.117 (9.68)**
age33	4.521 (28.17)**	0.247 -1.12	-1.309 (8.72)**	-1.252 (9.64)**	1.087 (7.64)**	0.454 (3.89)**	2.418 (18.45)**	0.118 (9.55)**
age34	4.491 (27.60)**	0.362 -1.62	-1.22 (8.02)**	-1.176 (8.93)**	0.986 (6.83)**	0.528 (4.46)**	2.322 (17.48)**	0.125 (10.03)**
age35	4.415 (26.78)**	0.463 (2.04)*	-1.013 (6.57)**	-0.982 (7.37)**	0.798 (5.46)**	0.715 (5.95)**	2.141 (15.90)**	0.13 (10.32)**
age36	4.624 (27.69)**	0.512 (2.23)*	-1.088 (6.97)**	-1.06 (7.85)**	0.848 (5.72)**	0.649 (5.33)**	2.211 (16.21)**	0.134 (10.48)**
age37	4.582 (27.09)**	0.605 (2.61)*	-1.054 (6.66)**	-1.033 (7.55)**	0.797 (5.31)**	0.674 (5.47)**	2.161 (15.65)**	0.139 (10.72)**
age38	4.661 (27.22)**	0.748 (3.18)**	-1.028 (6.42)**	-1.021 (7.37)**	0.74 (4.87)**	0.69 (5.53)**	2.121 (15.16)**	0.149 (11.33)**
age39	4.626 (26.69)**	0.742 (3.12)**	-1.068 (6.59)**	-1.059 (7.55)**	0.775 (5.04)**	0.65 (5.15)**	2.147 (15.17)**	0.147 (11.08)**
age40	4.319 (24.63)**	0.855 (3.55)**	-0.848 (5.17)**	-0.856 (6.04)**	0.567 (3.64)**	0.832 (6.51)**	1.917 (13.39)**	0.155 (11.53)**
age41	4.313 (24.32)**	0.901 (3.70)**	-1.032 (6.22)**	-1.037 (7.23)**	0.706 (4.49)**	0.655 (5.07)**	2.037 (14.06)**	0.156 (11.44)**

age42	4.16	1.002	-0.92	-0.934	0.596	0.746	1.912	0.16
	(23.19)**	(4.07)**	(5.49)**	(6.43)**	(3.74)**	(5.71)**	(13.05)**	(11.62)**
age43	4.042	1.139	-0.816	-0.842	0.479	0.824	1.786	0.167
	(22.29)**	(4.57)**	(4.81)**	(5.74)**	(2.98)**	(6.24)**	(12.06)**	(11.98)**
age44	3.758	1.285	-0.721	-0.761	0.362	0.87	1.608	0.173
	(20.50)**	(5.10)**	(4.21)**	(5.13)**	(2.23)*	(6.51)**	(10.74)**	(12.31)**
age45	3.484	1.503	-0.323	-0.392	-0.007	1.181	1.238	0.183
	(18.81)**	(5.91)**	-1.86	(2.62)**	-0.04	(8.75)**	(8.18)**	(12.92)**
age46	3.256	1.52	-0.349	-0.42	0.008	1.108	1.156	0.182
	(17.40)**	(5.91)**	(2.00)*	(2.78)**	-0.05	(8.12)**	(7.56)**	(12.70)**
age47	3.079	1.64	-0.184	-0.265	-0.152	1.21	0.969	0.184
	(16.29)**	(6.32)**	-1.04	-1.74	-0.9	(8.78)**	(6.27)**	(12.72)**
age48	2.877	1.84	-0.008	-0.114	-0.342	1.293	0.743	0.191
	(15.07)**	(7.02)**	-0.05	-0.74	(2.02)*	(9.29)**	(4.76)**	(13.07)**
age49	2.561	1.974	0.267	0.138	-0.601	1.413	0.406	0.193
	(13.29)**	(7.45)**	-1.48	-0.89	(3.51)**	(10.06)**	(2.58)*	(13.08)**
age50	2.406	2.105	0.483	0.33	-0.816	1.515	0.178	0.197
	(12.36)**	(7.87)**	(2.65)**	(2.09)*	(4.72)**	(10.68)**	-1.12	(13.20)**
age51	2.196	2.281	0.657	0.478	-0.997	1.544	-0.065	0.2
	(11.18)**	(8.45)**	(3.58)**	(3.01)**	(5.72)**	(10.78)**	-0.4	(13.26)**
age52	2.106	2.312	0.833	0.641	-1.155	1.635	-0.22	0.199
	(10.62)**	(8.49)**	(4.50)**	(4.00)**	(6.56)**	(11.32)**	-1.36	(13.09)**
age53	1.973	2.512	0.984	0.758	-1.329	1.652	-0.419	0.205
	(9.86)**	(9.14)**	(5.26)**	(4.69)**	(7.49)**	(11.33)**	(2.57)*	(13.36)**
age54	1.8	2.644	1.111	0.862	-1.471	1.63	-0.622	0.206
	(8.92)**	(9.54)**	(5.89)**	(5.28)**	(8.21)**	(11.08)**	(3.78)**	(13.33)**
age55	1.784	2.724	1.452	1.174	-1.783	1.86	-0.828	0.208
	(8.76)**	(9.74)**	(7.63)**	(7.13)**	(9.87)**	(12.53)**	(4.98)**	(13.35)**
age56	1.565	2.71	1.632	1.35	-1.94	1.841	-1.082	0.202
	(7.62)**	(9.61)**	(8.50)**	(8.13)**	(10.65)**	(12.30)**	(6.45)**	(12.82)**
age57	1.423	2.828	1.974	1.652	-2.279	1.962	-1.392	0.205
	(6.87)**	(9.95)**	(10.20)**	(9.86)**	(12.40)**	(13.00)**	(8.23)**	(12.89)**
age58	1.255	2.641	2.108	1.799	-2.365	1.933	-1.581	0.194
	(5.99)**	(9.18)**	(10.76)**	(10.62)**	(12.72)**	(12.66)**	(9.24)**	(12.11)**
age59	1.17	2.892	2.258	1.912	-2.545	1.942	-1.757	0.199
	(5.51)**	(9.93)**	(11.38)**	(11.14)**	(13.52)**	(12.56)**	(10.14)**	(12.23)**
age60	0.933	3.268	2.778	2.316	-3.081	2.005	-2.299	0.205
	(4.32)**	(11.02)**	(13.76)**	(13.26)**	(16.08)**	(12.74)**	(13.04)**	(12.41)**
age61	0.704	2.83	2.688	2.318	-2.941	1.829	-2.375	0.195
	(3.16)**	(9.26)**	(12.92)**	(12.88)**	(14.90)**	(11.28)**	(13.07)**	(11.46)**
age62	0.824	2.779	2.816	2.457	-3.072	2.014	-2.363	0.203
	(3.44)**	(8.44)**	(12.56)**	(12.67)**	(14.44)**	(11.53)**	(12.07)**	(11.04)**
coh18	-0.049	-0.04	-0.049	-0.003	0.053	-0.02	0.026	-0.007
	-0.71	-0.42	-0.76	-0.05	-0.88	-0.41	-0.46	-1.37
coh19	-0.064	0.018	-0.245	-0.179	0.195	-0.147	0.14	0
	-0.89	-0.19	(3.66)**	(3.08)**	(3.07)**	(2.80)**	(2.39)*	-0.07
coh20	-0.135	-0.065	-0.249	-0.146	0.225	-0.144	0.134	-0.008
	-1.8	-0.63	(3.54)**	(2.40)*	(3.37)**	(2.62)**	(2.18)*	-1.41
coh21	-0.18	-0.096	-0.308	-0.177	0.289	-0.18	0.175	-0.015
	(2.27)*	-0.88	(4.17)**	(2.77)**	(4.12)**	(3.13)**	(2.72)**	(2.45)*
coh22	-0.267	-0.114	-0.381	-0.24	0.352	-0.262	0.21	-0.02
	(3.20)**	-1	(4.90)**	(3.56)**	(4.76)**	(4.31)**	(3.09)**	(3.07)**

coh23	-0.296	-0.258	-0.421	-0.24	0.433	-0.268	0.264	-0.037
	(3.37)**	(2.14)*	(5.12)**	(3.38)**	(5.55)**	(4.18)**	(3.67)**	(5.43)**
coh24	-0.334	-0.369	-0.453	-0.251	0.493	-0.281	0.312	-0.049
	(3.64)**	(2.93)**	(5.28)**	(3.38)**	(6.06)**	(4.20)**	(4.16)**	(6.96)**
coh25	-0.535	-0.495	-0.535	-0.311	0.598	-0.355	0.378	-0.062
	(5.60)**	(3.77)**	(5.99)**	(4.02)**	(7.05)**	(5.09)**	(4.84)**	(8.44)**
coh26	-0.541	-0.622	-0.567	-0.326	0.658	-0.37	0.429	-0.072
	(5.45)**	(4.56)**	(6.12)**	(4.06)**	(7.48)**	(5.12)**	(5.30)**	(9.47)**
coh27	-0.63	-0.649	-0.715	-0.467	0.78	-0.512	0.531	-0.074
	(6.13)**	(4.60)**	(7.44)**	(5.61)**	(8.55)**	(6.84)**	(6.32)**	(9.36)**
coh28	-0.728	-0.907	-0.702	-0.428	0.839	-0.481	0.568	-0.092
	(6.86)**	(6.22)**	(7.07)**	(4.98)**	(8.90)**	(6.21)**	(6.55)**	(11.34)**
coh29	-0.658	-0.88	-0.808	-0.533	0.916	-0.582	0.647	-0.091
	(6.01)**	(5.85)**	(7.90)**	(6.02)**	(9.43)**	(7.29)**	(7.24)**	(10.79)**
coh30	-0.725	-1.091	-0.803	-0.507	0.963	-0.558	0.684	-0.105
	(6.43)**	(7.05)**	(7.62)**	(5.56)**	(9.63)**	(6.79)**	(7.43)**	(12.19)**
coh31	-0.724	-1.116	-0.897	-0.598	1.046	-0.648	0.76	-0.106
	(6.25)**	(7.02)**	(8.28)**	(6.38)**	(10.18)**	(7.68)**	(8.04)**	(11.97)**
coh32	-0.67	-1.167	-0.965	-0.659	1.114	-0.707	0.827	-0.109
	(5.64)**	(7.15)**	(8.69)**	(6.86)**	(10.56)**	(8.17)**	(8.52)**	(12.01)**
coh33	-0.758	-1.367	-1.046	-0.721	1.229	-0.772	0.922	-0.122
	(6.23)**	(8.17)**	(9.19)**	(7.32)**	(11.37)**	(8.69)**	(9.27)**	(13.06)**
coh34	-0.915	-1.443	-1.055	-0.722	1.253	-0.781	0.924	-0.127
	(7.33)**	(8.42)**	(9.04)**	(7.16)**	(11.32)**	(8.59)**	(9.07)**	(13.28)**
coh35	-0.917	-1.393	-1.125	-0.797	1.292	-0.854	0.961	-0.123
	(7.19)**	(7.95)**	(9.43)**	(7.73)**	(11.42)**	(9.19)**	(9.22)**	(12.55)**
coh36	-0.766	-1.599	-1.188	-0.84	1.399	-0.89	1.078	-0.136
	(5.88)**	(8.94)**	(9.75)**	(7.97)**	(12.10)**	(9.37)**	(10.13)**	(13.60)**
coh37	-0.89	-1.59	-1.174	-0.828	1.385	-0.885	1.047	-0.135
	(6.69)**	(8.70)**	(9.44)**	(7.70)**	(11.73)**	(9.13)**	(9.64)**	(13.27)**
coh38	-0.987	-1.722	-1.283	-0.924	1.503	-0.986	1.136	-0.143
	(7.28)**	(9.24)**	(10.12)**	(8.42)**	(12.49)**	(9.97)**	(10.25)**	(13.77)**
coh39	-0.888	-1.909	-1.385	-1.008	1.63	-1.062	1.264	-0.154
	(6.42)**	(10.05)**	(10.71)**	(9.01)**	(13.29)**	(10.53)**	(11.19)**	(14.53)**
coh40	-1.01	-2.081	-1.438	-1.048	1.713	-1.109	1.306	-0.163
	(7.17)**	(10.76)**	(10.92)**	(9.20)**	(13.71)**	(10.81)**	(11.35)**	(15.13)**
coh41	-1.144	-2.123	-1.552	-1.159	1.813	-1.236	1.347	-0.165
	(7.98)**	(10.78)**	(11.58)**	(10.00)**	(14.26)**	(11.83)**	(11.51)**	(15.05)**
coh42	-1.197	-2.16	-1.625	-1.225	1.88	-1.312	1.377	-0.169
	(8.21)**	(10.79)**	(11.92)**	(10.39)**	(14.53)**	(12.35)**	(11.57)**	(15.11)**
coh43	-1.157	-2.292	-1.661	-1.253	1.943	-1.328	1.441	-0.175
	(7.80)**	(11.25)**	(11.99)**	(10.45)**	(14.77)**	(12.29)**	(11.90)**	(15.36)**
coh44	-1.196	-2.337	-1.789	-1.376	2.055	-1.459	1.502	-0.177
	(7.94)**	(11.30)**	(12.70)**	(11.30)**	(15.38)**	(13.29)**	(12.21)**	(15.32)**
coh45	-1.203	-2.49	-1.936	-1.502	2.213	-1.581	1.604	-0.186
	(7.87)**	(11.85)**	(13.53)**	(12.14)**	(16.31)**	(14.18)**	(12.84)**	(15.89)**
coh46	-1.232	-2.657	-1.938	-1.494	2.251	-1.583	1.611	-0.193
	(7.93)**	(12.46)**	(13.35)**	(11.89)**	(16.34)**	(13.99)**	(12.70)**	(16.23)**

coh47	-1.15	-2.733	-2.078	-1.621	2.385	-1.669	1.742	-0.195
	(7.30)**	(12.63)**	(14.11)**	(12.72)**	(17.06)**	(14.54)**	(13.54)**	(16.18)**
coh48	-1.199	-2.736	-2.14	-1.681	2.438	-1.74	1.749	-0.197
	(7.50)**	(12.46)**	(14.32)**	(13.00)**	(17.19)**	(14.94)**	(13.40)**	(16.09)**
coh49	-1.271	-3.004	-2.205	-1.709	2.555	-1.793	1.78	-0.211
	(7.84)**	(13.50)**	(14.56)**	(13.04)**	(17.77)**	(15.18)**	(13.45)**	(16.99)**
coh50	-1.249	-3.073	-2.413	-1.898	2.746	-1.944	1.911	-0.214
	(7.60)**	(13.62)**	(15.71)**	(14.29)**	(18.85)**	(16.24)**	(14.25)**	(16.99)**
coh51	-1.268	-3.148	-2.413	-1.891	2.761	-1.953	1.901	-0.217
	(7.62)**	(13.78)**	(15.51)**	(14.05)**	(18.70)**	(16.11)**	(13.99)**	(17.04)**
coh52	-1.251	-3.405	-2.631	-2.064	2.997	-2.081	2.06	-0.225
	(7.43)**	(14.71)**	(16.70)**	(15.15)**	(20.04)**	(16.95)**	(14.97)**	(17.45)**
coh53	-1.266	-3.222	-2.76	-2.218	3.083	-2.207	2.094	-0.22
	(7.42)**	(13.75)**	(17.30)**	(16.07)**	(20.36)**	(17.75)**	(15.03)**	(16.81)**
coh54	-1.245	-3.452	-2.99	-2.402	3.327	-2.324	2.266	-0.226
	(7.21)**	(14.55)**	(18.51)**	(17.19)**	(21.71)**	(18.46)**	(16.06)**	(17.09)**
coh55	-1.248	-3.627	-3.196	-2.565	3.552	-2.434	2.406	-0.233
	(7.14)**	(15.11)**	(19.55)**	(18.14)**	(22.90)**	(19.10)**	(16.85)**	(17.36)**
coh56	-1.257	-3.438	-3.193	-2.602	3.513	-2.479	2.366	-0.228
	(7.10)**	(14.14)**	(19.29)**	(18.17)**	(22.37)**	(19.22)**	(16.37)**	(16.82)**
coh57	-1.346	-3.851	-3.367	-2.705	3.741	-2.604	2.443	-0.241
	(7.49)**	(15.60)**	(20.04)**	(18.61)**	(23.46)**	(19.88)**	(16.65)**	(17.47)**
yr2002	-0.049	0.267	0.041	0	-0.104	-0.011	-0.092	0.015
	(3.07)**	(12.25)**	(2.78)**	-0.02	(7.35)**	-0.94	(7.07)**	(12.68)**
yr2003	-0.106	0.132	-0.01	-0.031	-0.024	-0.058	-0.054	0.006
	(6.64)**	(6.05)**	-0.67	(2.40)**	-1.68	(5.04)**	(4.18)**	(4.63)**
yr2004	0.058	-0.028	0.011	0.014	0	0.032	0.007	0.001
	(3.92)**	-1.4	-0.82	-1.13	-0.03	(2.99)**	-0.61	-0.75
yr2005	0.04	-0.167	-0.022	0.005	0.059	0.011	0.065	-0.01
	(3.26)**	(10.00)**	-1.95	-0.51	(5.45)**	-1.19	(6.55)**	(11.15)**
Constant	-0.604	-1.659	0.935	0.479	-1.179	-1.228	-2.363	0.061
	(5.38)**	(10.75)**	(8.90)**	(5.26)**	(11.82)**	(14.99)**	(25.74)**	(7.12)**
Observations	246	246	246	246	246	246	246	246
R-squared	1	0.94	0.98	0.98	0.98	0.93	0.99	0.97
Absolute value of t-statistics in parentheses								
* significant at 5% level; ** significant at 1% level								

APPENDIX B

COHORT PROFILES OF EACH VARIABLE FOR EDUCATION GROUPS

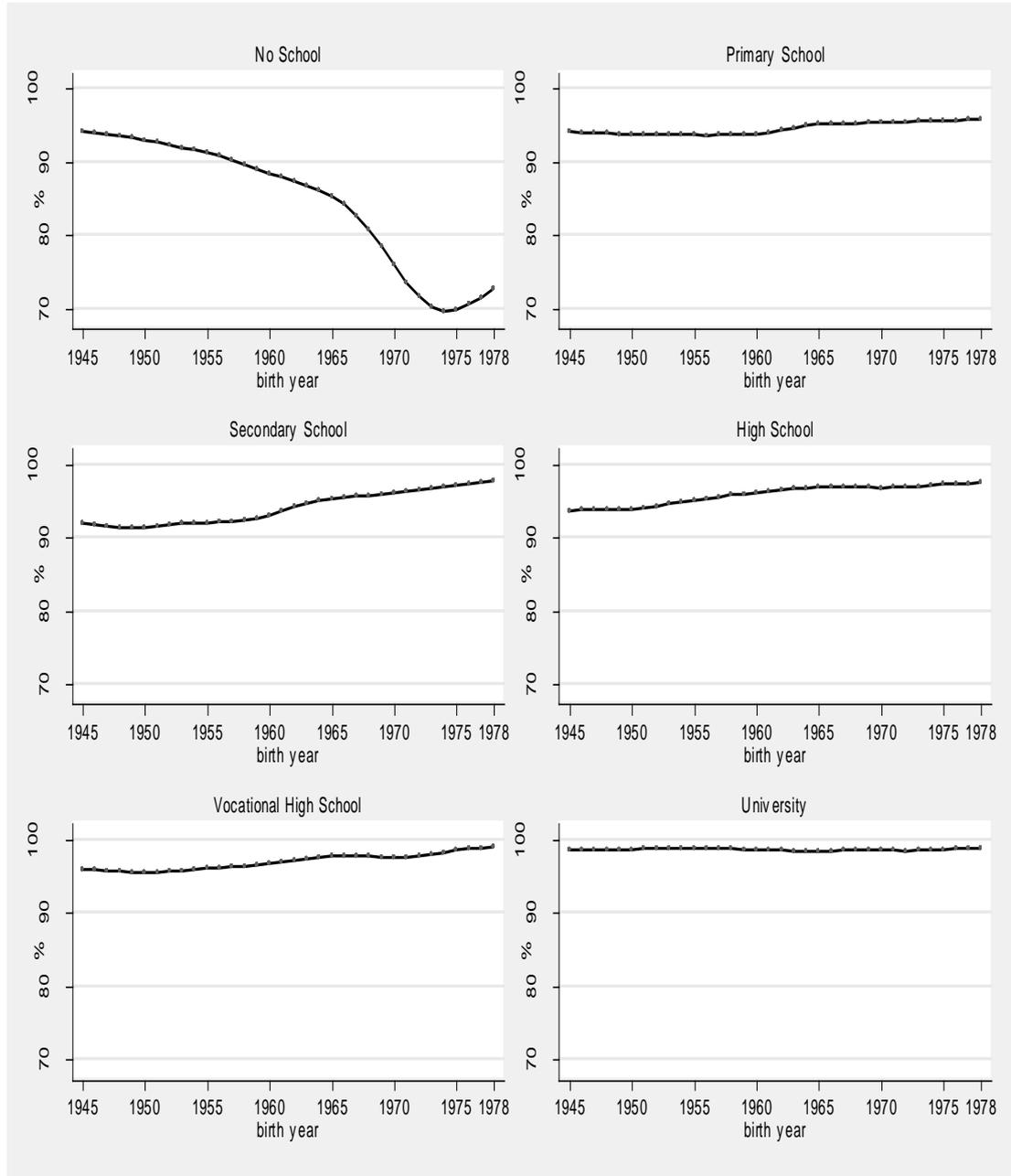


Figure B1: Predicted Labor Force Participation Rate Cohort Profiles at Age 35 without Year Effect by Education Groups

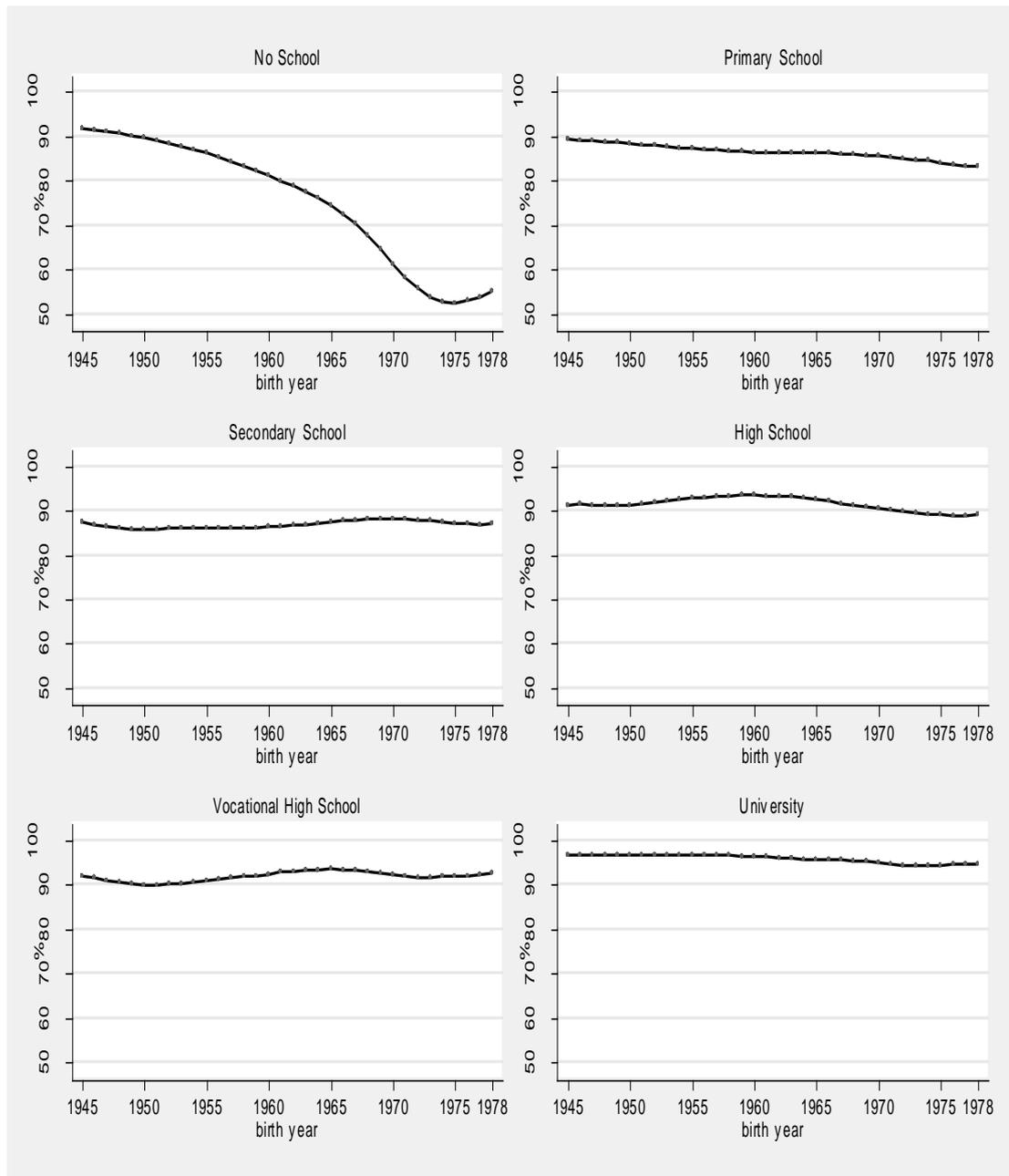


Figure B2: Predicted Employment Rate Cohort Profiles at Age 35 without Year Effect by Education Groups

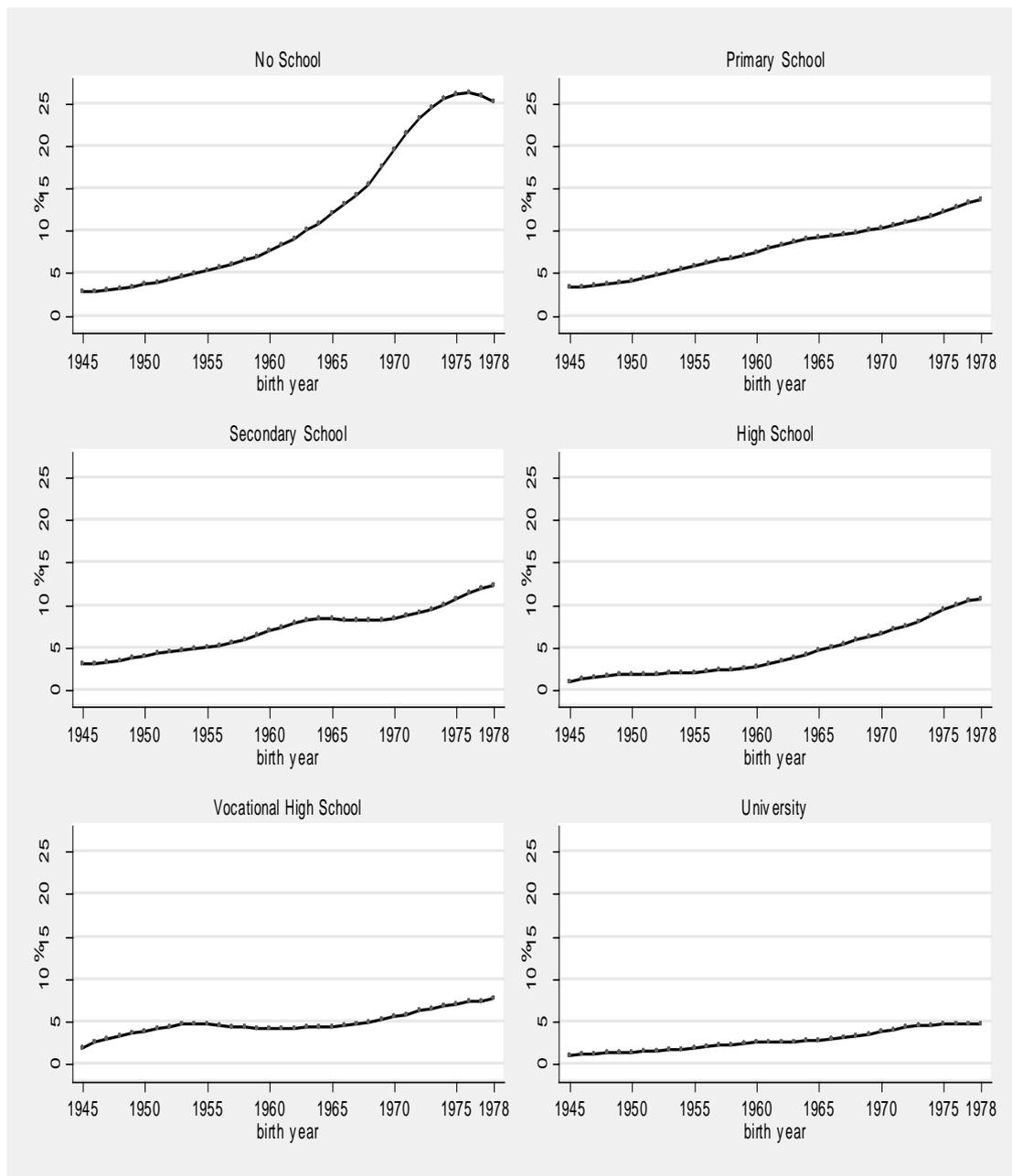


Figure B3: Predicted Unemployment Rate Cohort Profiles at Age 35 without Year Effect by Education Groups

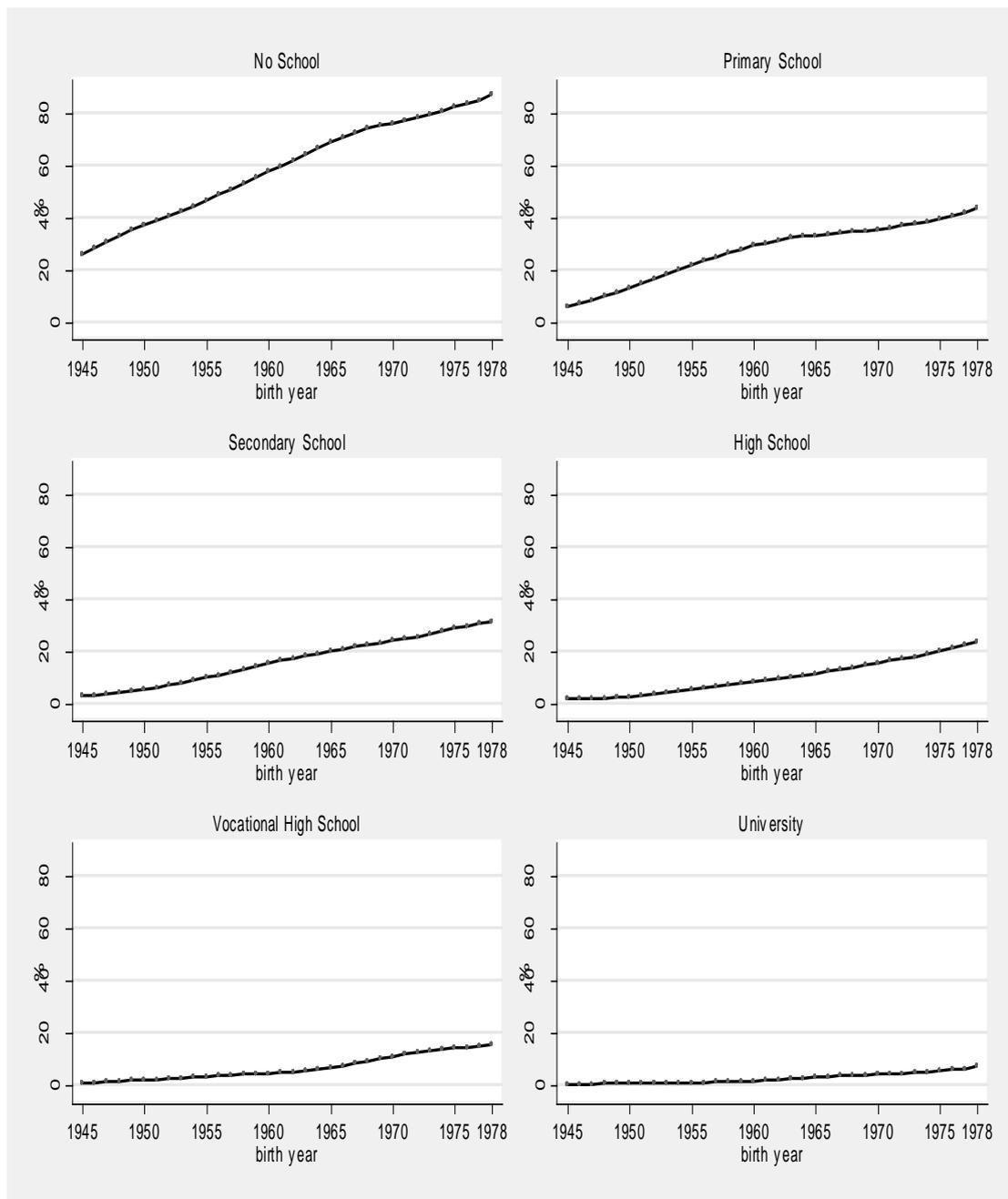


Figure B4: Predicted Informal Employment Rate Cohort Profiles at Age 35 without Year Effect by Education Groups

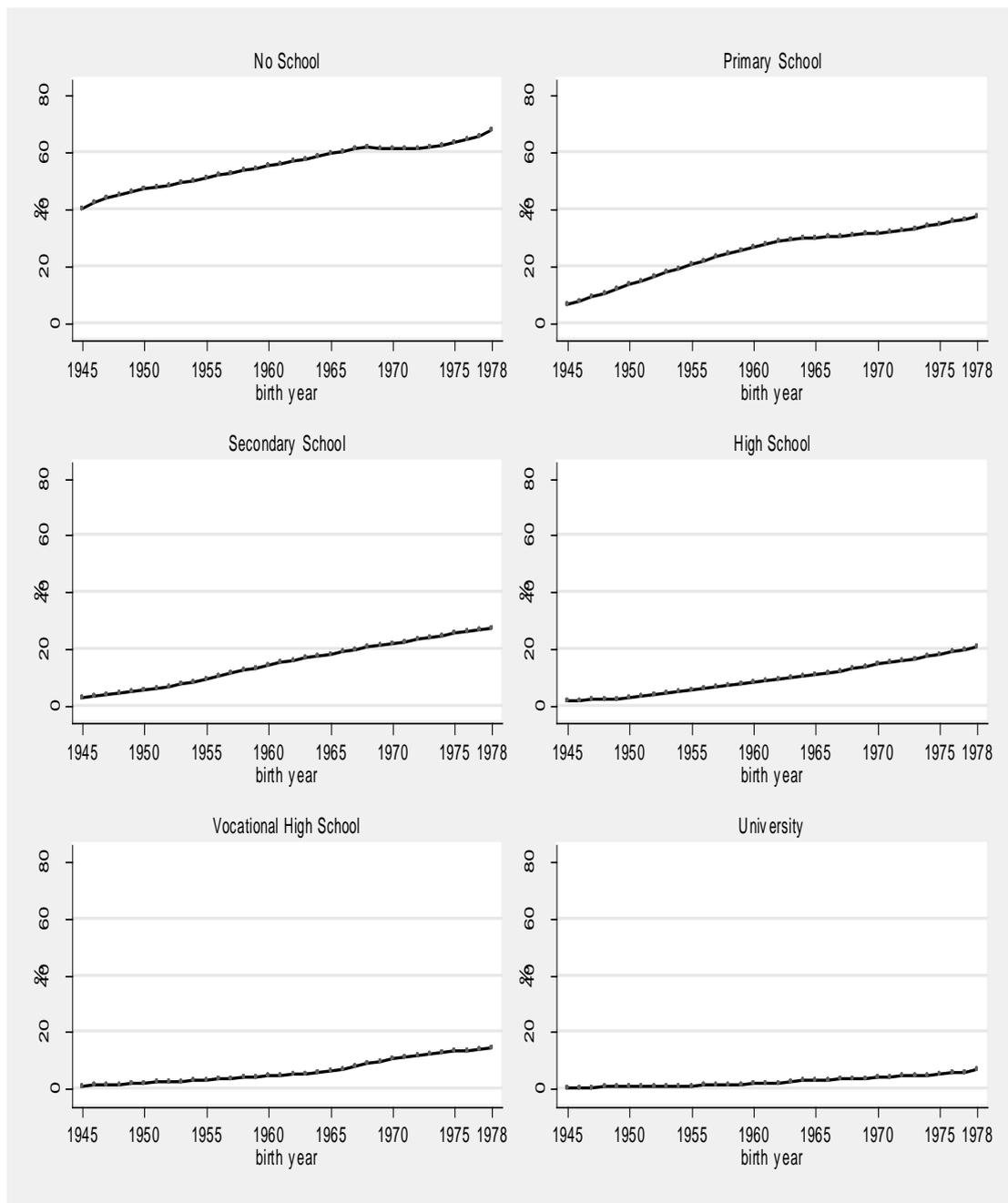


Figure B5: Predicted Share of Informal Employment in Labor Force Cohort Profiles at Age 35 without Year Effect by Education Groups

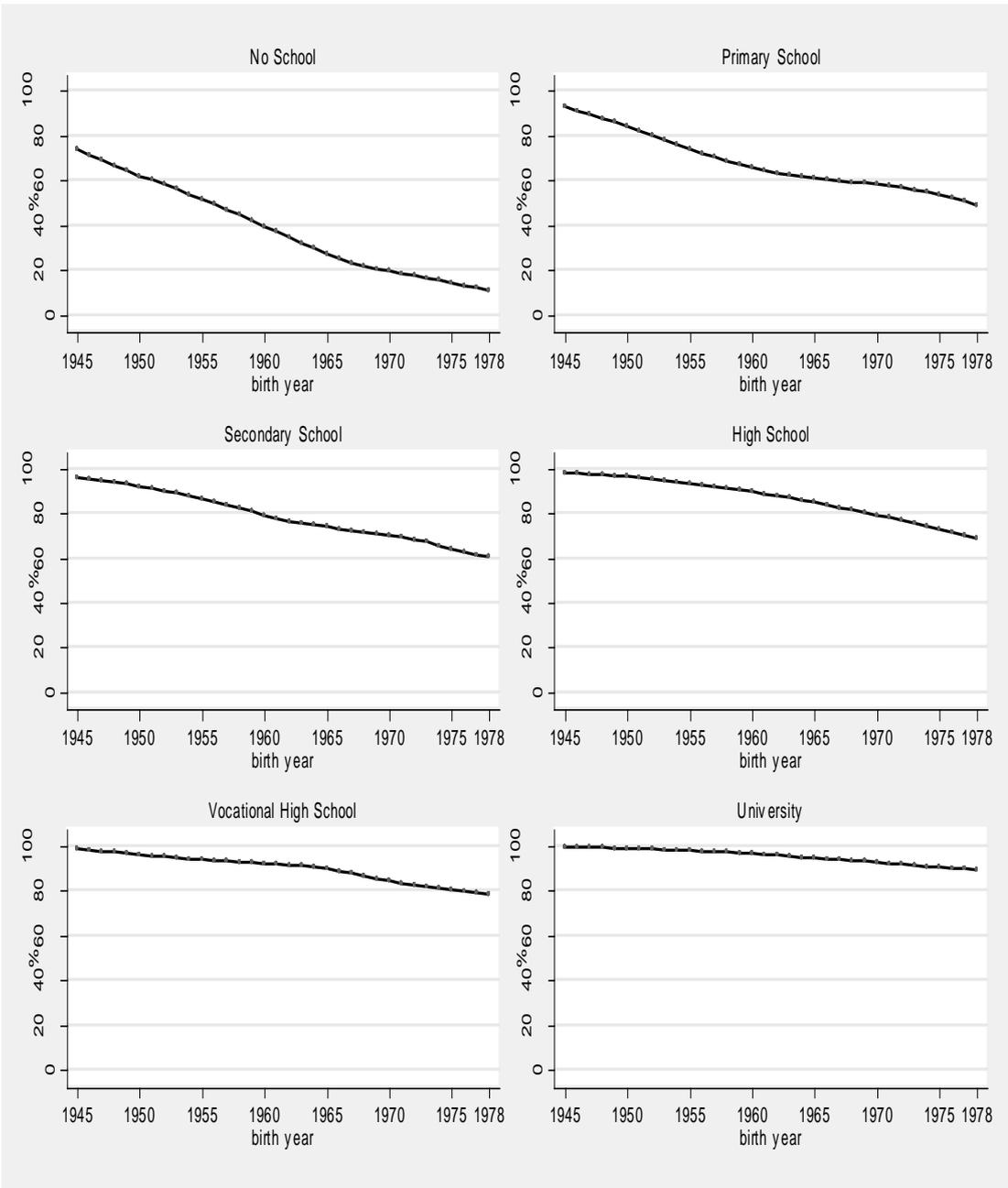


Figure B6: Predicted Share of Formal Employment in Labor Force Cohort Profiles at Age 35 without Year Effect by Education Groups

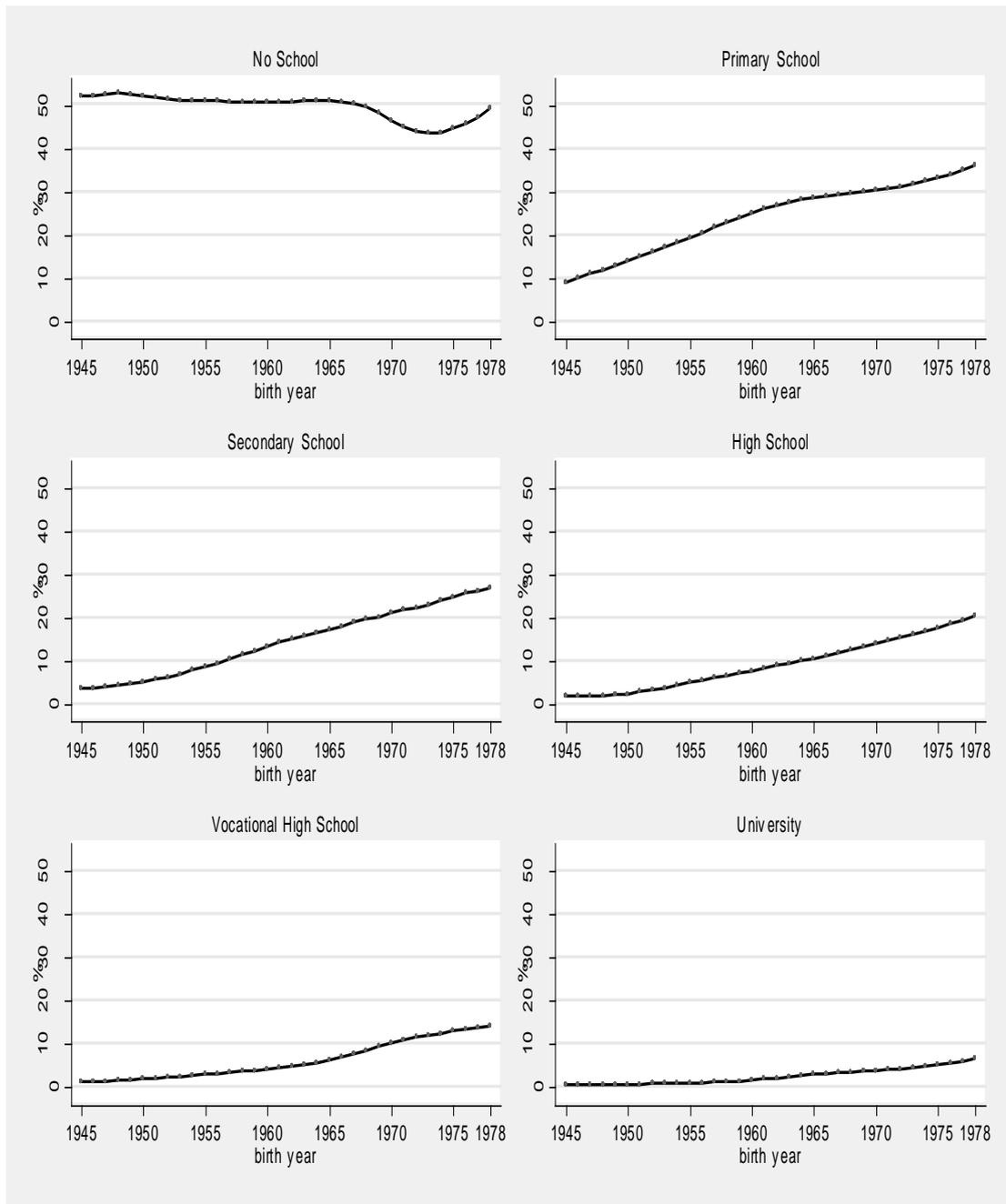


Figure B7: Predicted Share of Informal Employment in Population Cohort Profiles at Age 35 without Year Effect by Education Groups

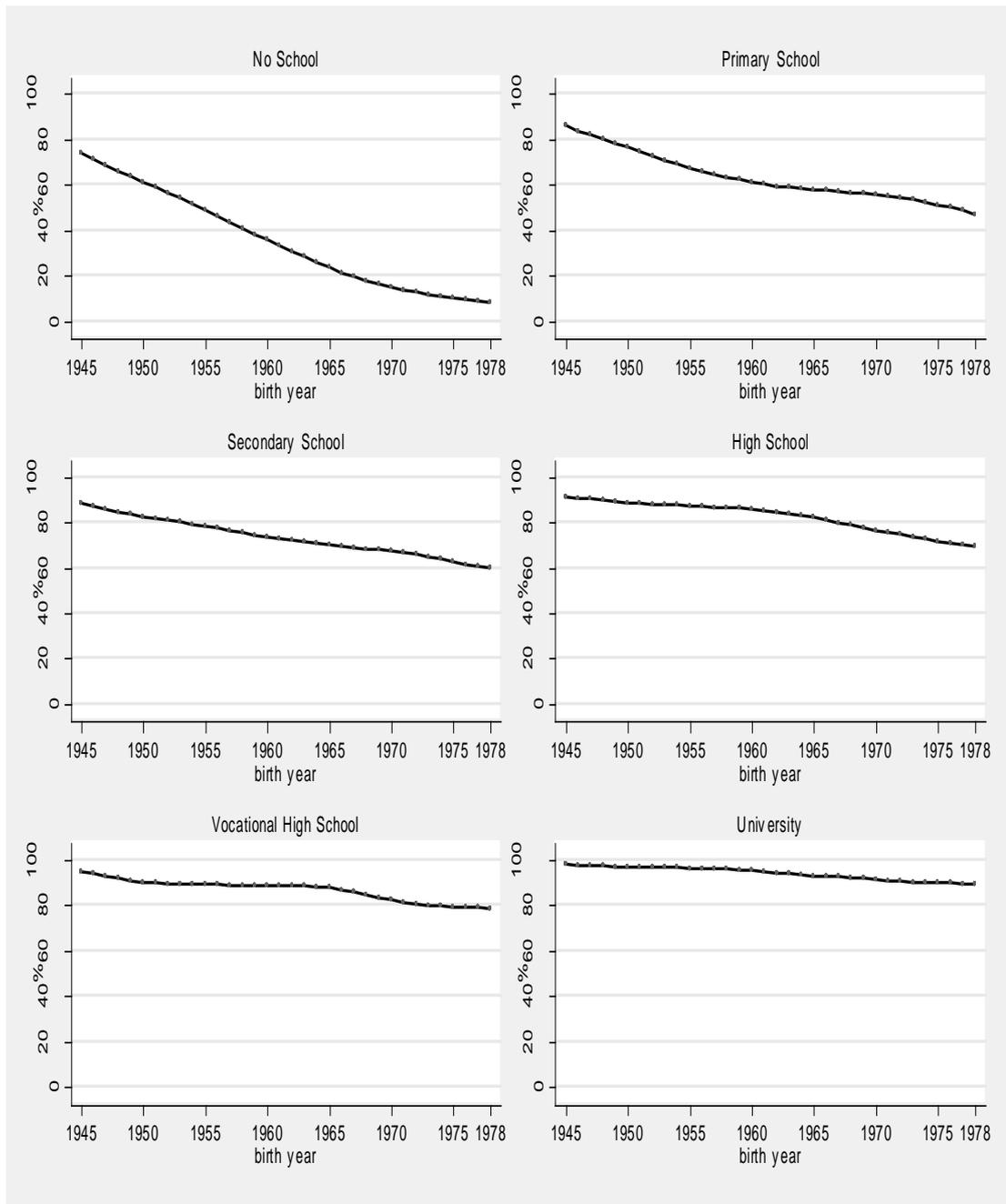


Figure B8: Predicted Share of Formal Employment in Population Cohort Profiles at for Age 35 without Year Effect by Education Groups

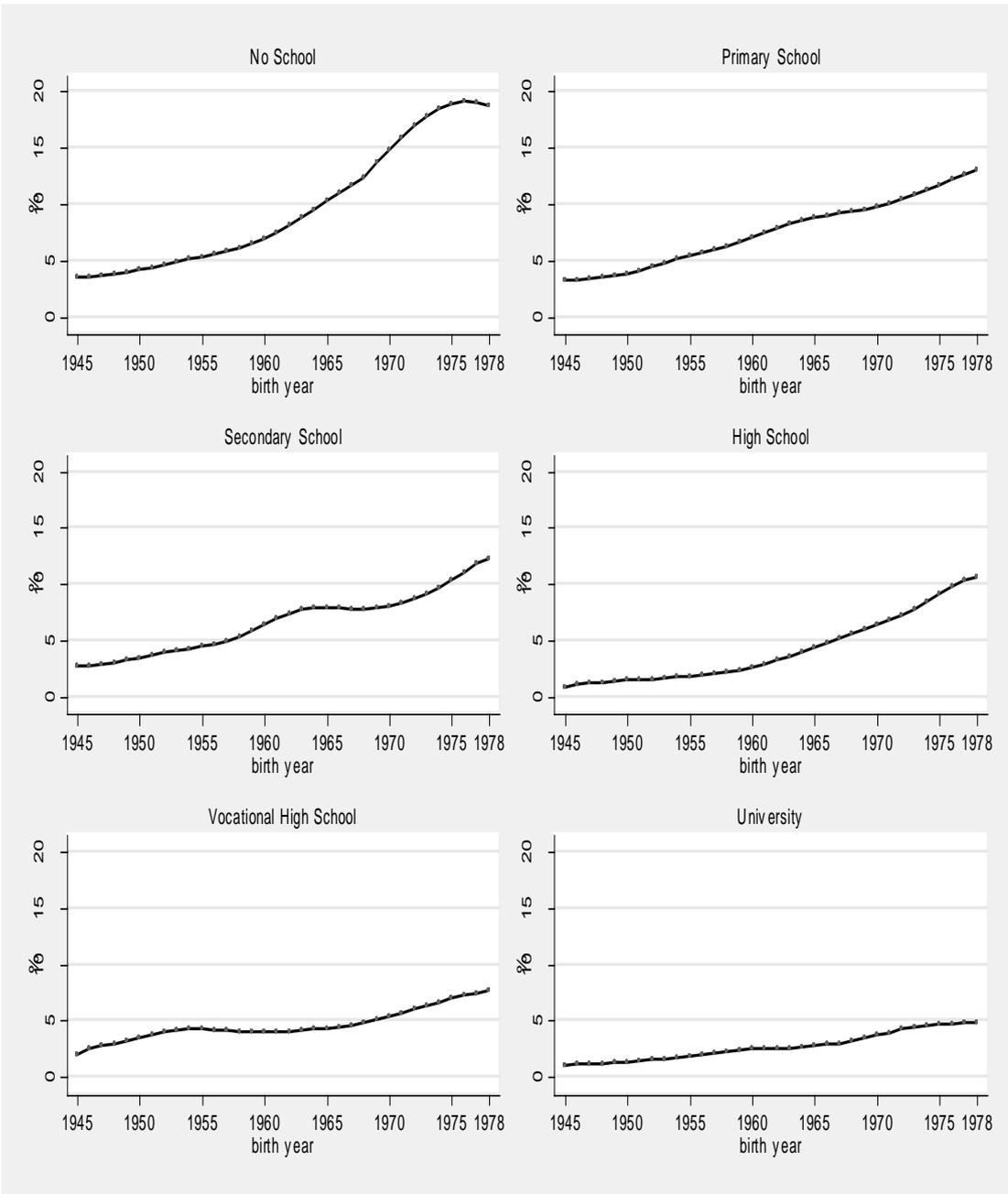


Figure B9: Predicted Share of Unemployment in Population Cohort Profiles at for Age 35 without Year Effect by Education Groups

APPENDIX C

YEAR PROFILES OF EACH VARIABLE FOR EDUCATION GROUPS

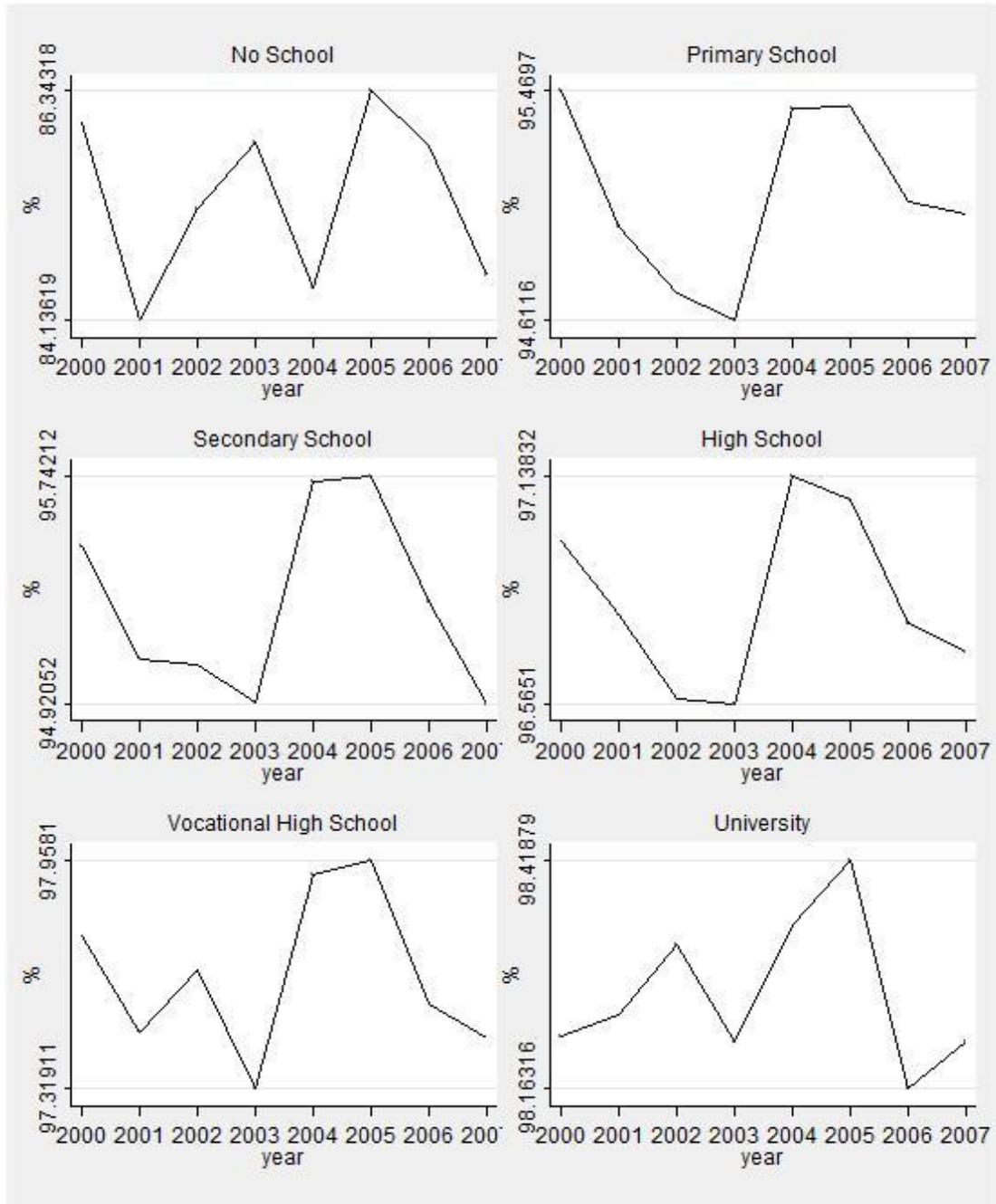


Figure C1: Predicted Labor Force Participation Rate Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

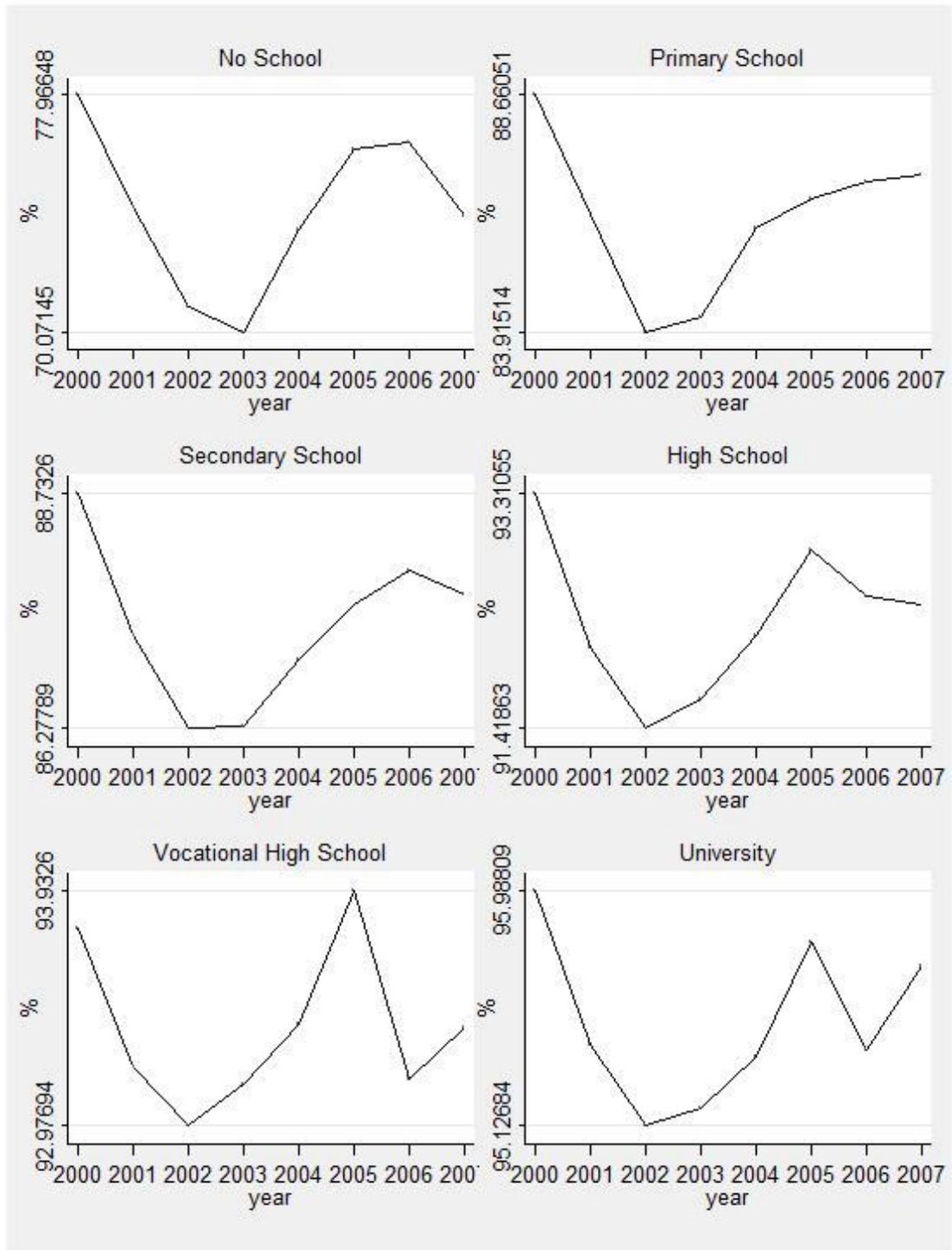


Figure C2: Predicted Employment Rate Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

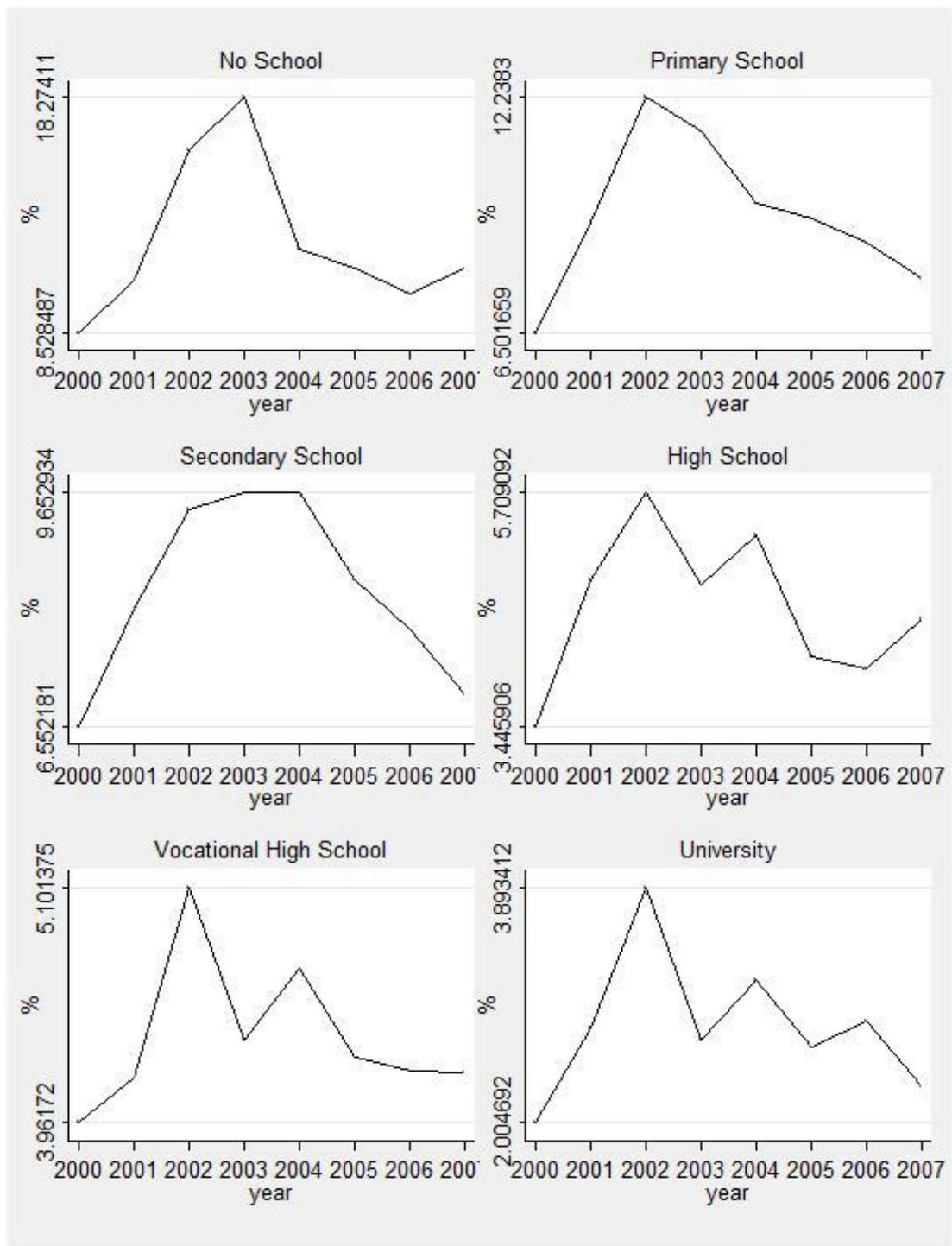


Figure C3: Predicted Unemployment Rate Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

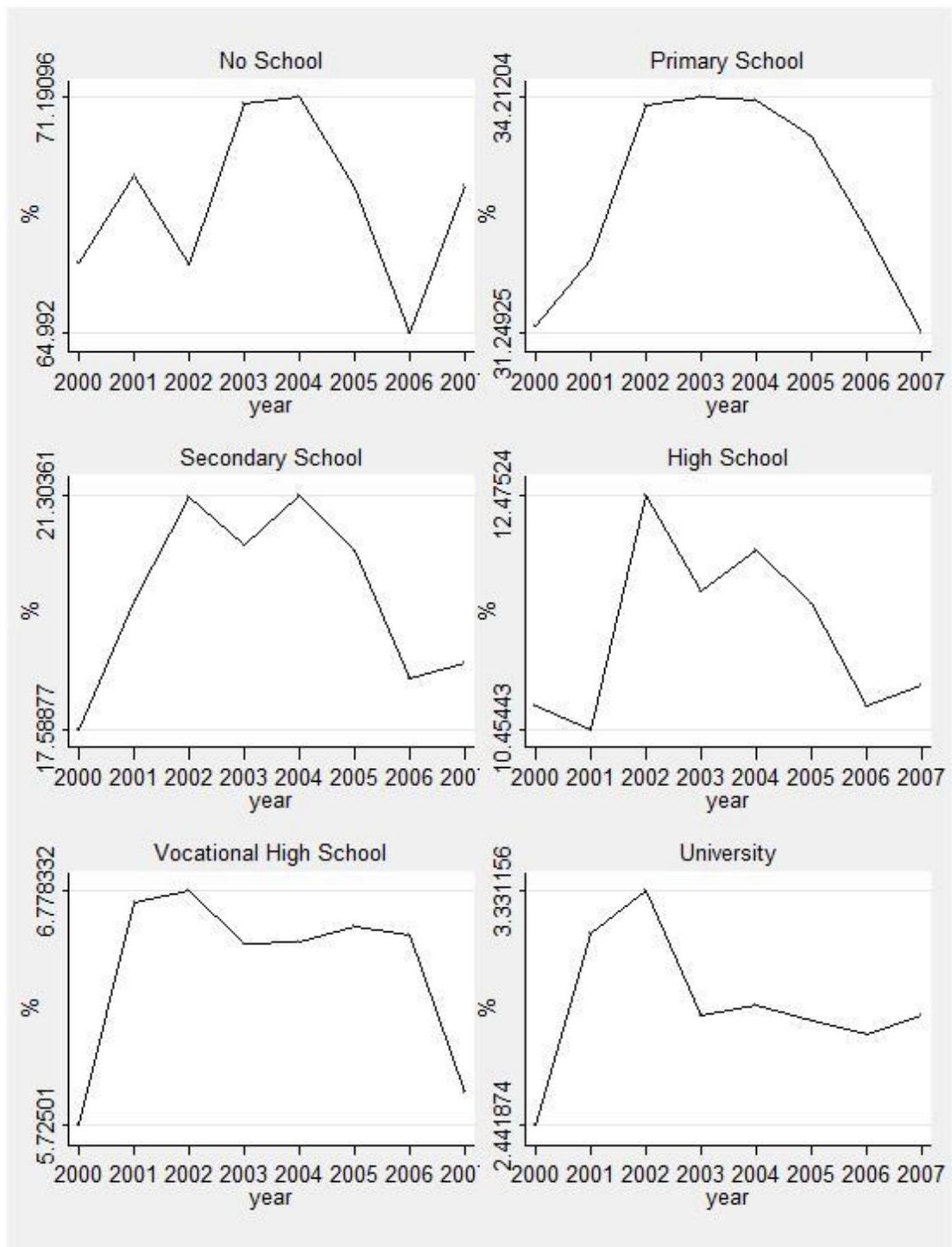


Figure C4: Predicted Informal Employment Rate Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

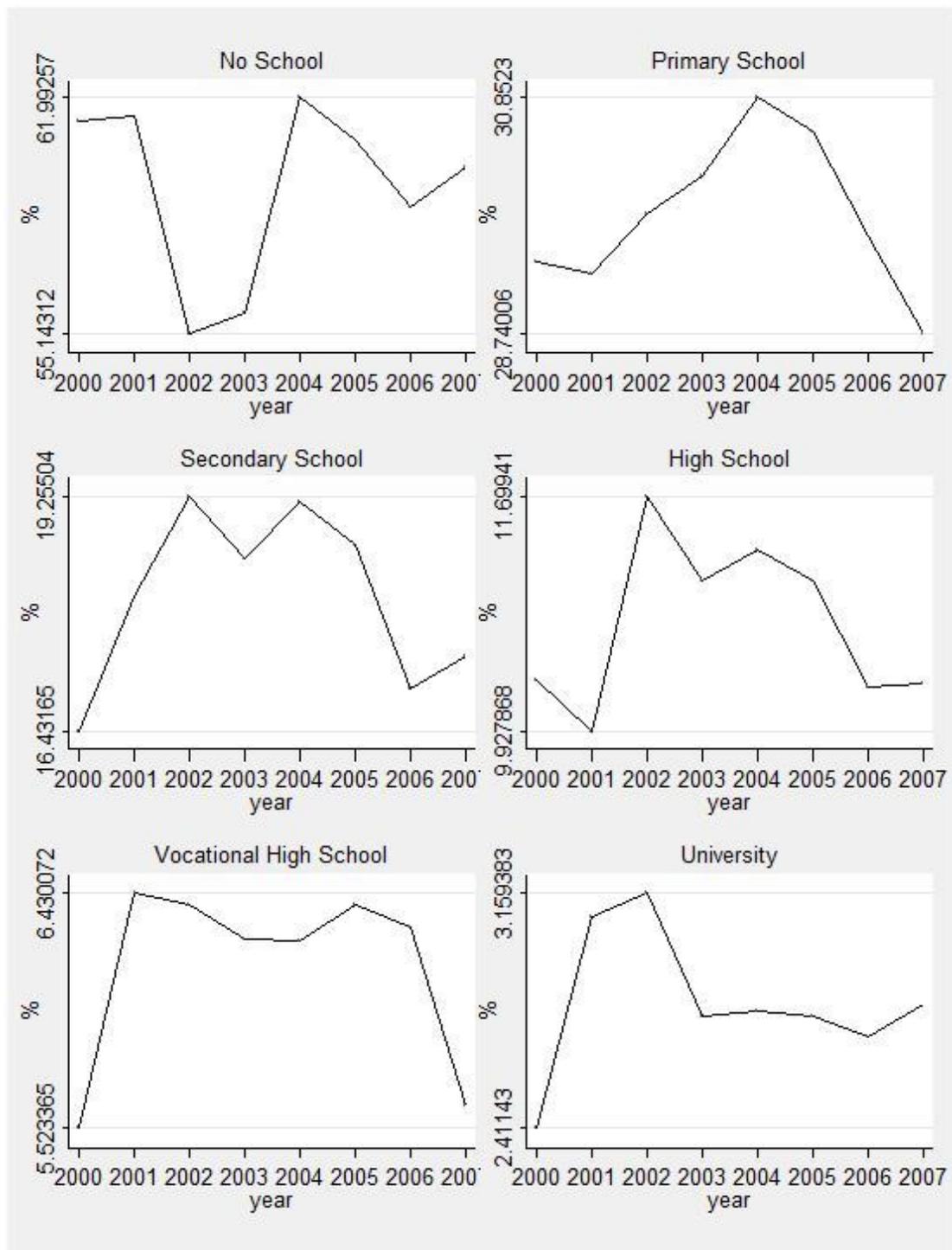


Figure C5: Predicted Share of Informal Employment in Labor Force Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

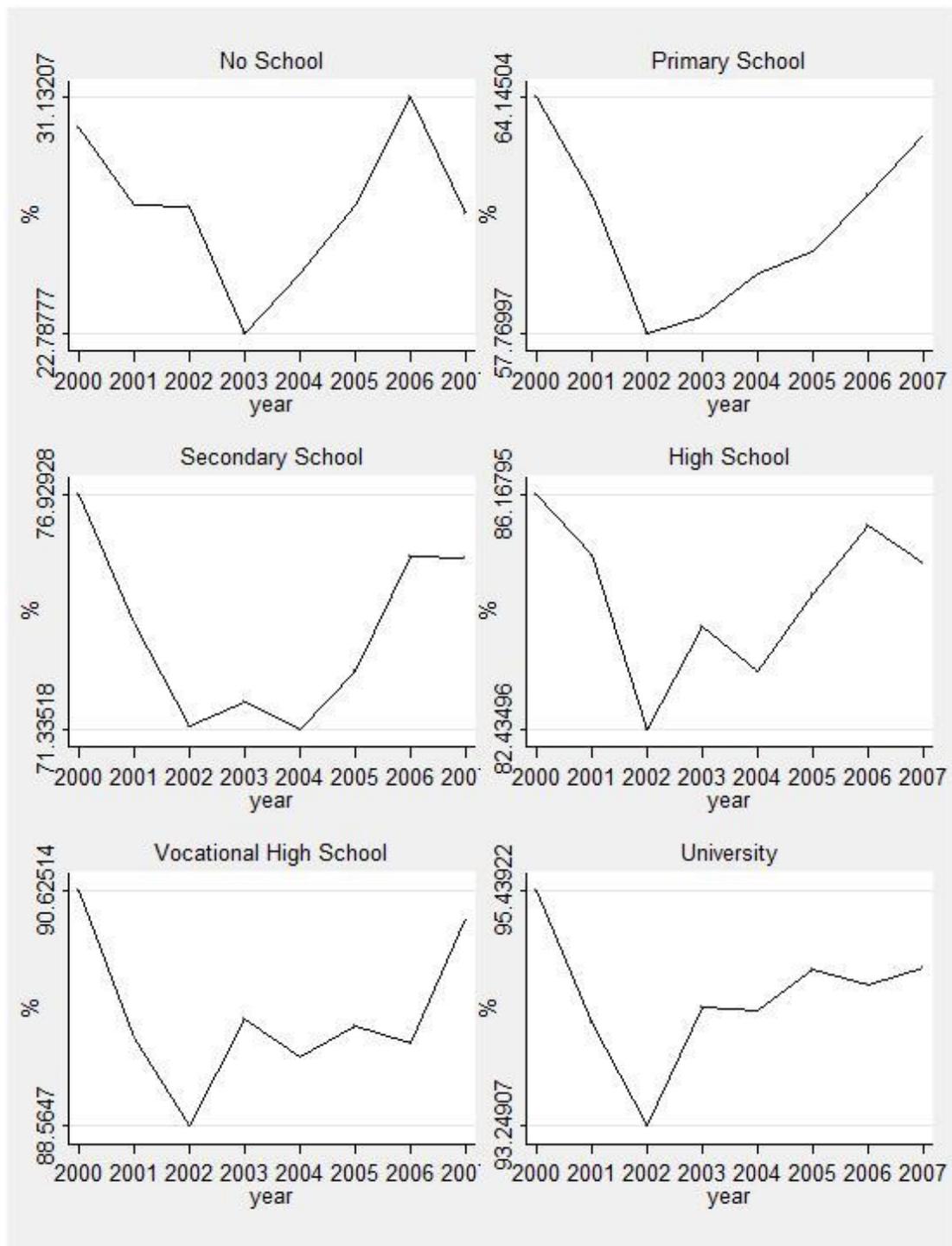


Figure C6: Predicted Share of Formal Employment in Labor Force Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

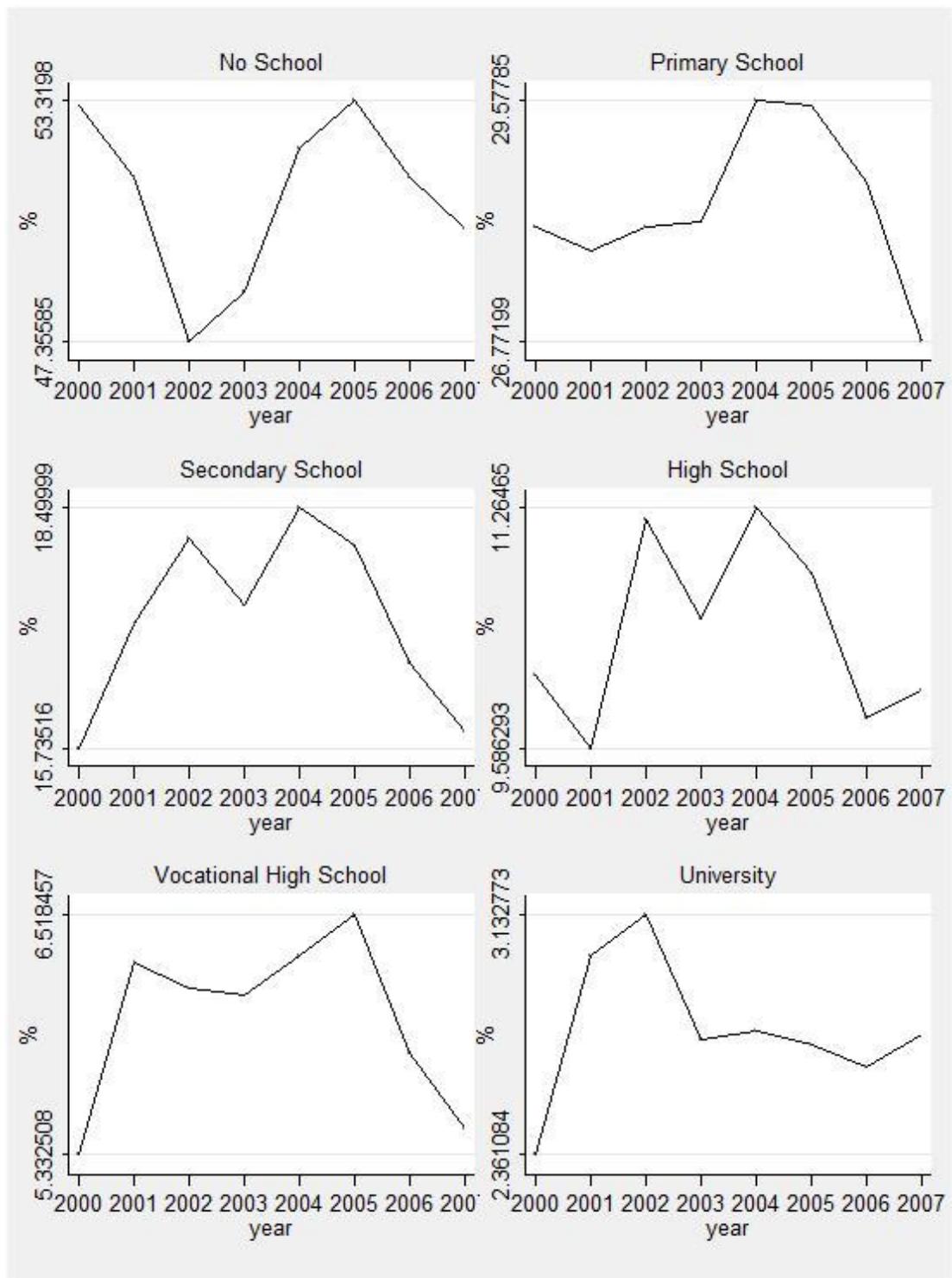


Figure C7: Predicted Share of Informal Employment in Population Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

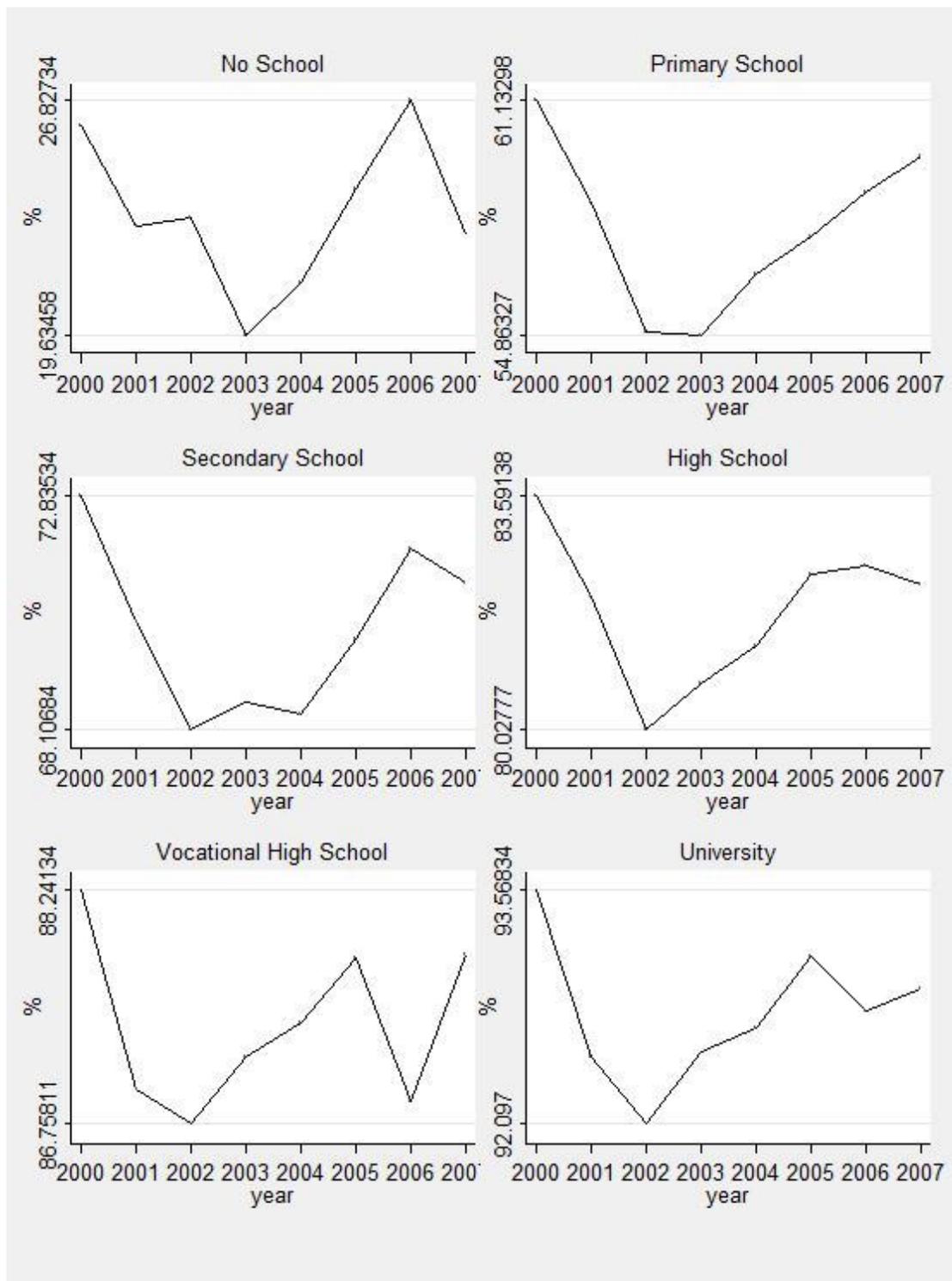


Figure C8: Predicted Share of Formal Employment in Population Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

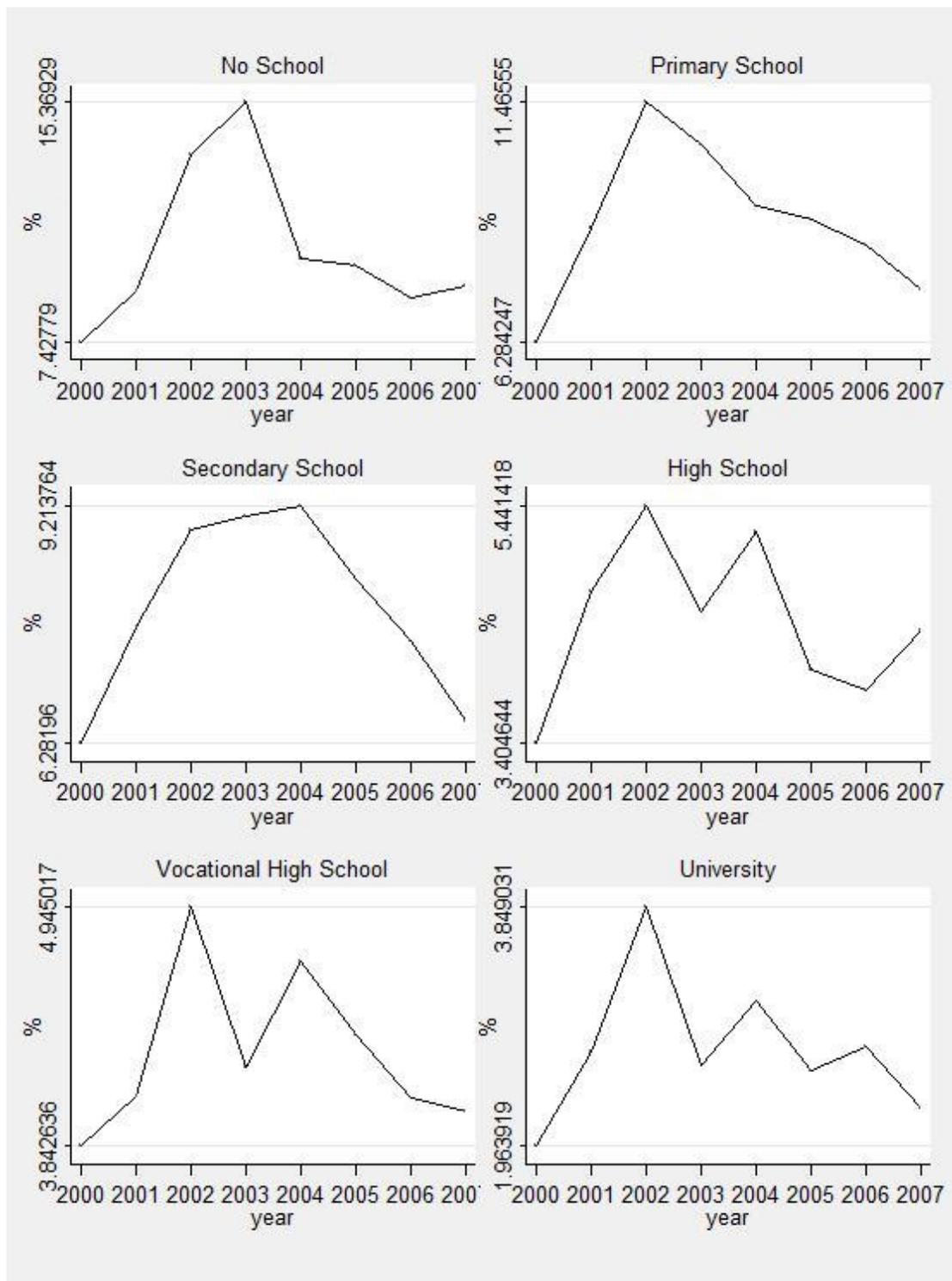


Figure C9: Predicted Share of Unemployment in Population Year Profiles of 1965 Born Cohort at Age 35 by Education Groups

APPENDIX D

LIFE-CYCLE AND CROSS SECTION PROFILES FOR EDUCATION GROUPS

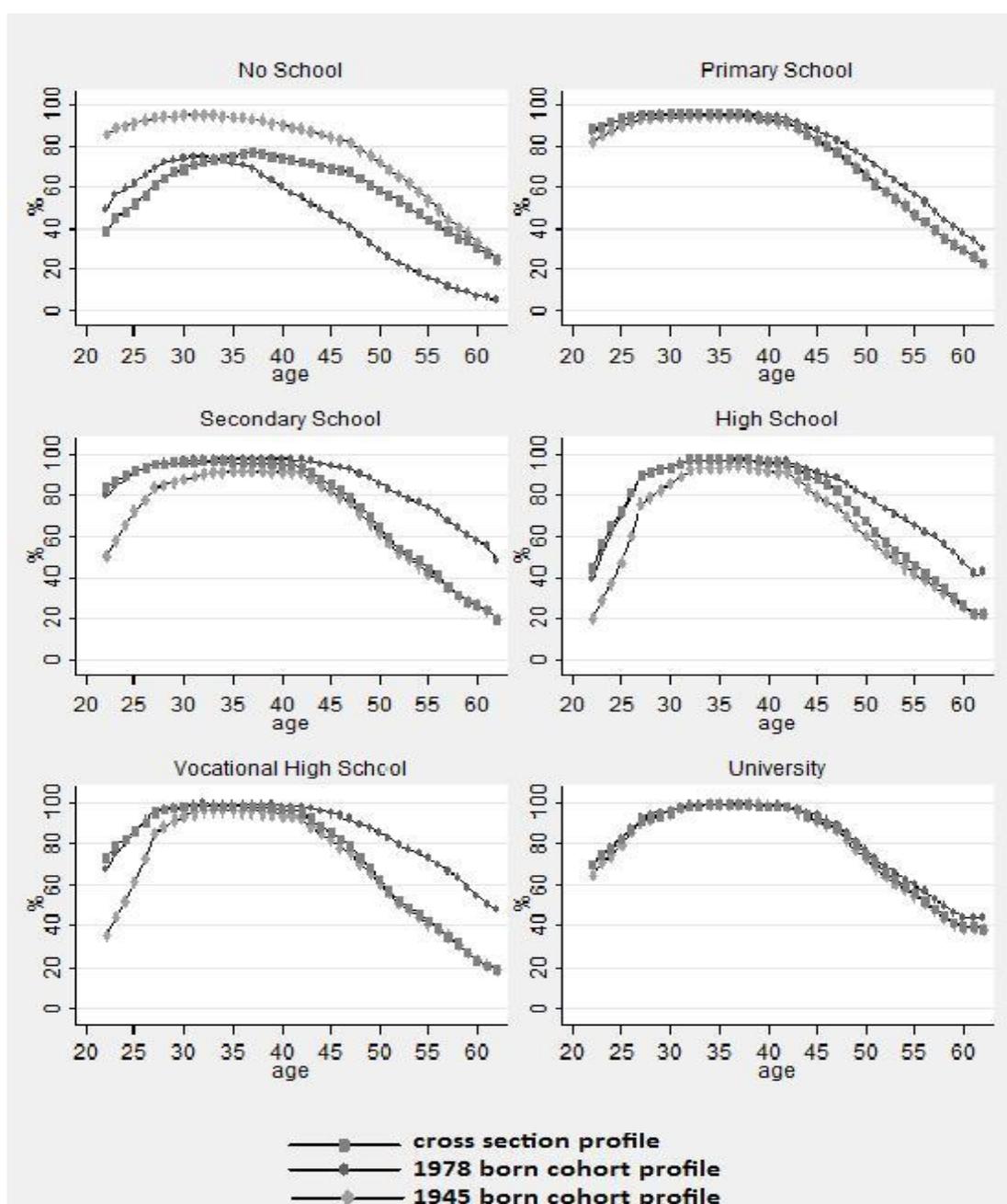


Figure D.1: Predicted Life-Cycle and Cross Section Labor Force Participation Rate Profiles by Education Groups

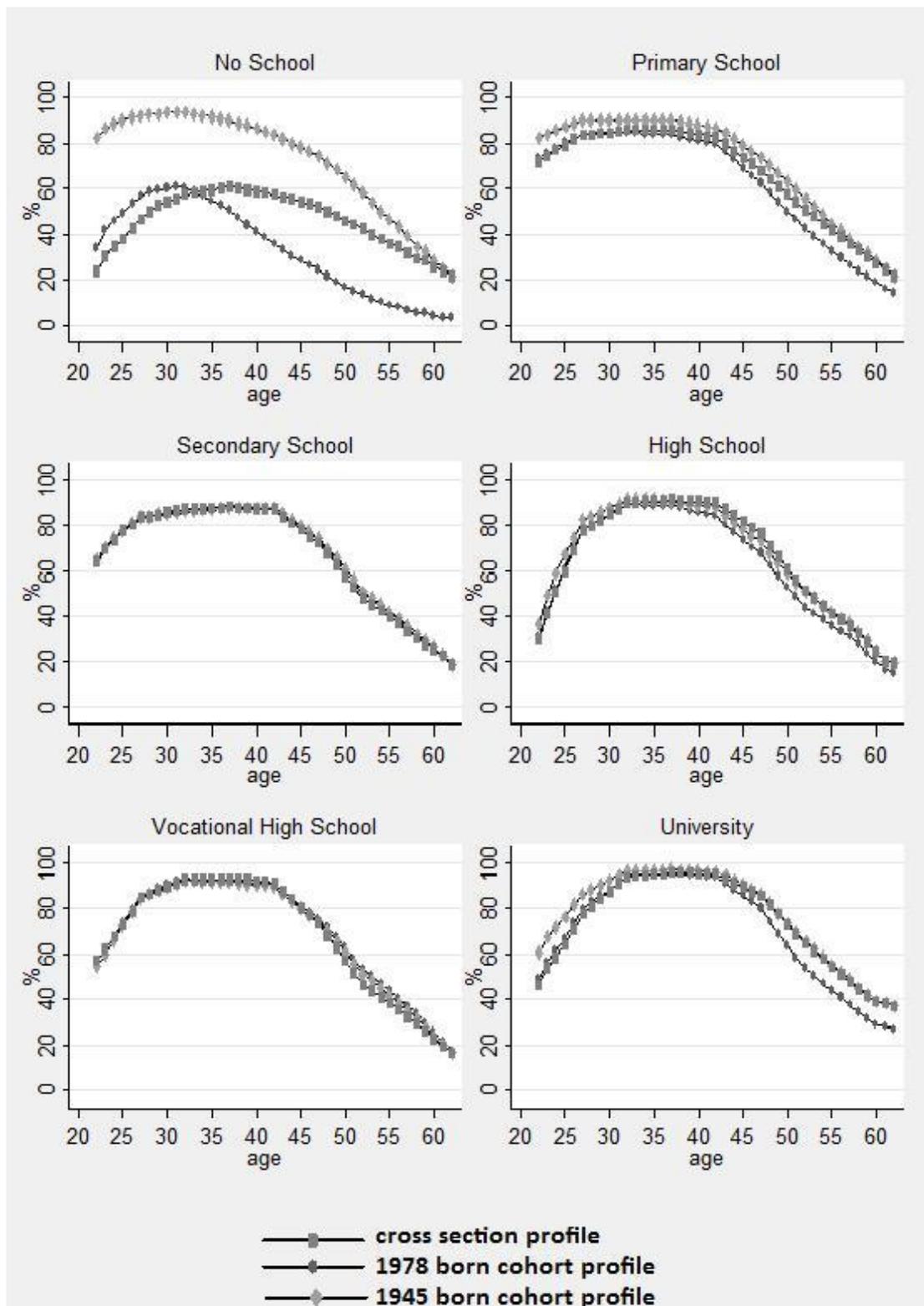


Figure D.2: Predicted Life-Cycle and Cross Section Employment Rate Profiles by Education Groups

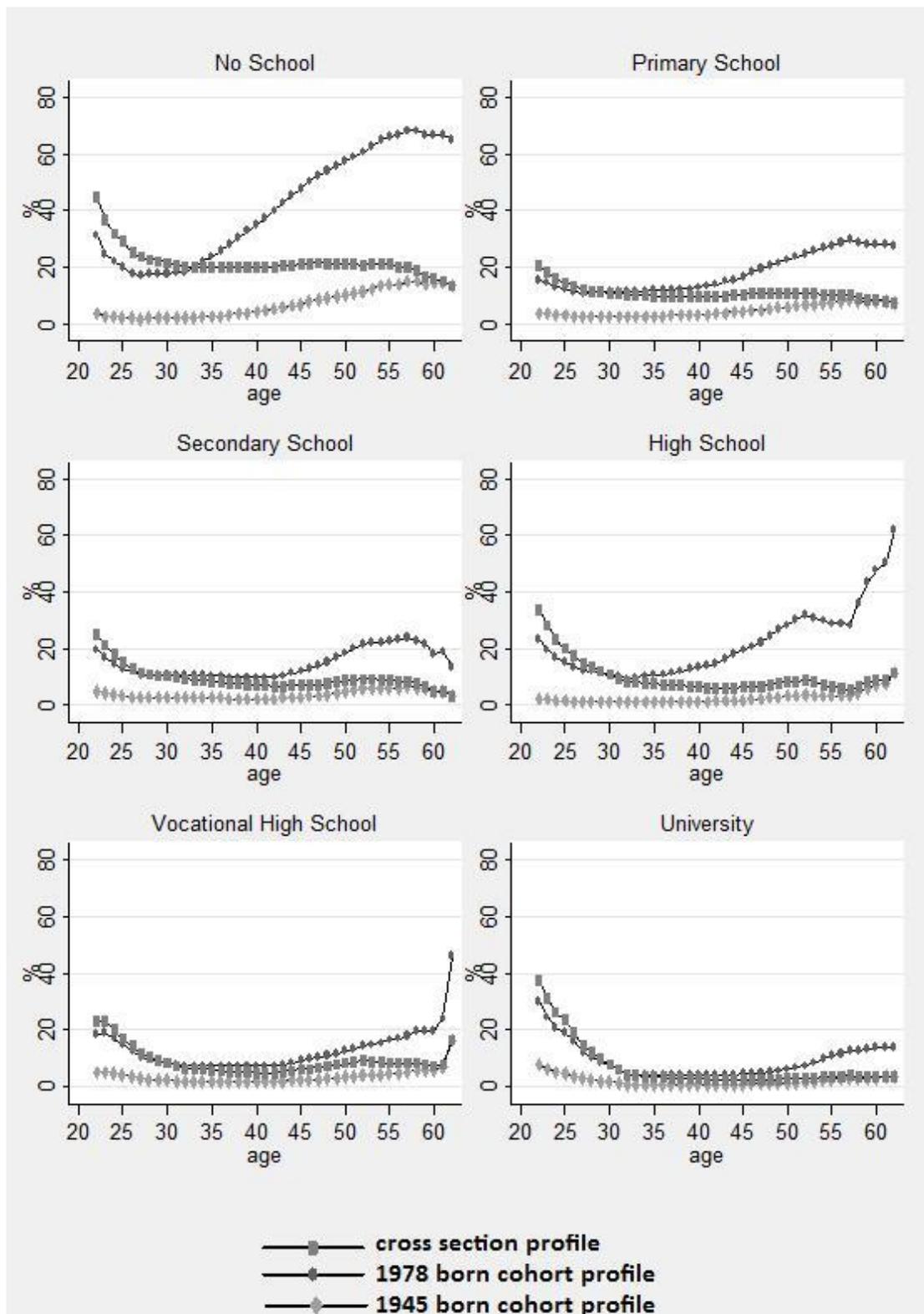


Figure D.3: Predicted Life-Cycle and Cross Section Unemployment Rate Profiles by Education Groups

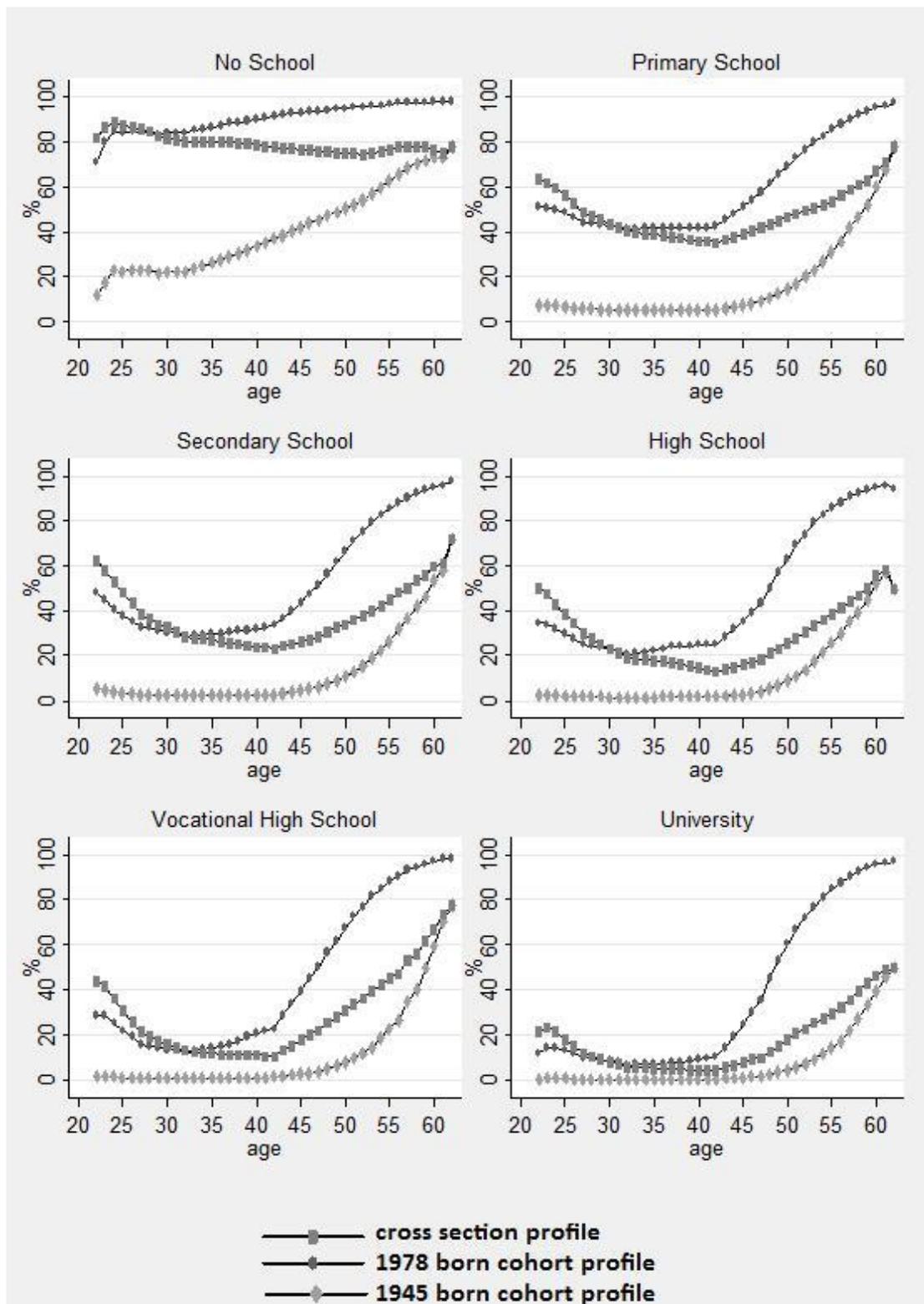


Figure D.4: Predicted Life-Cycle and Cross Section Informal Employment Rate Profiles by Education Groups

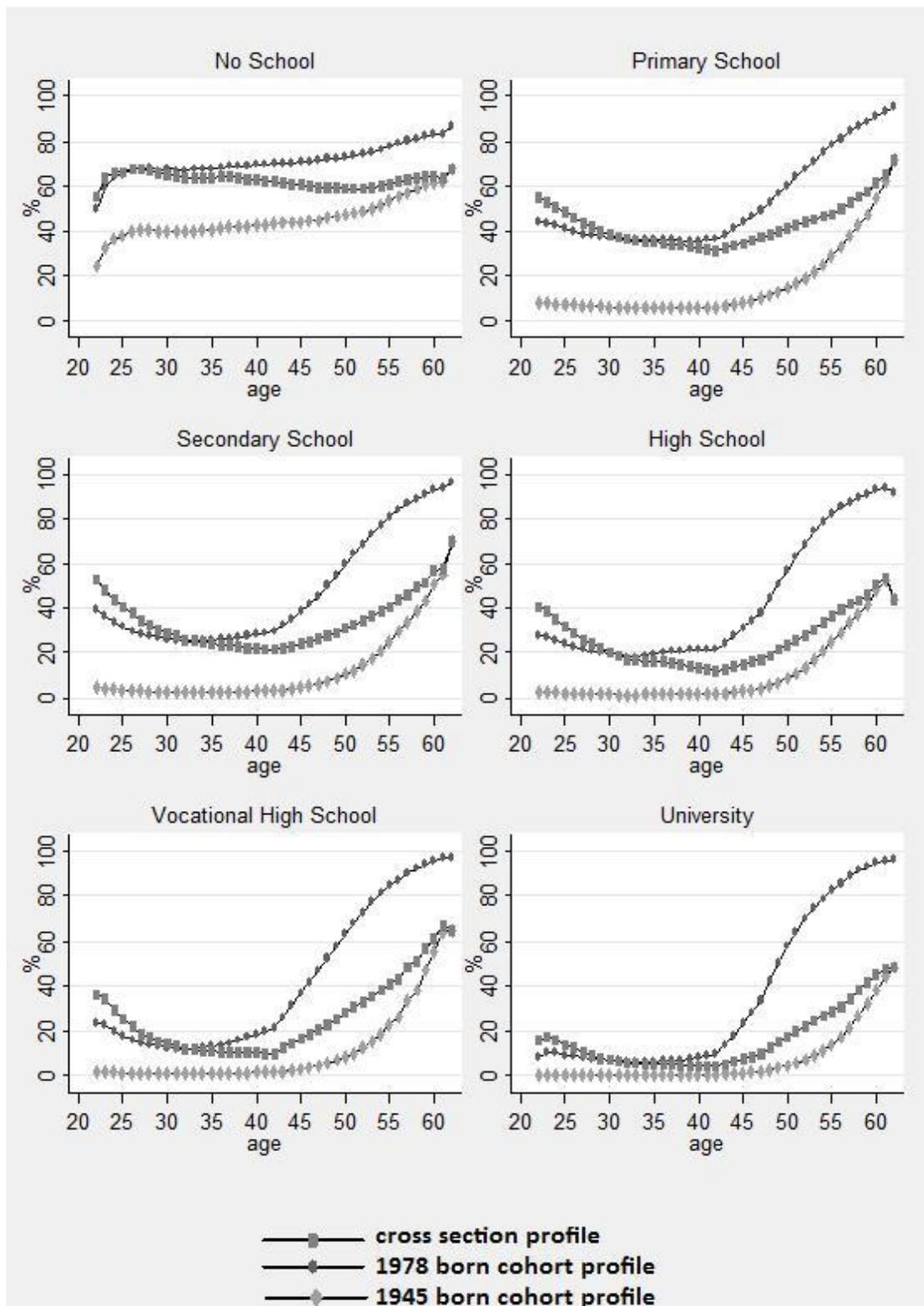


Figure D.5: Predicted Life-Cycle and Cross Section Share of Informal Employment in Labor Force Profiles by Education Groups

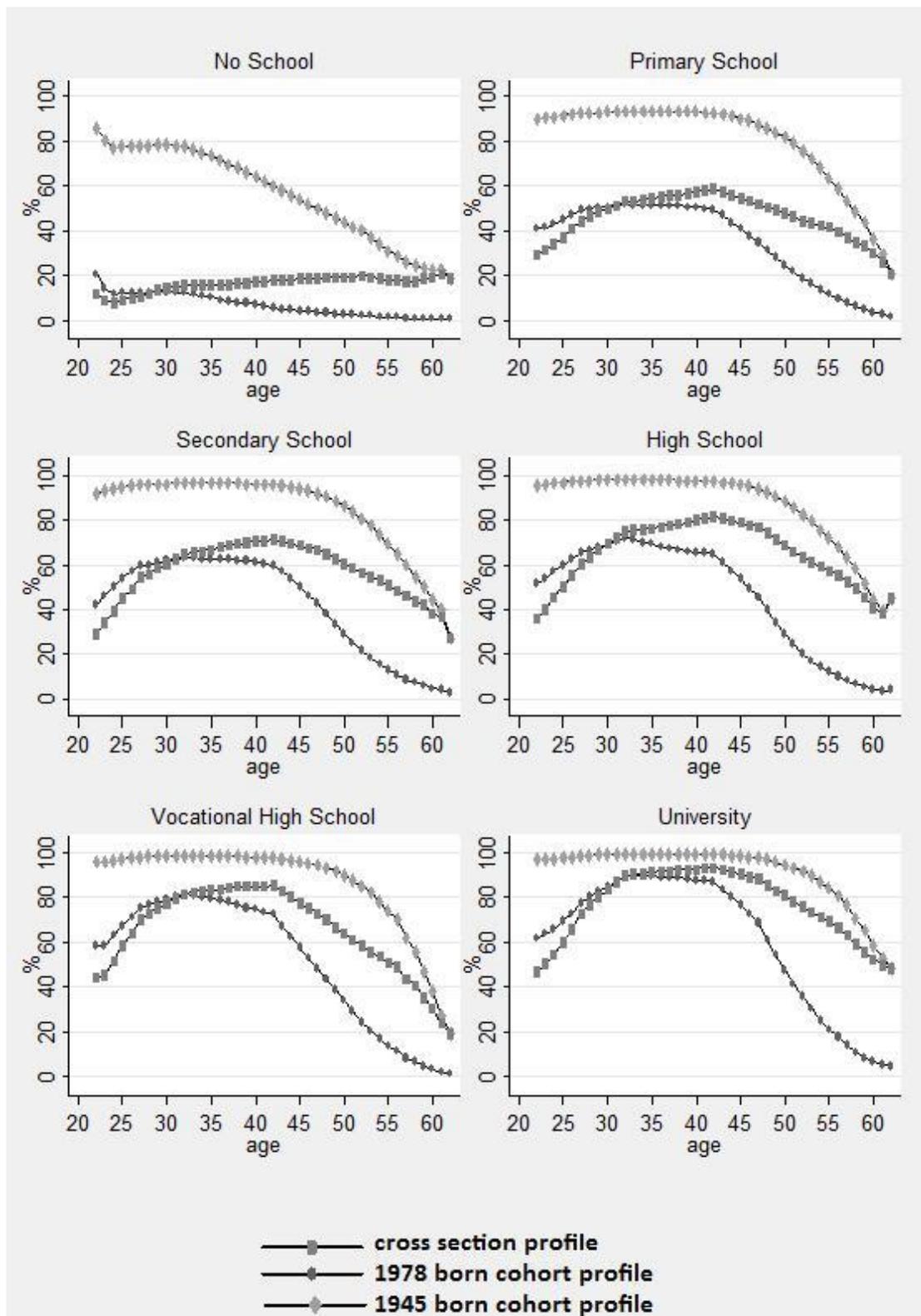


Figure D.6: Predicted Life-Cycle and Cross Section Share of Formal Employment in Labor Force Profiles by Education Groups

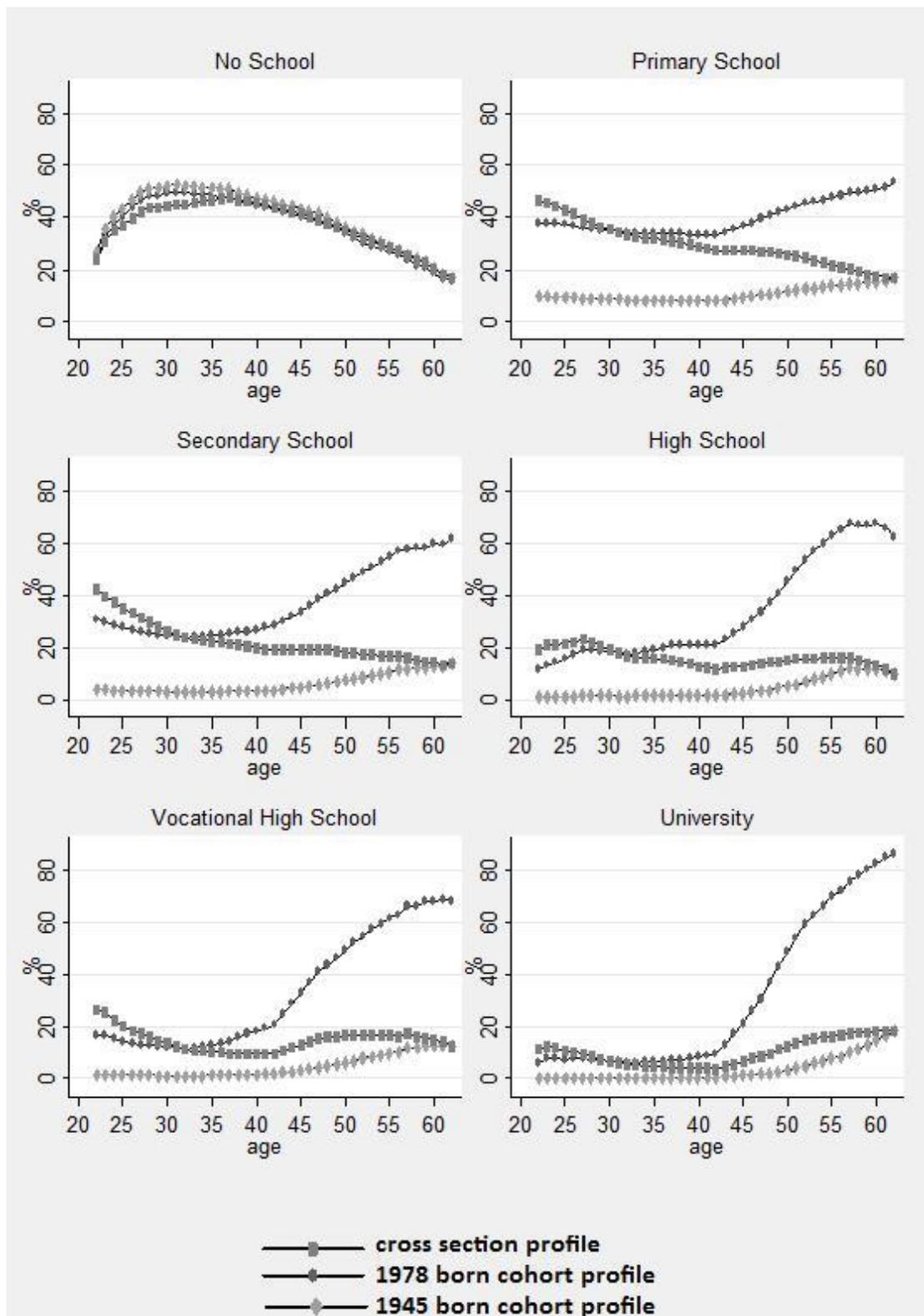


Figure D.7: Predicted Life-Cycle and Cross Section Share of Informal Employment in Population Profiles by Education Groups

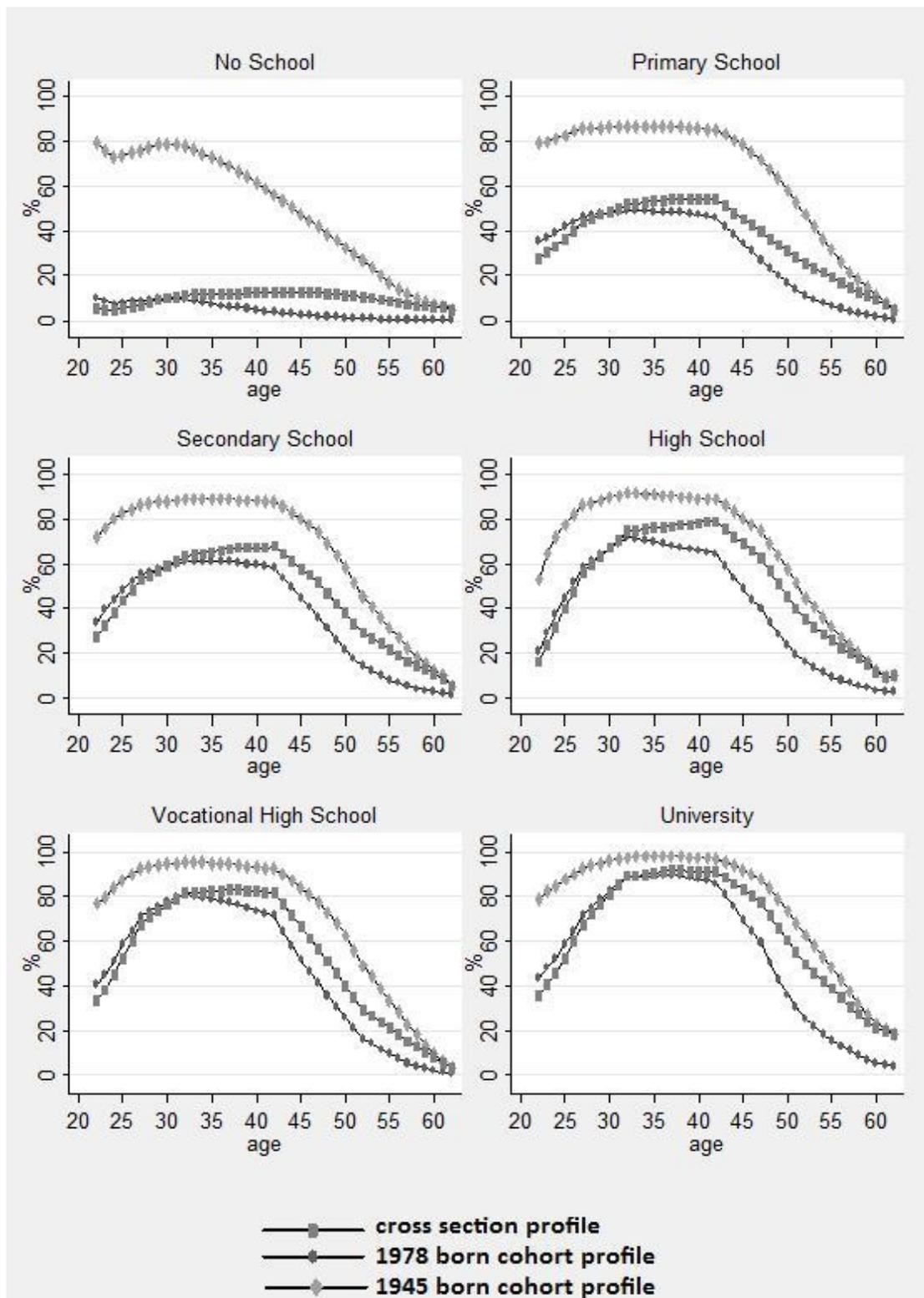


Figure D.8: Predicted Life-Cycle and Cross Section Share of Formal Employment in Population Profiles by Education Groups

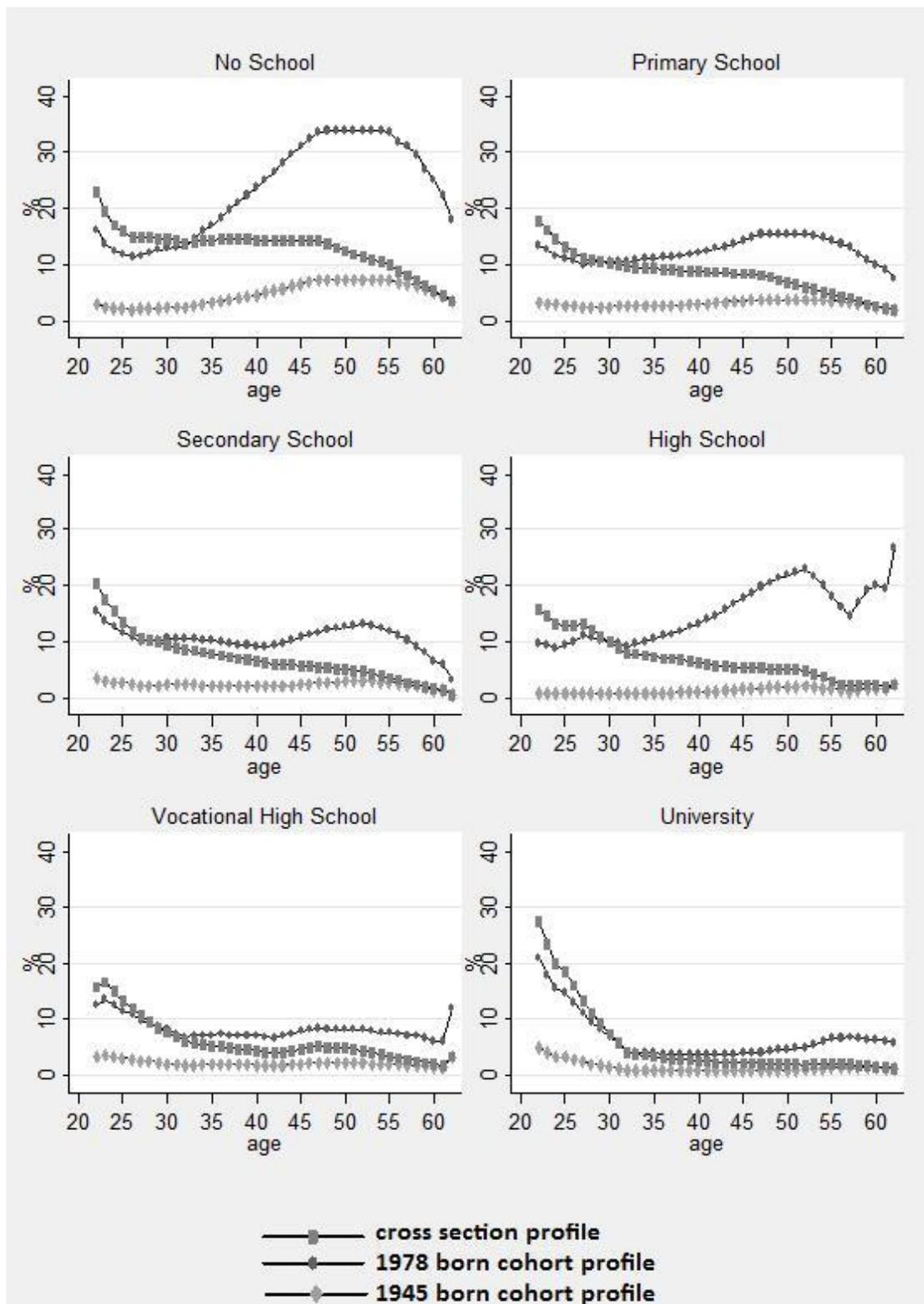


Figure D.9: Predicted Life-Cycle and Cross Section Share of Unemployment in Population Profiles by Education Groups