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Caroline Krafft, *St. Catherine University*

Ragui Assaad

Caitlyn Keo



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THE EVOLUTION OF LABOR SUPPLY IN EGYPT  
FROM 1988-2018: A GENDERED ANALYSIS

Caroline Krafft, Ragui Assaad, and Caitlyn Keo

Working Paper No. 1358

# **THE EVOLUTION OF LABOR SUPPLY IN EGYPT FROM 1988-2018: A GENDERED ANALYSIS**

Caroline Krafft,<sup>1</sup> Ragui Assaad,<sup>2</sup> and Caitlyn Keo<sup>3</sup>

**Working Paper No. 1358**

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Send correspondence to:  
Caroline Krafft  
St. Catherine University  
[cgkrafft@stkate.edu](mailto:cgkrafft@stkate.edu)

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<sup>1</sup> Assistant Professor of Economics, Department of Economics and Political Science, St. Catherine University, 2004 Randolph Avenue, St. Paul, MN 55105, USA, [cgkrafft@stkate.edu](mailto:cgkrafft@stkate.edu)

<sup>2</sup> Professor, Humphrey School of Public Affairs, University of Minnesota 301 19th Avenue S., Minneapolis, MN, 55455, Email: [assaad@umn.edu](mailto:assaad@umn.edu)

<sup>3</sup> Department of Applied Economics, University of Minnesota 1994 Buford Avenue, St. Paul, MN 55108, [ckkeo@umn.edu](mailto:ckkeo@umn.edu)

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### **Abstract**

This paper investigates the character of labor supply and especially female labor force participation in Egypt and its evolution over the twenty-year span from 1988 to 2018 using various waves of the Egypt Labor Market Panel Survey. The paper pays particular attention to women's labor force outcomes while examining trends in labor force participation, employment, and unemployment. The population and labor supply in Egypt are analyzed by demographic characteristics such as age, sex, educational attainment, and location. Demographic changes, including in age at marriage and fertility, are explored as important determinants of both labor supply and women's participation.

**Keywords:** Labor Force Participation, Unemployment, Employment, Population Growth, Egypt

**JEL Classifications:** J00, J21, J64, J11

## 1. Introduction

Egypt's labor market has faced a number of challenges since the turn of the century. In the 1990s the economy struggled with substantial structural reforms and labor supply pressures related to the youth bulge. While labor market conditions improved in the early 2000s, the global financial crisis and the ensuing global economic slowdown were a challenge for Egypt as well. Soon after this challenge, the January 25, 2011 revolution led to a period of substantial political and economic uncertainty. Economic growth has recovered in recent years after the introduction of a series of economic reforms and the stabilization of the political situation, but Egypt continues to face the long-term challenges of creating enough productive employment for its growing and increasingly educated workforce (World Bank 2019).

This paper investigates Egypt's labor supply, starting with the growth and changing composition of the working age population. Subsequently, we examine the changing patterns of labor force participation by gender, age and education. These patterns mediate between the demographic trends and the actual patterns of labor supply in the economy. As part of our focus on female labor force participation, we examine changes in the timing of marriage and fertility, as well as their implications for the labor force behavior of women. To understand the evolution of labor supply, the paper uses data from the four waves of the Egypt Labor Market Panel Survey (ELMPS) conducted in 1998, 2006, 2012, and 2018, as well as, when possible, data from the 1988 special round of the Labor Force Survey (LFS). This breadth of data allows us to study how the demographic structure of the population and labor force behavior have evolved over several decades.<sup>5</sup> This work builds on previous research on the evolution of labor supply in Egypt using the preceding waves of the ELMPS (Assaad and Krafft 2015b; a; Assaad 2002, 2009).

The main finding that emerges from our analysis is that labor supply pressures have subsided greatly during the 2012-18 period as the growth of the youth and young adult populations abated. The reduced demographic pressure on labor supply was compounded by a decline in labor force participation and employment rates among both men and women. The decline in participation among men is a relatively recent phenomenon and one affecting both younger and older men and men at all education levels. The decline in participation among women has occurred despite the substantial increase in educational attainment among women and the traditionally strong relationship between education and economic participation for women in Egypt. Rates of participation have steadily declined among educated Egyptian women since 1998. The decline is most likely driven by the reduction in employment opportunities in the public sector, without a commensurate increase in suitable opportunities in the private sector. This trend especially affects married women. While overall unemployment rates, measured in the standard way, have remained

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<sup>5</sup> For more information on ELMPS 1998, see Assaad and Barsoum (2000). For more information on ELMPS 2006, see Barsoum (2009). For more information on ELMPS 2012, see Assaad and Krafft (2013). For more information on ELMPS 2018, see Krafft, Assaad, and Rahman (2019). ELMPS 2018 data will be publicly available from [www.erfdataportal.com](http://www.erfdataportal.com) in late October 2019.

fairly stable since 2006, broad unemployment has increased more, reflecting a rise in discouraged unemployment among both men and women.

In what follows, we characterize the evolution of the working age population, labor force participation, employment, and unemployment from 1988 to 2018 by age, sex, educational attainment and location. Since marriage and childbearing and childrearing particularly affect women's labor force participation, we further show important trends in age at marriage and fertility as well as their relationship with labor supply.

## **2. Demographic Change in Egypt**

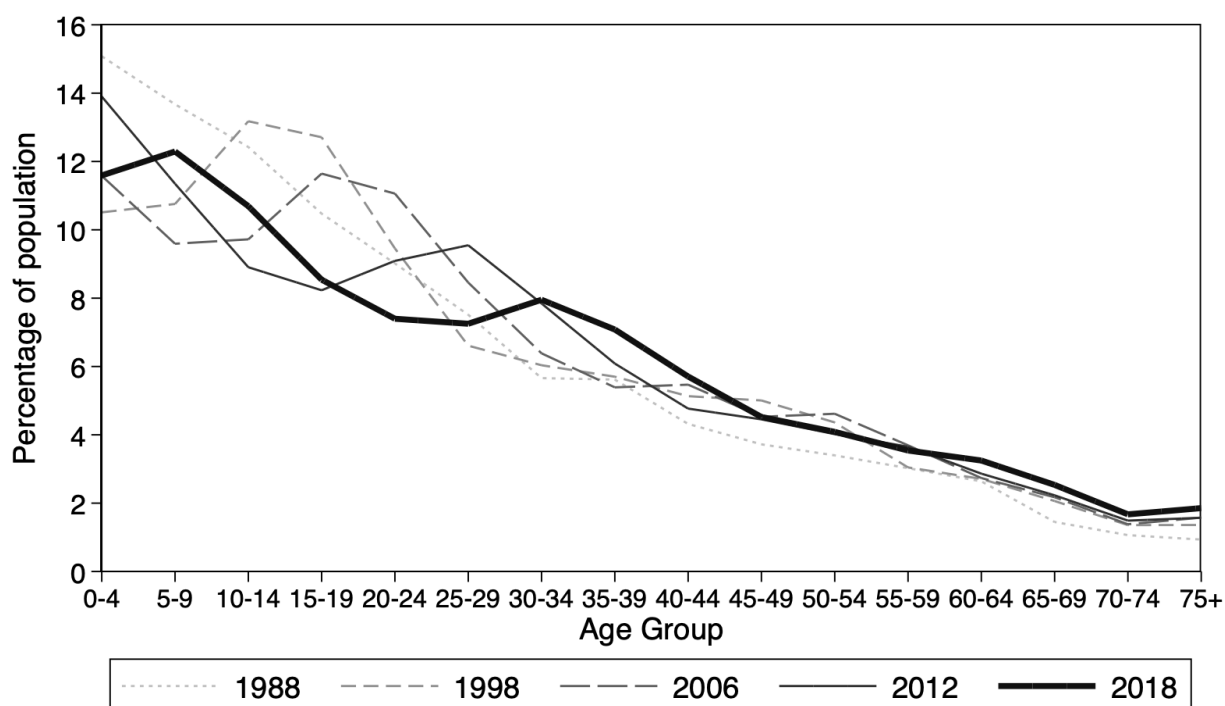
In this section, we focus on key aspects of demographic change in Egypt. We start with population growth for the population as a whole and for various age sub-groups of particular relevance to labor supply. We also examine the evolution of the age and geographic compositions of the population. We end the section by examining marriage and fertility trends as key determinants of both population trends and trends in women's labor force participation.

### **2.1. Population Growth and The Age Composition of the Population**

Over the past several decades, one of the main feature of Egypt's demographic transition has been the emergence of a pronounced "youth bulge" resulting from rapidly falling early childhood mortality, especially in the early 1980s, which was not matched by a commensurate decline in fertility (Assaad and Roudi-Fahimi 2007; Miller and Hirschhorn 1995; Rashad 1989; Robinson and El-Zanaty 2006).

As shown in Figure 1, the bulge generation was still in its infancy in 1988 and moved to the 10-14 and 15-19 age groups in 1998. By 2006, the "youth bulge" was at its peak, with a clear rise in the share of the 15-19 and 20-24 age groups. By 2012, the bulge had shifted to the 25-29 age group, many of whom were already starting to have children, leading to an "echo" among those aged 0-4 (Krafft and Assaad 2014a). By 2018, the "bulge" generation had reached the age of 30-34 and the "echo" generation was centered around school-entry age, namely 5-9. The size of the echo was compounded by a temporary increase in the total fertility rate (TFR) from 3.0 to 3.5 children per woman, an issue which we return to below (Krafft 2016; Ministry of Health and Population, El-Zanaty and Associates, and ICF International 2015).

**Figure 1. Population structure of Egypt (percentage in five-year age group), by wave**



Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

The changing age structure of the population had direct implications for the rates at which various age groups of relevance to the labor supply were growing. As shown in Table 1, Egypt's overall population has been growing at a fairly stable rate of about 2% per annum (p.a.) over the thirty year period from 1988 to 2018. However, this overall rate of population growth masks substantial variations in population growth across age groups. From 1988 to 1998, the most rapidly growing age group was youth aged 15-24, which grew at 3.4% p.a., more than one and half times the rate of overall population growth (2.1% p.a.), a phenomenon that reflected the peak of the youth bulge. This led to a fairly rapid growth of the working age population at a rate of 3.0% p.a. and, accordingly, substantial labor supply pressures.

In the 1998-2006 period, the bulge had moved to the young adult population (ages 25-29), which grew at a rate of 5.0% p.a., continuing strong labor supply pressures, especially among the relatively educated, who enter the labor market at a later age and tend to spend longer in unemployment upon entry. The growth of the working age population slowed somewhat during this period to 2.5% p.a.

In the 2006-12 period, the young adult age group continued to grow fast at 4.2% p.a., but the youth group actually contracted at a rate of 2.3% p.a. This shift marked the start of a period of reduced labor supply pressures, which dropped the growth of the working age population to only 1.2% p.a. The emergence of the echo of the bulge was clearly apparent in the growth of the child population during this period. After having grown at only 0.5% p.a. during the previous period, the child



population growth accelerated to 3.8% p.a., reflecting both the growth in the population of women in their peak child-bearing years as well as the increase in fertility we referred to above.

In the 2012-18 period, the contraction reached the young adult population, which declined at a rate of 2.9% p.a. Together, with the slow growth of the youth population (0.3% p.a.), this marked a period of reduced labor supply pressure. At the same time, the resumption of fertility decline resulted in a slight deceleration of the child population growth to 1.9% p.a.

Thus, the aging of the “bulge” generation means that labor supply pressures have subsided somewhat in the 2010s, but the progression of the “echo” suggests that these pressures are likely to resume soon. The effects of the echo are now being felt in the primary education system and will eventually reach the labor market within the next ten to fifteen years.

**Table 1. Average annual growth rates (percentages) of the total population and selected age groups, by wave**

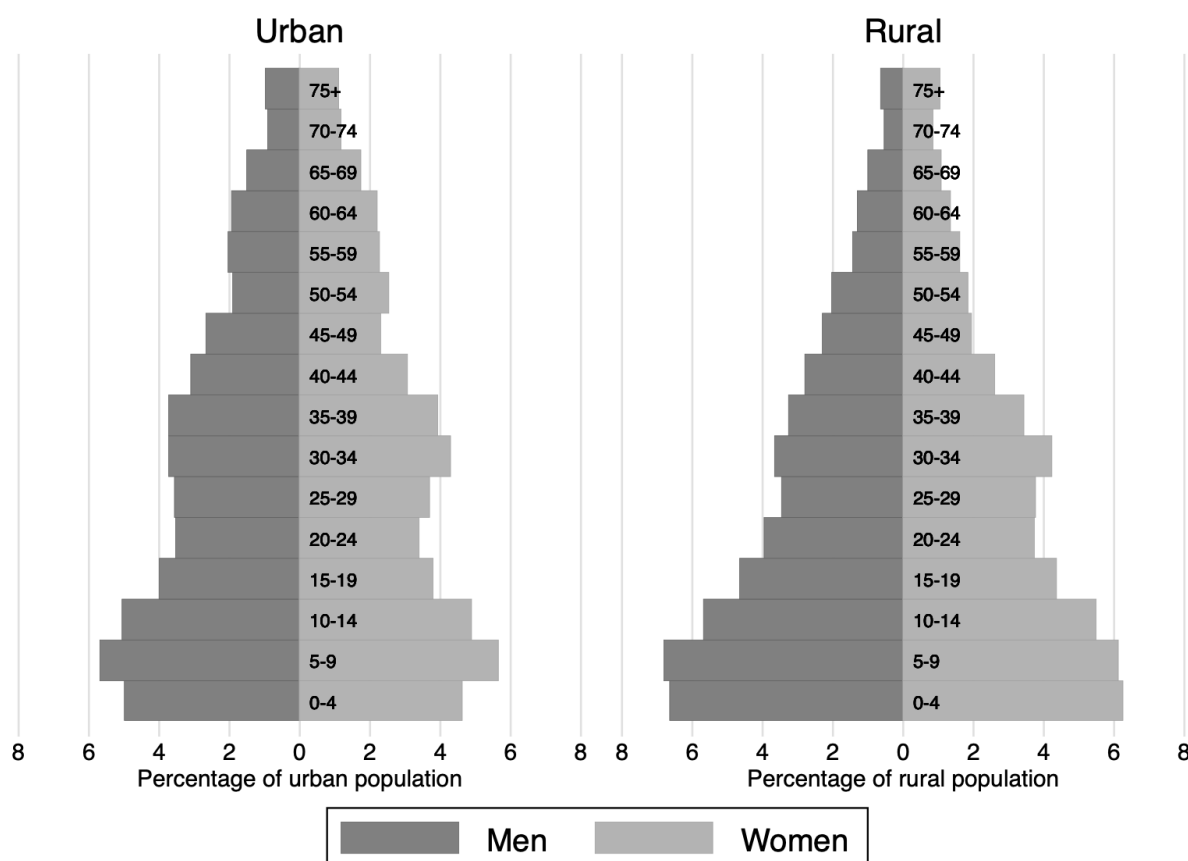
	Children	Youth	Young Adults	Working Age	All
Ages:	0-14	15-24	25-29	15-64	
<b>Urban</b>					
1988-1998	0.1	2.4	-0.3	2.3	1.7
1998-2006	0.2	1.8	5.4	2.4	1.9
2006-2012	4.5	-2.6	2.8	1.1	2.2
2012-2018	0.7	-0.8	-3.6	0.3	0.6
<b>Rural</b>					
1988-1998	0.4	4.1	1.7	3.6	2.3
1998-2006	0.7	2.4	4.6	2.6	1.9
2006-2012	3.4	-2.2	5.3	1.4	2.2
2012-2018	2.6	1.0	-2.4	2.2	2.4
<b>Total</b>					
1988-1998	0.3	3.4	0.8	3.0	2.1
1998-2006	0.5	2.2	5.0	2.5	1.9
2006-2012	3.8	-2.3	4.2	1.2	2.2
2012-2018	1.9	0.3	-2.9	1.3	1.7

Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

Using the most recent wave of the ELMPS from 2018, Figure 2 shows the age structure of the population in urban and rural areas by sex in the form of population pyramids. This figure shows that, in 2018, the bulge was fairly pronounced in both the 30-34 and 35-39 age groups in urban areas and the 30-34 age group in rural areas. The trough that follows the bulge (in 2018, centered on the 20-24 age group) was also more pronounced in urban areas. The echo was apparent in both contexts, but was attenuating faster in urban areas, due to faster fertility declines there.<sup>6</sup> Additionally, among the youngest cohorts in rural areas (aged 0-9), there were slightly higher percentages of young boys compared to young girls, likely due to son preference (Yount, Langsten, and Hill 2000).

<sup>6</sup> See Krafft, Keo, and Fedi (2019) for an exploration of fertility patterns by location.

**Figure 2. Population structure of Egypt (percentage in age group), by location and sex, 2018**



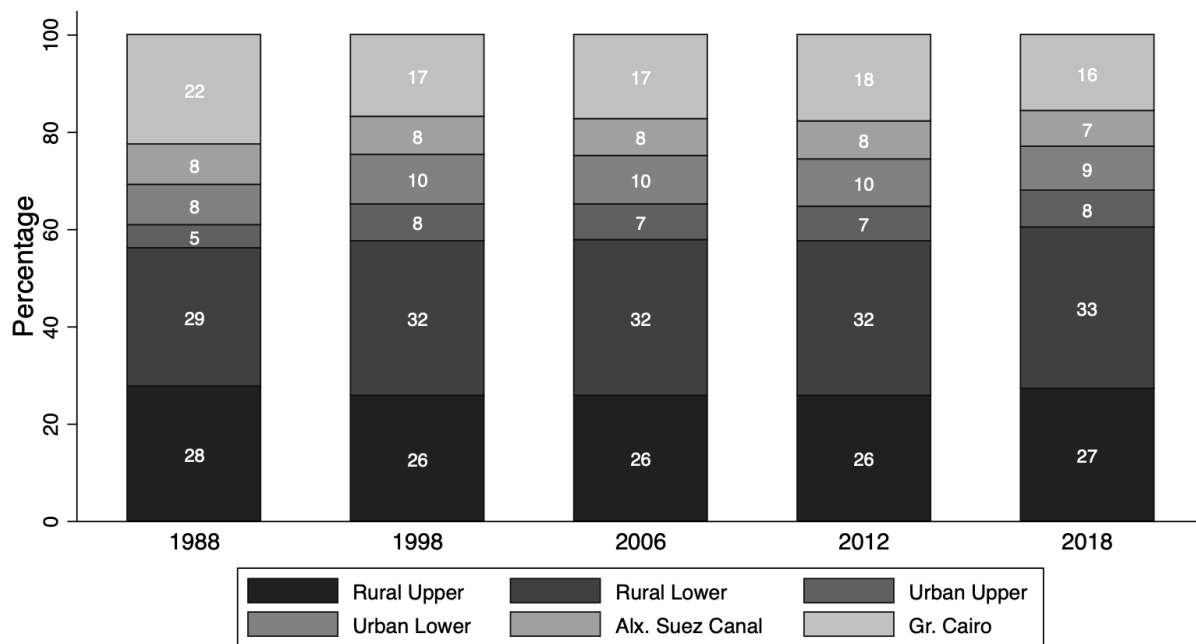
Source: Authors' calculations based on data from ELMPS 2018.

The population structure patterns are clearly reflected in the differential rates of growth of various age groups in urban and rural areas. Returning to Table 1, we can see that higher fertility in rural areas resulted in a higher rate of population growth there relative to urban areas. Rural areas also experienced a higher rate of growth of the youth population in the 1988-98 period and a more pronounced growth of the young adult population in the 2006-12 period. In the 2012-18 period, rural areas were still experiencing a fairly high growth in the working age population (2.2% p.a.), whereas that growth had slowed down substantially in urban areas to just 0.3% p.a.

## 2.2. The Regional Composition of the Population

The ELMPS does not cover the Frontier governorates, so to analyze the geographic distribution of the population over time, we examine six regions: Greater Cairo, Alexandria and the Suez Canal region, Urban Lower Egypt, Urban Upper Egypt, which constitute the 4 urban regions, and Rural Lower Egypt and Rural Upper Egypt, which constitute the two rural regions.<sup>7</sup> Figure 3 shows the distribution of the population by region and survey wave. The share of the population in rural areas has increased between 1988 and 2018 from 56% to 60%. This appears to be most directly because of the consistent (but small) increases in Rural Lower Egypt, from 29% of the population in 1988 to 33% in 2018. Rural Upper Egypt first experienced a decline in its share from 1988 to 1998, stability from 1998 to 2012, and then a slight increase in its share from 2012 to 2018. The region that has experienced the greatest decline in its population share over time was the Greater Cairo region, whose share went from 22% in 1988 to 16% in 2018. Other urban regions have essentially maintained their share, at least since 1998.

**Figure 3. Population (percentage) by region and wave**



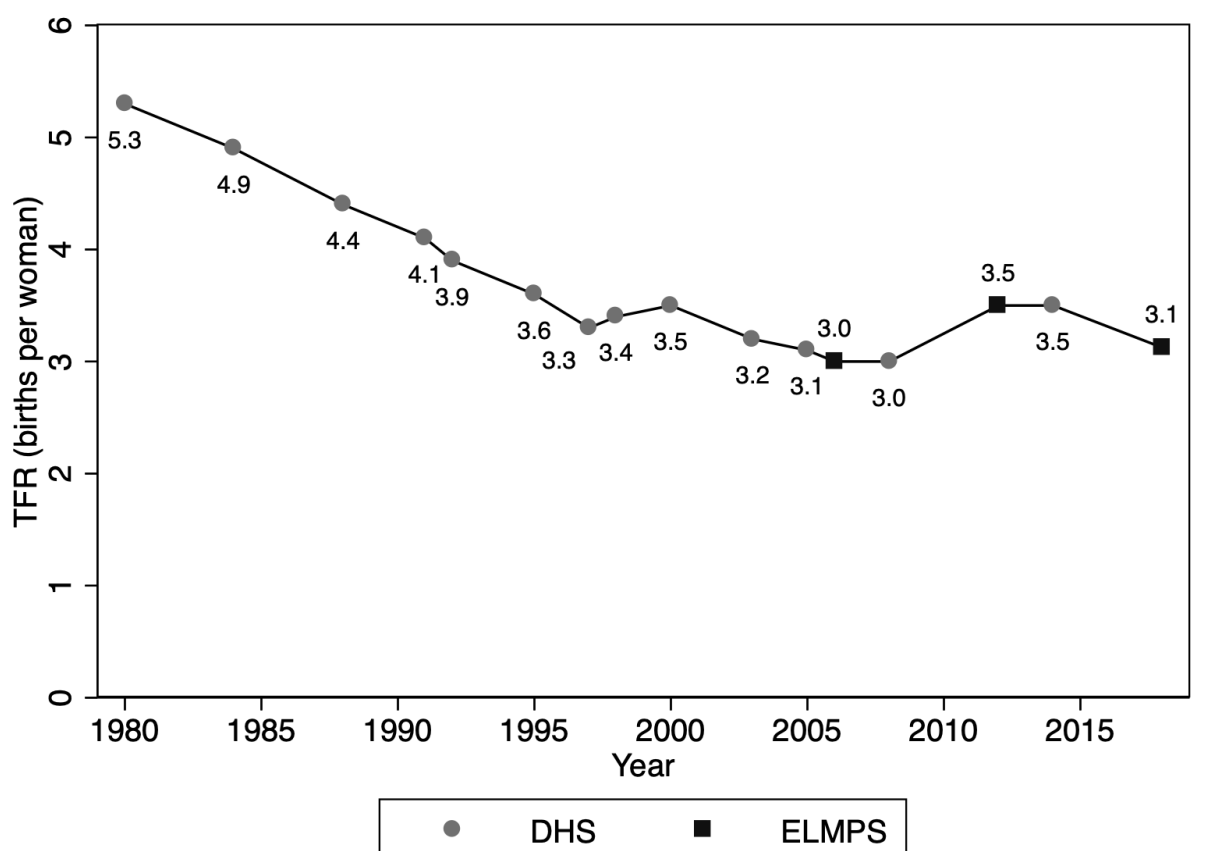
Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

<sup>7</sup> The Frontier governorates include Red Sea, El-Wadi El-Gedid, Matrouh and North and South Sinai. Together these governorates constituted 1.7% of Egypt's population in 2017 (CAPMAS 2019). Greater Cairo includes Cairo governorate and the cities of Giza in Giza governorate and Shobra El-Kheimah in Kalyubia governorate. The Alexandria and Suez Canal region includes Alexandria, Suez and Port-Said governorates, which are entirely urban, as well as the urban portions of Ismailia governorate. The remaining locations are allocated to urban and rural Lower and Upper Egypt depending on whether they are urban or rural. In Greater Cairo, less than half a percent (0.3%) of people across all 5 waves of the ELMPS (N=80) were in rural areas. Therefore, we discuss Greater Cairo as an exclusively urban region.

### 2.3. Trends in Fertility and Marriage Patterns

As shown in Figure 4, the total fertility rate (TFR) in Egypt has been on a generally declining trend since 1980, but this trend has slowed appreciably since 1997, with important periods of increasing fertility. The first reversal was in the 1997-2000 period, when fertility increased from 3.3 to 3.5. Fertility resumed its decline from 2000 to 2008 (3.0), albeit at a somewhat slower trend than in the 1980 to 1997 period. More recently, there was a second reversal, from 2008 to 2012, when the TFR increased from 3.0 to 3.5 children per woman and then remained at that level in 2014. The 2018 wave of the ELMPS is the first to confirm that the decline in TFR has resumed since the last round of the Demographic Health Survey (DHS), which was carried out in 2014. At 3.1 children per woman, the TFR in 2018 remains slightly higher than its lowest recorded level of 3.0 children per woman reached in 2006 and 2008.

**Figure 4. Total fertility rate (births per woman) over time**



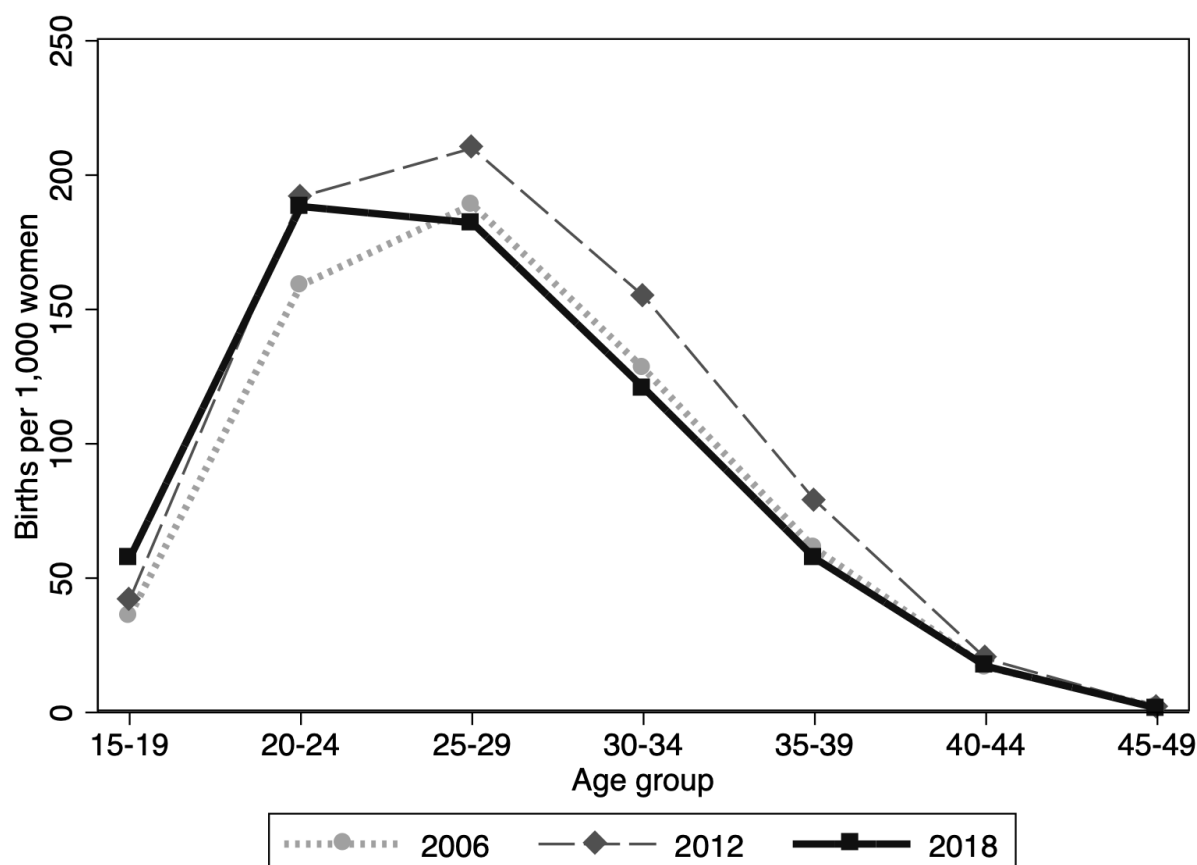
Source: TFRs for 1980-2005 and 2008 are from El-Zanaty & Way (2009) and are primarily Demographic and Health Survey statistics. TFR for 2014 is from the 2014 Demographic and Health Survey (Ministry of Health and Population, El-Zanaty and Associates, and ICF International 2015). TFRs for 2006 and 2012 from Krafft (2016). TFRs for 2018 based on authors' calculations using STATA program `tfr2` on the ELMPS 2018.

Notes: TFRs for 1980, 1984, and 1991 are 12 months preceding the survey. TFRs for 2018, 2012 and 2006 are three years preceding the survey, remainder are 1-36 months preceding the survey.

One important other aspect of fertility change that is worthy of note is that contraceptive prevalence rates have increased. Among currently married women aged 15-49, 62.6% were taking some steps to prevent pregnancy in ELMPS 2018, compared to only 58.5% in the DHS 2014 (Ministry of Health and Population, El-Zanaty and Associates, and ICF International 2015). The 63% rate is the highest contraceptive prevalence rate ever observed in Egypt; rates were around 60% in 2003-2008. The increased prevalence also includes a slight increase in the use of IUDs (from 51.4% in DHS 2014 to 53.3% in ELMPS 2018) as well as the pill (from 27.4% in DHS 2014 to 34.9% in ELMPS) along with a decrease in injectables (from 14.5% in DHS 2014 to 10.0% in ELMPS 2018). The changes in family planning prevalence and mix may have played an important role in the recent fertility decline.

As suggested by the trends in age-specific fertility rates (ASFR) shown in Figure 5, the observed decrease in TFR between 2012 and 2018 was primarily driven by decreased child bearing for women aged 25 to 39. There was hardly any change in fertility among those 20-24 from 2012 to 2018. As a result, the 20-24 cohort had the highest ASFR (188 births per 1,000 women) by 2018, unlike previous waves where the highest levels were reached at age 25-29. ASFRs at ages 25-29 and 30-34 were lower in 2018 than 2012 and even slightly lower than in 2006 for the 25 to 34 age group. The reversal in the unusual increase in fertility that was observed between 2006 and 2012 is welcome news. Egypt's demographic future will depend on whether fertility continues to decline, stabilizes, or reverses again.

**Figure 5. Age specific fertility rates (ASFRs, births per 1,000 women) by wave, women aged 15-49**



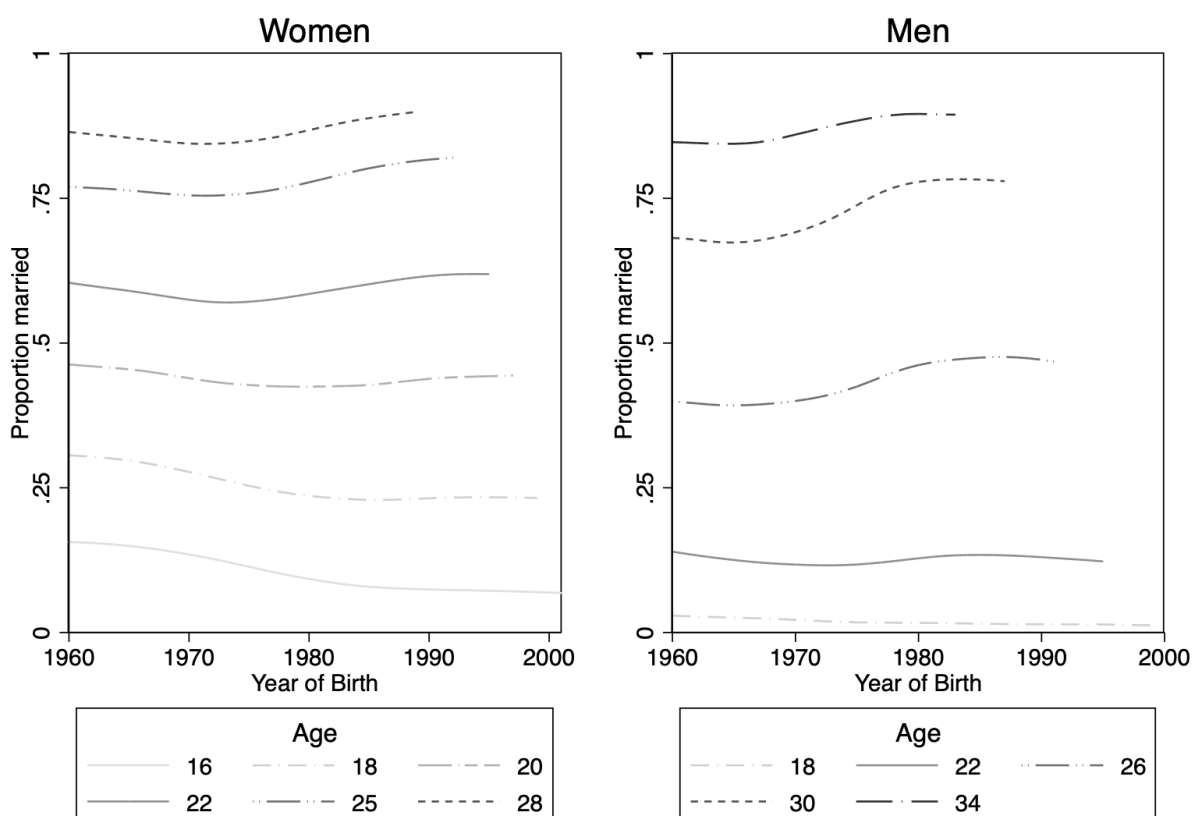
Source: ASFRs for 2006 and 2012 from Krafft (2016). ASFRs for 2018 based on authors' calculations using STATA program tfr2 on the ELMPS 2018.

Changes in age at marriage are related to both changes in fertility and women's labor force participation. Figure 6 examines the proportion of men and women married at various ages, by birth year. The proportion of women married by age 16 has fallen across cohorts, but the share married by age 18, after falling for cohorts born in 1960 through the early 1980s, has stabilized at around 25%. The proportion married by age 20 was just under 50% for those born in 1960, fell for cohorts born in the 1960s and 1970s and then has started to rise again for women born in the 1980s and 1990s, suggesting that the trend in increasingly late marriage has reversed.<sup>8</sup> A similar albeit more pronounced pattern is observed for those married by age 22. As a result, the median age at marriage for women aged 15-59 in 2018 was 21 years old, lower than the previous 22 years old (Assaad, Krafft, and Selwaness 2017). The increase in the proportion married by these ages may have contributed to the increase in ASFR for 20-24 year-olds between 2006 and 2012, as women

<sup>8</sup> See Assaad, Krafft, and Rolando (2017) and Assaad and Ramadan (2008) for a discussion of how changes in housing laws in Egypt have contributed to reducing the age of marriage.

in Egypt usually attempt to commence childbearing promptly after marriage. The shares of women married at older ages (25, 28) have also risen, suggesting that marriage age has declined across its entire distribution. While the share of men married at each age also rose over time (corroborating the possible effect of housing laws on allowing both men and women to marry earlier), there is some evidence that this trend may be reversing for the youngest cohort of men. Spousal age gaps and the structure of the youth bulge and echo may have resulted in a temporary decrease in the supply of younger (female) spouses for men. These marriage market dynamics merit further investigation.

**Figure 6. Proportion married at various ages, by sex and birth year**



Source: Authors' calculations based on data from ELMPS 2018.

Notes: Lowess running mean smoother with bandwidth two.

### 3. Trends in Educational Attainment

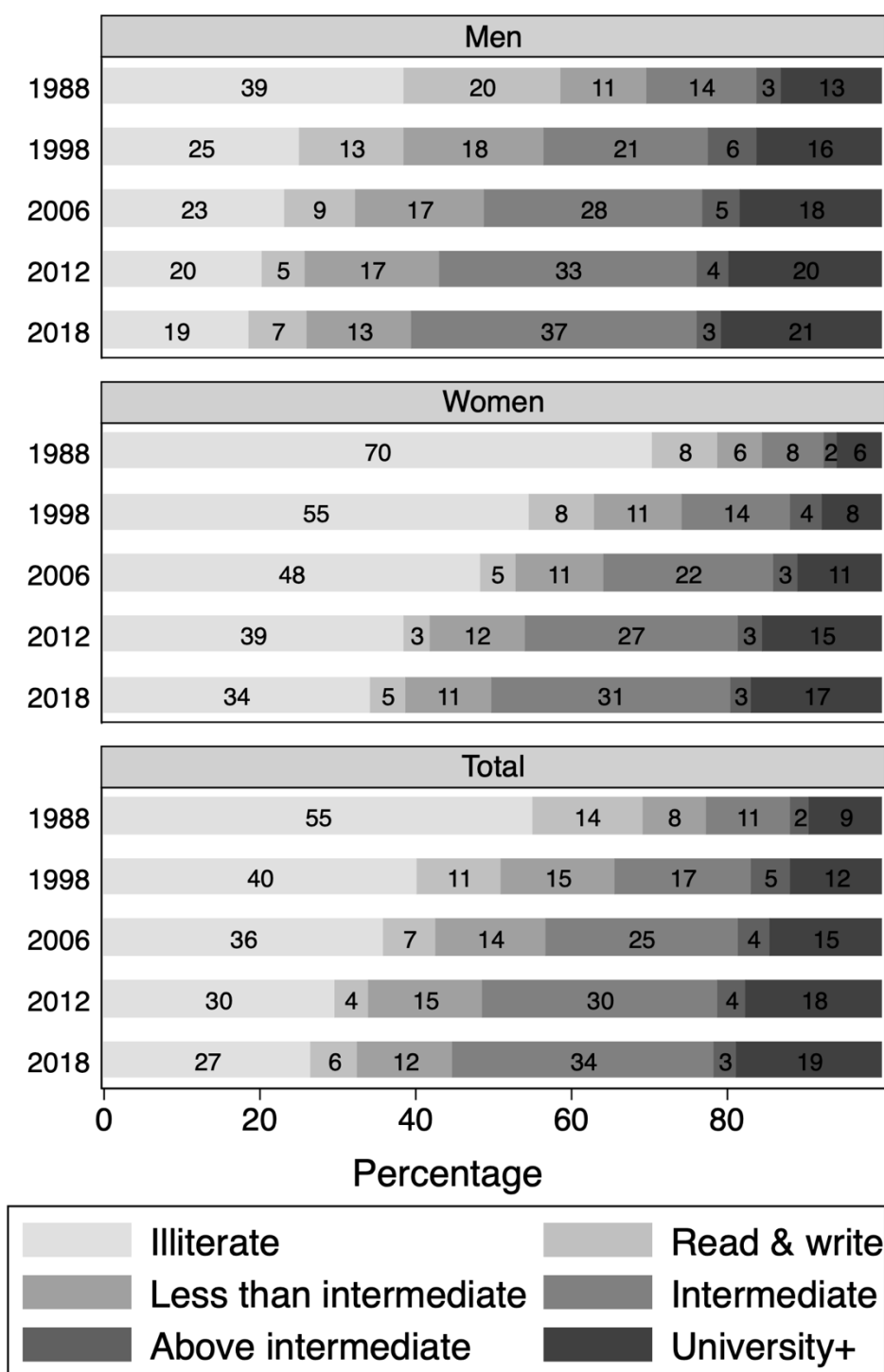
Along with the size and age structure of the population, its education composition is a critical aspect of labor supply. We examine the evolution of educational attainment along six education levels as is typical in Egypt: illiterate, read and write, less than intermediate (equivalent to elementary and lower secondary), intermediate (equivalent to upper secondary), above intermediate (2-year post-secondary), and university and higher (4-year post-secondary and



higher). We focus on individuals aged 25-64, to capture those who are most likely to have completed their educational progression.

Over time, there have been large declines in illiteracy and steady increases in higher levels of education, such as intermediate and university degrees or higher. As shown in Figure 7, between 1988 and 2018, the share of the population that was illiterate was halved, falling from 55% to 27%. Over the same span, there has been a 23 percentage point increase in the share of the adult population with intermediate education (from 11% to 34%) and a 10 percentage point increase for those with university degrees or higher (from 9% to 19%). The reductions in illiteracy and the increases in intermediate and university education were even larger for women, who started with a higher level of illiteracy and lower educational attainment. Although women were almost twice as likely as men to be illiterate in 2018 (34% vs 19%), like men they experienced a 51% decline in their illiteracy rates since 1988 (from 70% to 34%). The proportion of women ending up with intermediate degrees increased from 8% to 31% over the 30 year period from 1988 to 2018 compared to from 14% to 37% for men. Similarly, the proportion of women attaining university education or higher increased from 6% to 17%, compared to from 13% to 21% for men. The gender gap in higher education has therefore narrowed from 7 percentage points in 1998 to 4 percentage points in 2018.

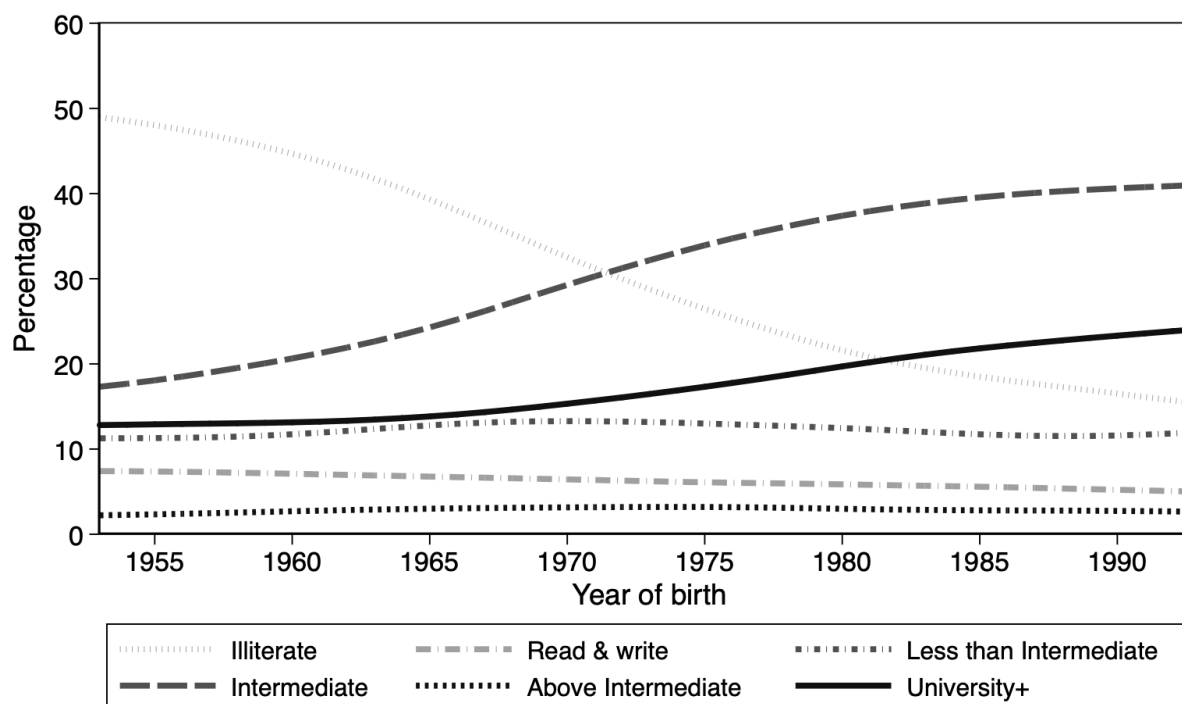
**Figure 7. Educational attainment (percentage), by sex and wave, ages 25-64**



Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

An examination of educational attainment by cohort of birth shows that large changes in attainment occurred for cohorts born between 1955 and 1975, but that the rate of increase in attainment moderated somewhat for more recent cohorts. Figure 8 illustrates the highest level of education completed by year of birth for all individuals between the ages of 25 and 64 in 2018 (i.e. born between 1953 and 1993). The percentage of people who remained illiterate dropped substantially, from nearly 50% of those born in the early 1950s to nearly 15% of those born in the early 1990s. The share of those who can only read and write or had less than an intermediate education remained fairly stable. As illiteracy decreased, the categories that increased the most were intermediate education and university and above education. The intermediate education category is made up mostly of technical secondary degree holders, since those obtaining general secondary degrees tend to go on to higher education (Assaad 2010). This category increased very rapidly to about 35% for those born in 1975 and then its increase slowed somewhat for subsequent cohorts. It reached just over 40% for those born in the early 1990s, becoming by far the most common educational attainment in Egypt in recent years. The proportion with university education was slow to increase at first, but started taking off for those born in 1970 only to see its growth slow as well among recent cohorts. By the cohorts born in the 1990s, more than 20% had acquired university education or higher.

**Figure 8. Educational attainment (percentage) by year of birth, aged 25-64, 2018**

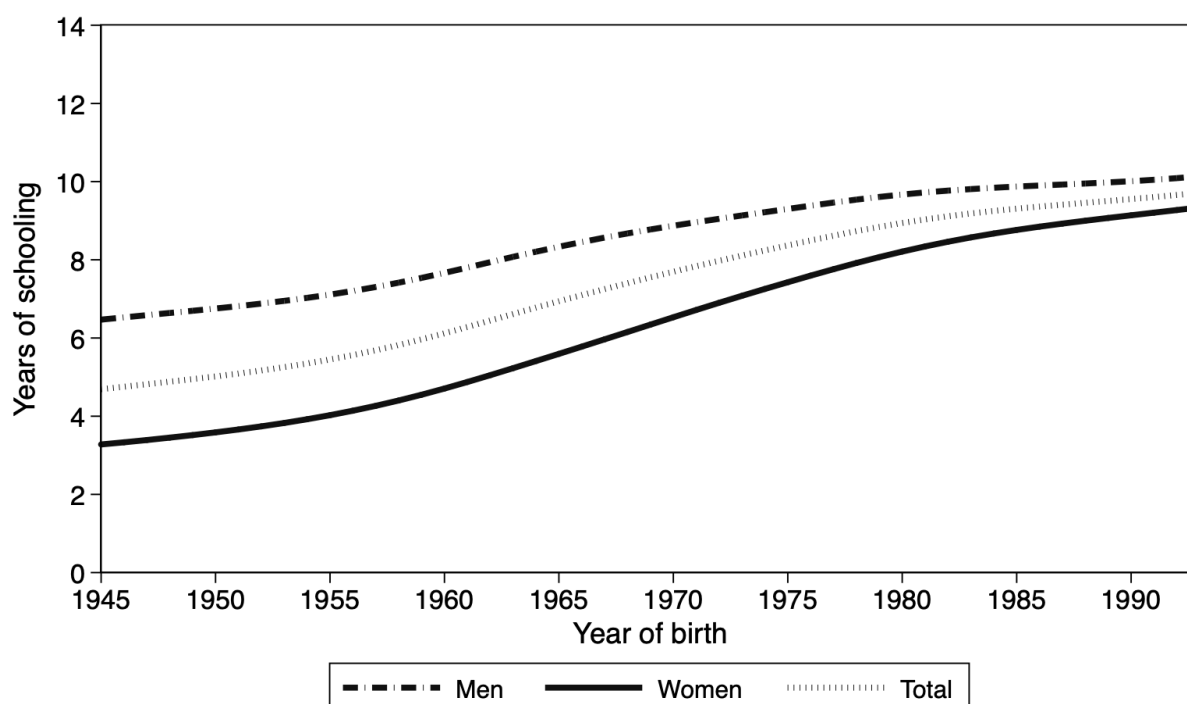


Source: Authors' calculations based on data from ELMPS 2018.

Notes: Lowest smoothed running mean with bandwidth two. Restricted to those cohorts aged at least 25 (birth year in 1993 or earlier) to ensure educational attainment is the final degree.

Commensurate with the increase in levels of education overall, the average years of schooling has continued to rise for both men and women (Figure 9). Among those aged 25-64 in 2018, men averaged 9.3 years of school and women 7.6 (the average was 8.4 overall). Despite the narrowing of the education gender gap over time, for those born in 1985 or later the gap between men and women has persisted, with a difference of about one additional year in school on average for men. This gender gap is closing among younger cohorts, not shown; for instance, in both the 2012 and 2018 waves, there was less than a percentage point difference in enrollment between girls and boys aged 6-17. The rising education levels in Egypt and closing of the gender gap have critical implications for the nature of the labor supply and Egypt's potential human resources.

**Figure 9. Average years of schooling by year of birth and sex, 2018**



Source: Authors' calculations based on data from ELMPS 2018.

Notes: Lowess smoothed running mean with bandwidth two. Restricted to those cohorts aged 25+ (birth year in 1993 or earlier) to ensure educational attainment is the final degree.

## **4. The Evolution of the Labor Force and Labor Force Participation**

### **4.1. Trends in the Labor Force**

While the working age population is a measure of potential labor supply, the actual size of the labor force results from how this potential is realized through labor force behavior, i.e. employment and job-seeking behavior. The economically active population or labor force consists of the employed and unemployed, but there are varying definitions of both these concepts that result in several possible definitions of the labor force. In all the definitions we discuss here, we limit ourselves to the current labor force, which is based on a reference period of the seven days that precede the date of the interview. We also focus our attention on the labor force aged 15-64.

We primarily use a market definition of employment, which is equivalent to the “work for pay or profit” definition of the 19<sup>th</sup> International Conference of Labor Statisticians (ILO 2013). The market definition of employment includes all of those who were occupied for at least one hour per week in an activity for the purpose of obtaining either pay or profit, as either wage workers, employers, self-employed workers, or unpaid family workers. The extended labor force definition of economic activity further includes those who were involved in the production or processing of primary commodities for own household consumption, sometimes referred to as subsistence work.

We distinguish between two types of unemployment, standard unemployment and broad unemployment. Under both definitions, the unemployed must want to work, to have not worked even one hour in the past seven days according to the definition of work used, and to be available to start work within two weeks. The standard definition of unemployment further adds a search criterion, that an individual actively searched for work within the past three months. The broad definition of unemployment does not require search and therefore includes among the unemployed the discouraged unemployed who are no longer actively searching. With two definitions of employment and two of unemployment, there are four possible definitions of the labor force. The special round of the Labor Force Survey of October 1988 only captured the extended definition of employment.

According to the standard market definition of the labor force (which is the most restricted definition among the four), the labor force in Egypt grew from 17 million in 1998 to 25 million in 2018 (Figure 10). This growth at an average annual rate of 1.9% p.a. is similar to the 1.8% p.a. growth rate of the working age population during that 20-year period (Table 2). The similarity of the growth rate of the labor force and that of the working age population over the long-run masks substantial variations over time. Over the period 1998-2006, the rate of growth of the standard market labor force substantially exceeded that of the working age population (3.7% p.a. vs 2.5% p.a.). This was in part due to the fact that this was a period of rapid growth in the young adult population as we saw in Table 1. This rate slowed substantially in the 2006-12 period, when the standard market labor force grew slower than the working age population (0.8% pa. vs. 1.2% p.a.) (Table 2). The growth rate of the standard market labor force slowed even further in the 2012-2018 period to just 0.4% p.a. as compared to 1.3% p.a. for the working age population. These results imply that the participation rate in the standard market labor force declined substantially at the same time the growth of the potential labor force was slowing.

Using the most expansive definition of the labor force, the broad extended definition, the Egyptian labor force grew from 22 million in 1998 to 30 million in 2018 or at a rate of 1.5% p.a., somewhat slower than the growth of the working-age population. Again, there was a great deal of variation over time in the growth of the labor force by this definition. It grew at 2.8% p.a. in 1998-2006, contracted by -0.4% p.a. from 2006 to 2012 and then grew again by 1.5% p.a. from 2012 to 2018. The more rapid growth of the labor force by this definition relative to the standard market definition suggests that the number of discouraged unemployed was growing rapidly and also the number of individuals (especially women) engaged in subsistence activities at home.

Until 2012, which definition of the labor force one used did not matter too much for men. The male labor force consisted of 13 million in 1998, 17 million in 2006, and 19 million in 2012, regardless of the definition used (Figure 10). By 2018, the estimate varied from 19.2 million for the standard market labor force to 19.8 million for the broad extended labor force. However, which definition one uses matters a lot for the estimation of the female labor force. In 1998, the female labor force estimate varied from 3.9 million according to the most restrictive definition (the standard market definition) to more than double, 8.6 million according to the most expansive definition (the broad extended definition). The difference was almost all due to the large number of women who engage exclusively in subsistence work. By 2018, the standard market female labor force had grown to 5.5 million, a rate of growth of 1.8% p.a. from 1998 to 2018, but the broad extended labor force had grown to 10.0 million, implying a lower growth rate of 0.8% p.a. Thus, over time, women in Egypt were somewhat more likely to engage in market work than in subsistence work. The female standard market labor force actually contracted at a rate of 0.1% p.a. in the 2012-18 period, in contrast to the female broad extended labor force, which grew at a rate of 3.2% p.a. (Table 2).

Comparing the standard and broad definitions of the market labor force allows us to ascertain the degree to which discouraged unemployment has grown. The contrast is particularly large for women, for whom the broad market labor force grew at 1.2% p.a. as compared to the 0.1% p.a. contraction of the standard market labor force. This suggests that discouraged unemployment (which is the difference between the two) grew substantially among women in the 2012-18 period. Although 635 thousand women were identified as discouraged unemployed in 2018 (12.4% of all active women), 158 thousand were identified as such in 2012. These figures imply that the rate of growth of discouraged unemployment between 2012 and 2018 was a dramatic 23% p.a. for women, as compared to 11% for men.

**Figure 10. Size of working age population and labor force (millions), by definition, sex and wave, ages 15-64**



Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

**Table 2. Average annual growth rates (percentages) of the working age population and labor force, by wave**

	<b>Working age pop.</b>	<b>Standard market LF</b>	<b>Standard ext. LF</b>	<b>Broad market LF</b>	<b>Broad ext. LF</b>
<b>Men</b>					
1988-1998	3.1		2.0		2.0
1998-2006	2.4	3.0	3.2	2.9	3.1
2006-2012	1.2	1.6	1.5	1.6	1.5
2012-2018	1.3	0.5	0.6	0.6	0.7
<b>Women</b>					
1988-1998	2.9		3.5		3.4
1998-2006	2.7	5.7	2.3	5.6	2.3
2006-2012	1.3	-1.7	-4.1	-1.8	-4.1
2012-2018	1.4	-0.1	2.8	1.2	3.2
<b>Total</b>					
1988-1998	3.0		2.6		2.6
1998-2006	2.5	3.7	2.9	3.6	2.8
2006-2012	1.2	0.8	-0.4	0.8	-0.4
2012-2018	1.3	0.4	1.3	0.7	1.5

Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

## 4.2. Trends in labor force participation

In what follows, we focus on participation using the standard market definition of the labor force. However, Figure 11 presents all four labor force definitions. Based on the standard market definition, participation rates have been falling from 2012 to 2018 for both men and women. For the working-age population as a whole, standard market participation rates increased from 47% in 1998 to 52% in 2006, then fell slightly to 51% in 2012, and then fell more sharply to 48% in 2018.<sup>9</sup> These totals hide larger differences between men and women. Among men, labor force participation increased from 73% in 1998 to 77% in 2006 and then to 80% in 2012, only to reverse and decrease to 76% by 2018. The decline of participation among men is, therefore, a relatively recent phenomenon that requires further investigation.

Women in Egypt have historically had far lower participation rates than men. According to the ILO modelled estimates, female participation rates in Egypt, at 25% in 2018 for the 15-64 age group, were the 11<sup>th</sup> lowest among 189 countries for which the ILO produces estimates (ILO 2019). These estimates were somewhat higher than the ELMPS 2018 estimate of 21%. According to the

<sup>9</sup> The standard market labor force participation rate was significantly higher overall for 2006 and 2012 compared to 1998, but the 2018 rate was not significantly higher than 1998. Participation was significantly higher for men in 2006-2018 compared to 1998. It was significantly higher for women in 2006 compared to 1998, but not statistically different comparing 2012 or 2018 to 1998.

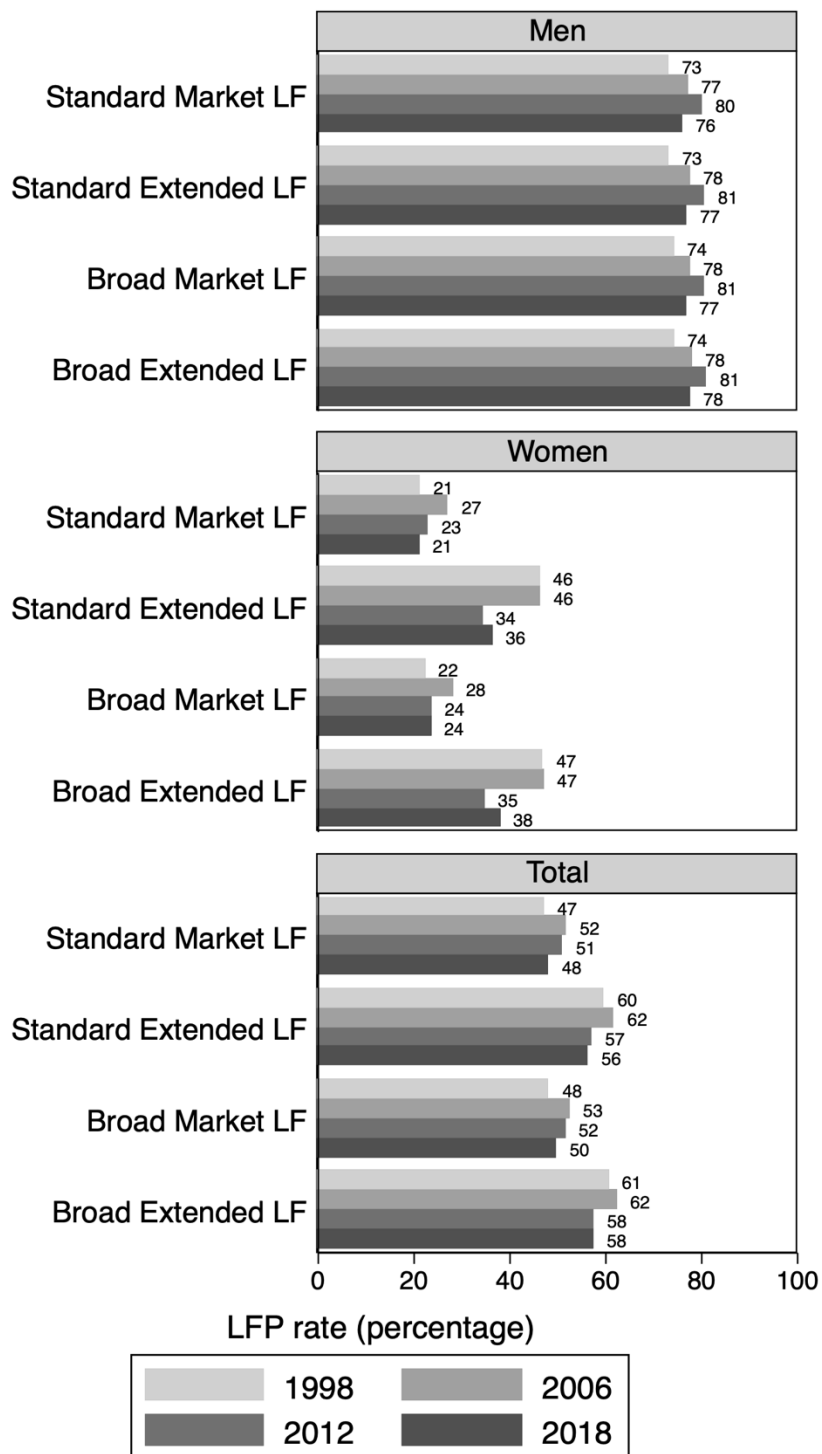


ELMPS, the female standard market labor force participation rate increased from 21% in 1998 to a high of 27% in 2006 but declined to 23% in 2012 and back to 21% in 2018.<sup>10</sup> The declining trends in participation account for the growing divergence we observed between the growth of the working age population (the potential labor supply) and the labor force (the actual labor supply). For men and women in Egypt, the working age population was growing at a rate 1.3%-1.4% p.a. from 2012 to 2018 (Table 2), but the standard market labor force was only growing at a rate of 0.5% p.a. for men and actually contracted at a rate of 0.1% p.a. for women in the same period. At least in the case of women, the rapid growth in discouraged unemployment indicates that these trends are not just due to supply side factors but may also be responding to opportunity structures in the economy.

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<sup>10</sup> While standard market female labor force participation rates were similar on average in 1998, 2012, and 2018, there were significant changes in terms of the determinants of participation such as age and education over time.

**Figure 11. Labor force participation rate (percentage), standard market definition, by sex and wave, ages 15-64**

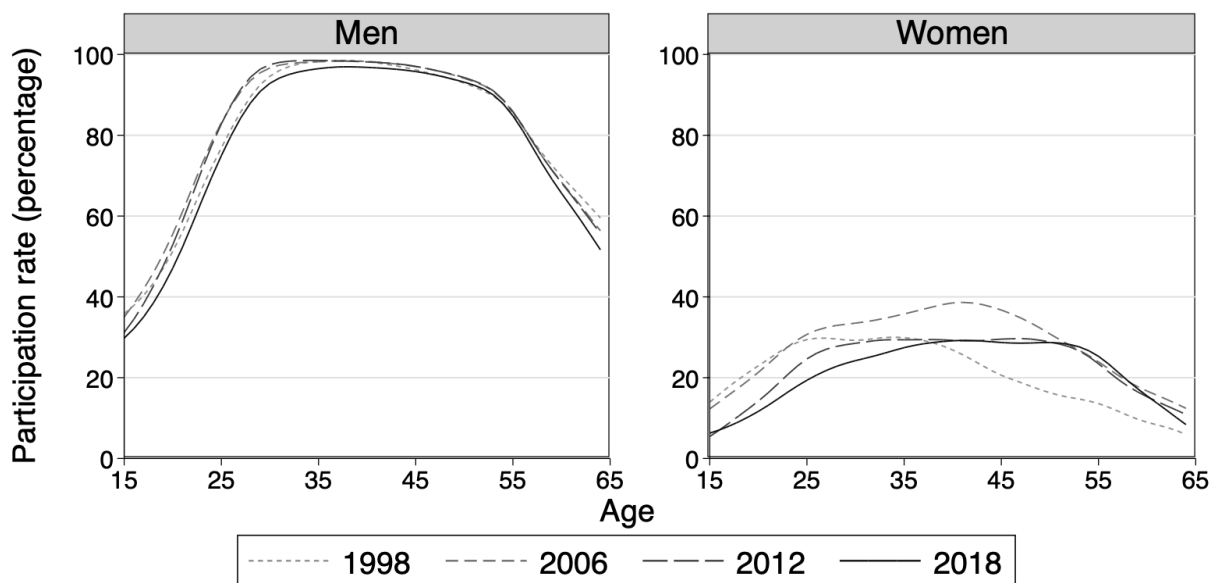


Source: Authors' calculations based on data from ELMPS 1998-2018.

### 4.3. The Age Profile of Labor Force Participation

As shown in Figure 12, labor force participation rates have the usual inverted U-shape by age for both men and women. There were substantial declines in participation from 2012 to 2018 for men at both ends of the age distribution. Men under the age of 35 have experienced sizable declines in participation between 2012 and 2018. There was also a noticeable decline among men above the age of 55. Among women, there was a substantial decline in participation from 2012 to 2018 for all ages through age 40, likely due to diminishing opportunities for young women to work in the public sector.<sup>11</sup> From age 40 onward, participation rates have remained roughly the same as in 2012.

**Figure 12. Labor force participation rate (percentage), standard market definition, by sex, age and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

Note: Lowess smoothed running mean with bandwidth 0.4.

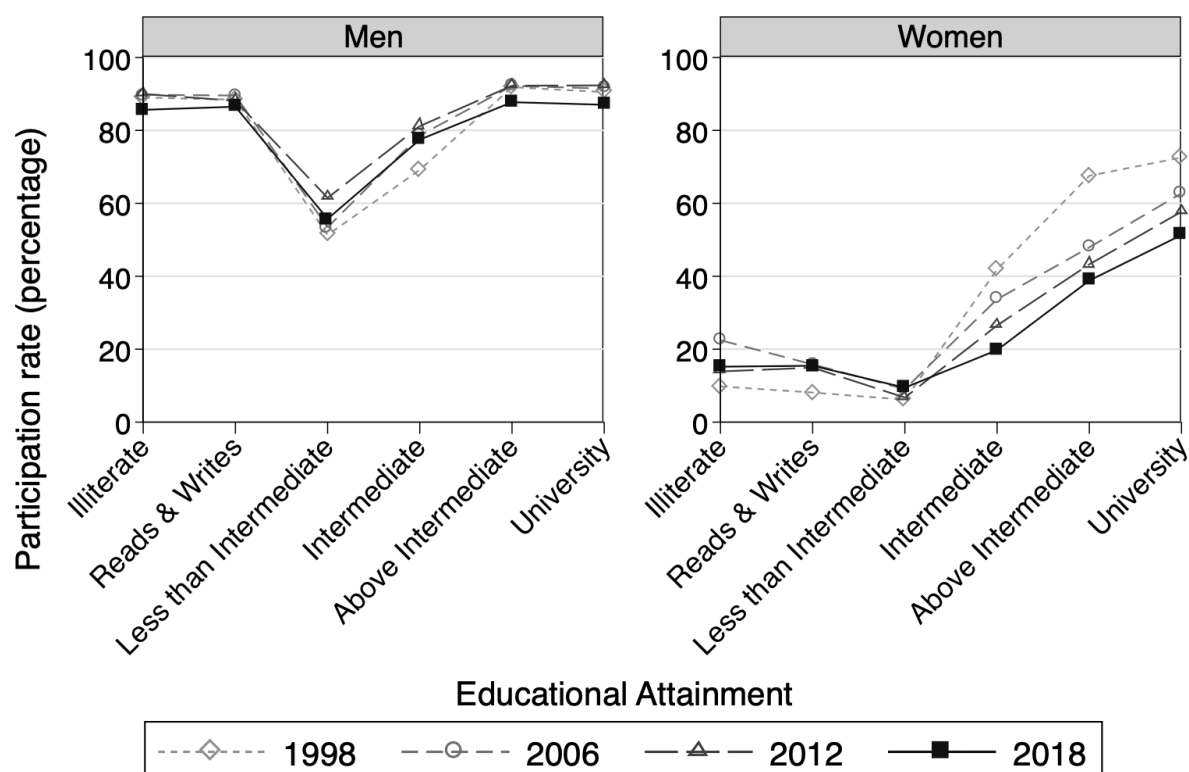
### 4.4. The Education Profile of Labor Force Participation

Figure 13 shows labor force participation by educational attainment. Labor force participation rates were lowest for men with less than intermediate education (many of whom may still have been in school), and highest among men with little or no education (i.e. illiterate and read and write) and for men with above intermediate education and university or higher. However, participation at these levels for men declined in 2018 across education levels compared to previous waves. Labor force participation among women increased with education. With increasing educational attainment, we would expect higher overall female participation over time. This is not happening, however, because participation rates among educated women have been decreasing substantially over time. For example, at the intermediate level (the most common educational attainment in

<sup>11</sup> For further discussion of employment trends by sector see Assaad, AlSharawy, and Salemi (2019).

Egypt) participation has dropped from 42% in 1998 to 20% in 2018. Similarly, participation among university educated women fell from 73% in 1998 to 51% in 2018. So, while participation for men fell across all education levels, for women it declined more for the educated, although it remained low for the less educated. The decline in participation among educated women has been attributed to declining employment opportunities in the public sector (Assaad et al. 2018).

**Figure 13. Labor force participation rate (percentage), standard market definition, by education, sex and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

## 5. The Evolution of Employment in Egypt

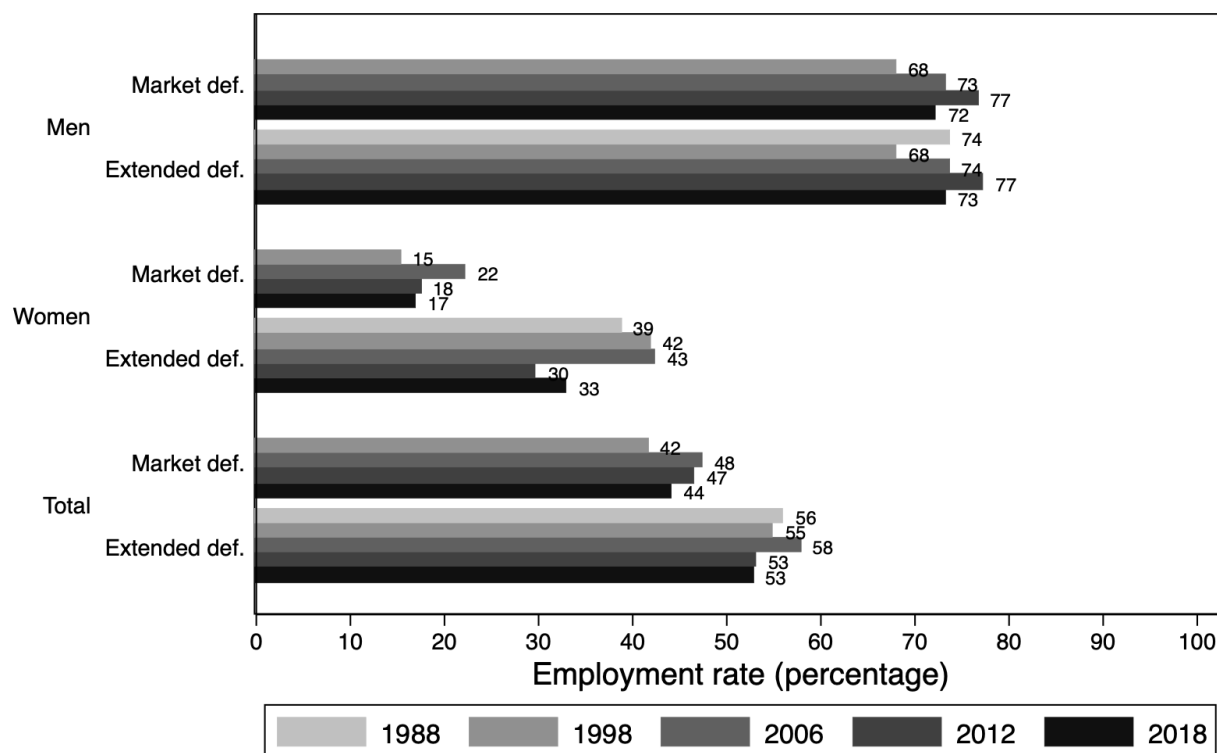
### 5.1. Trends in the Employment Rates

In this section, we examine trends in employment rates (the employment-to-population ratio). Figure 14 shows both market and extended employment rates by sex and wave. Aside from a spike in 2006, the extended employment rate has been falling over time. The market employment rate rose from 42% in 1998 to 48% in 2006, dropped slightly to 47% in 2012, and then more precipitously to 44% in 2018. Again, for males, there is little difference between the market and extended employment rates. Like labor force participation rates, male employment rates were rising from 1998 to 2012, but then fell from 77% in 2012 to 72% in 2018.

For women, the market employment rate is almost half the extended rate in 2018, accounting for the large fraction of women engaged in subsistence work. Only 17% of Egyptian women aged 15-

64 were employed in 2018 according to the market definition, which is now the accepted international definition of employment as adopted by the 19<sup>th</sup> International Conference of Labor Statisticians (ILO 2013). The decline in female employment rates started earlier. Female market employment rates fell from 22% in 2006 to 18% in 2012 and declined further to 17% from 2012 to 2018.<sup>12</sup>

**Figure 14. Employment rate (percentage), by sex, definition and wave, ages 15-64**



Source: Authors' calculations based on data from LFS 1988 and ELMPS 1998-2018.

Note: Employment is based on a 7-day reference period.

## 5.2. The Age Profile of Employment Rates<sup>13</sup>

The shape of the age profile for men in market employment generally shows rising employment rates through approximately age 30 and then a plateau at over 90% from age 30 to 55 (Figure 15). Around age 55, male employment rates begin to decline, likely because men begin to retire. However, in 2018, employment rates for young men looked more like 1998 patterns, and the employment rate for prime-age men (ages 30 to 55) was lower than in any previous year. The

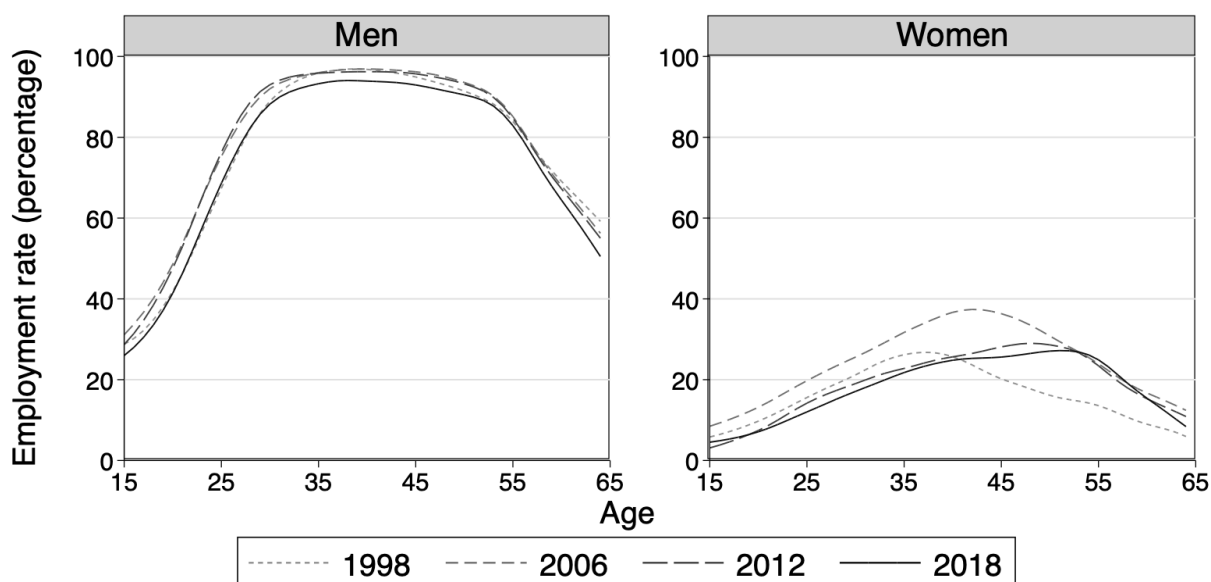
<sup>12</sup> While the female market employment rates in 2006 and 2012 were significantly higher than in 1998, the rate in 2018 was not statistically different from 1998. Rates for men and overall were higher in 2006-2018 than in 1998.

<sup>13</sup> The subsequent discussion focuses exclusively on the market definition of employment. See Krafft, Keo, and Fedi (2019) for a more detailed discussion of subsistence employment among rural women in Egypt.

decline in overall employment rates for men from 2012 to 2018 permeates virtually the entire age distribution.

For women, employment rates appear to rise steadily with age until about age 40, when they flatten out a bit and then decline when women reach their early 50s. The peak employment rate appears to have steadily shifted to later ages from 1998 to 2006 to 2012. This shift is probably due to women who acquired government jobs in the 1970s and 1980s retaining these jobs until retirement. Although the age profile of employment is similar in 2012 and 2018, we do observe a decline in employment rates for women between the ages of 20 and 50.

**Figure 15. Employment rate (percentage), market definition, by sex, age and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

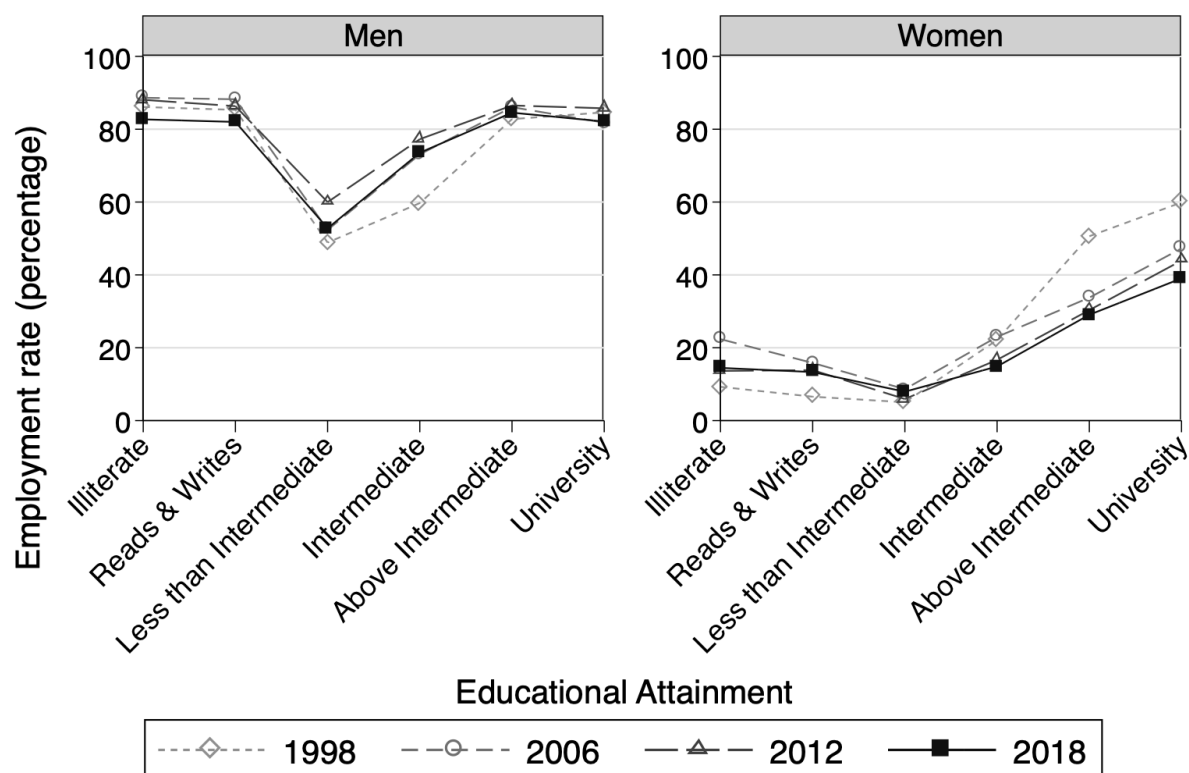
Notes: Employment is based on a 7-day reference period. Lowess smoothed running mean with bandwidth 0.4.

### 5.3. The Education Profile of Employment Rates

As in the case of labor force participation, employment rates have decreased from 2012 to 2018 across the education spectrum for men. The pattern of falling participation since 1998 for educated women is also reflected in their employment rates. For example, employment rates for women with intermediate education have been cut in half since 1998, going from 42% to 20% (Figure 16). A similar steadily declining trend can be seen for women with above intermediate education and those with university education or above.<sup>14</sup>

<sup>14</sup> Changes over time were statistically significant, however, educational attainment still had a positive and statistically significant association with market employment even in 2018.

**Figure 16. Employment rate (percentage), market definition, by education, sex and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

Notes: Employment is based on a 7-day reference period.

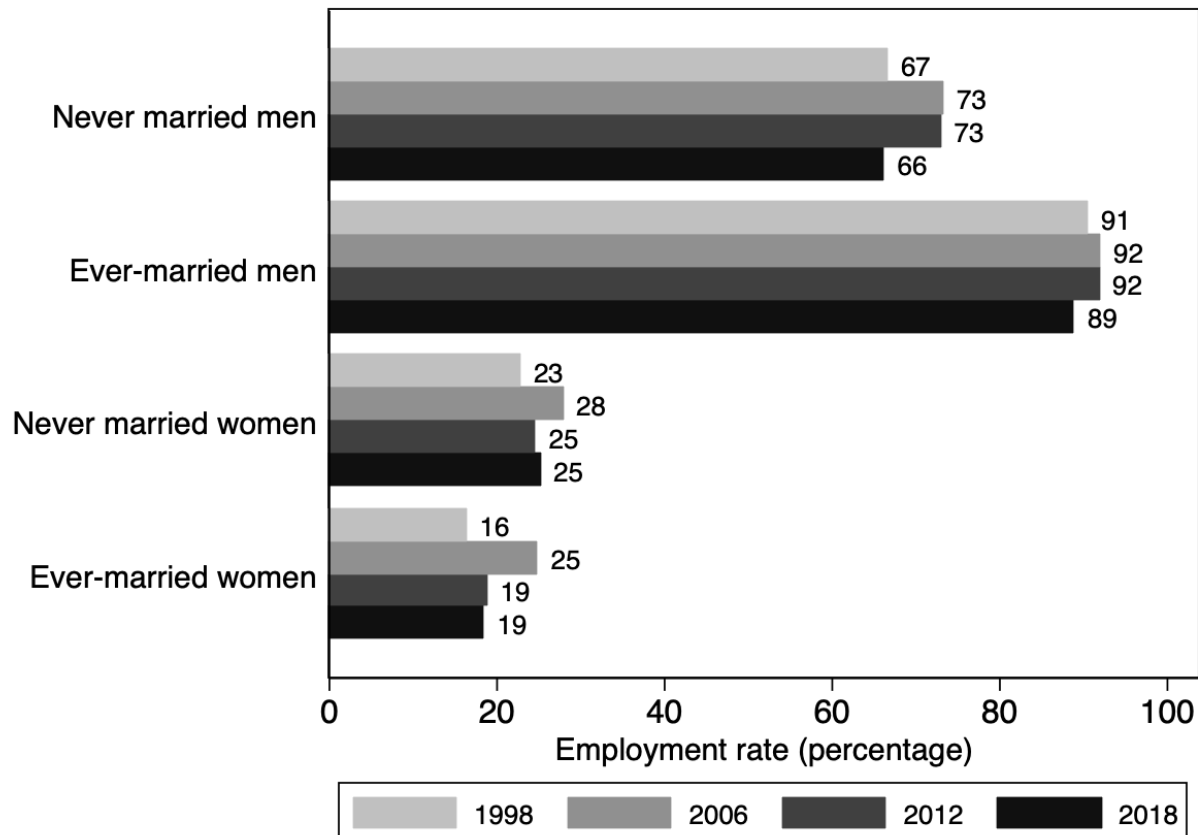
#### 5.4. Family Formation and Employment

After marriage, intra-household dynamics and the changing opportunity cost of time affect married women's decisions to work (Assaad, Krafft, and Selwaness 2017; Selwaness and Krafft 2018). Since, according to prevalent gender norms in Egypt, women are the primary caregivers, this can substantially shift the opportunity cost of their time and employment decisions. In Figure 17, we look at employment rates by sex and marital status for individuals aged 15-64 who were not enrolled in school (as this might bias results for the never married). Overall, rates of employment for ever-married men were much higher than rates for never-married men, since employment is almost a pre-requisite for marriage for men (Assaad, Binzel, and Gadallah 2010; Krafft and Assaad 2017). Regardless of marital status, however, employment rates for men have decreased substantially between 2012 and 2018; rates have decreased seven percentage points (from 73% to 66%) for men who have never married and by three percentage points (from 92% to 89%) for ever-married men. These rates were even lower than they were two decades prior in 1998. In 1998, employment rates were 67% of never-married men and 91% of ever-married men.

In contrast to men, employment rates for never-married women were slightly higher than rates for ever-married women. While employment is a pre-requisite to marriage for men, women may work

prior to marriage and then exit, a trend we explore further below (Assaad, Krafft, and Selwaness 2017; Krafft and Assaad 2017). However, the rate of employment for never-married women has hardly changed over the past two decades. Most recently, in 2018 the employment rate was 25% for never-married women compared to 23% in 1998. Similarly, the rate was only three percentage points higher for ever-married women in 2018 compared to 1998 (increased from 16% to 19%) and substantially lower than in 2006 (decreased from 25% to 19%).

**Figure 17. Employment rate (percentage), market definition, by sex, marital status, and wave, not enrolled in school, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

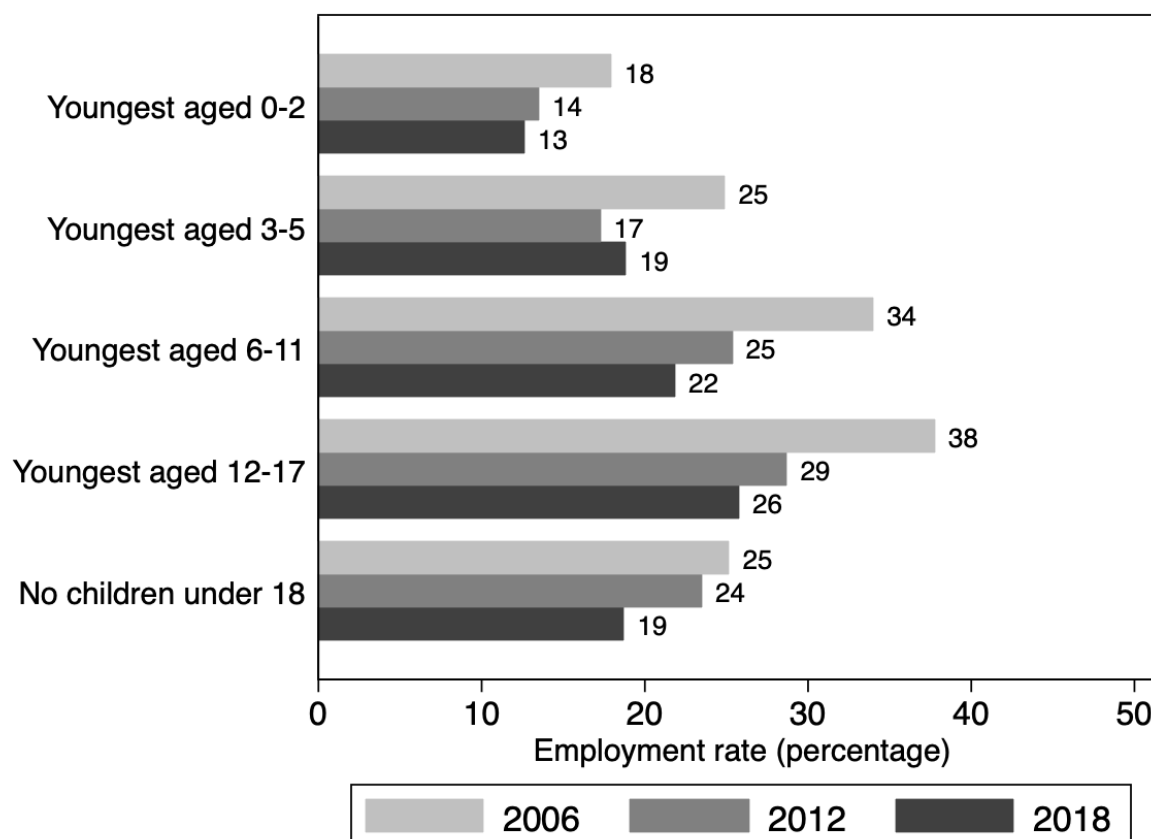
Notes: Ever-married women includes women who are married, divorced, and widowed. Employment is based on a 7-day reference period.

Time and financial constraints related to raising children can influence women's employment decisions. Figure 18 examines employment rates for ever-married women aged 20-54 by their youngest child's age – ages 0-2, ages 3-5, ages 6-11, and ages 12-17 – compared to ever married women with no children under 18 years old. Analyses start in 2006, the first year with birth history data. Employment rates rise for women as their youngest child gets older. In 2018, the employment rate was 13% for ever-married women with a youngest child under 2 years old, compared to 26% for those with a youngest child aged 12-17. However, employment rates have been decreasing over time across all groups. For example, in 2006, the employment rate for women with infants and



toddlers (ages 0-2) was 18% and it declined to 13% by 2018. Among women with a youngest child aged 12-17, the employment rate was 38% in 2006 compared to 26% in 2018.

**Figure 18. Employment rate (percentage), market definition, by household composition and wave, ever-married women aged 20-54**



Source: Authors' calculations based on data from ELMPS 2006-2018.

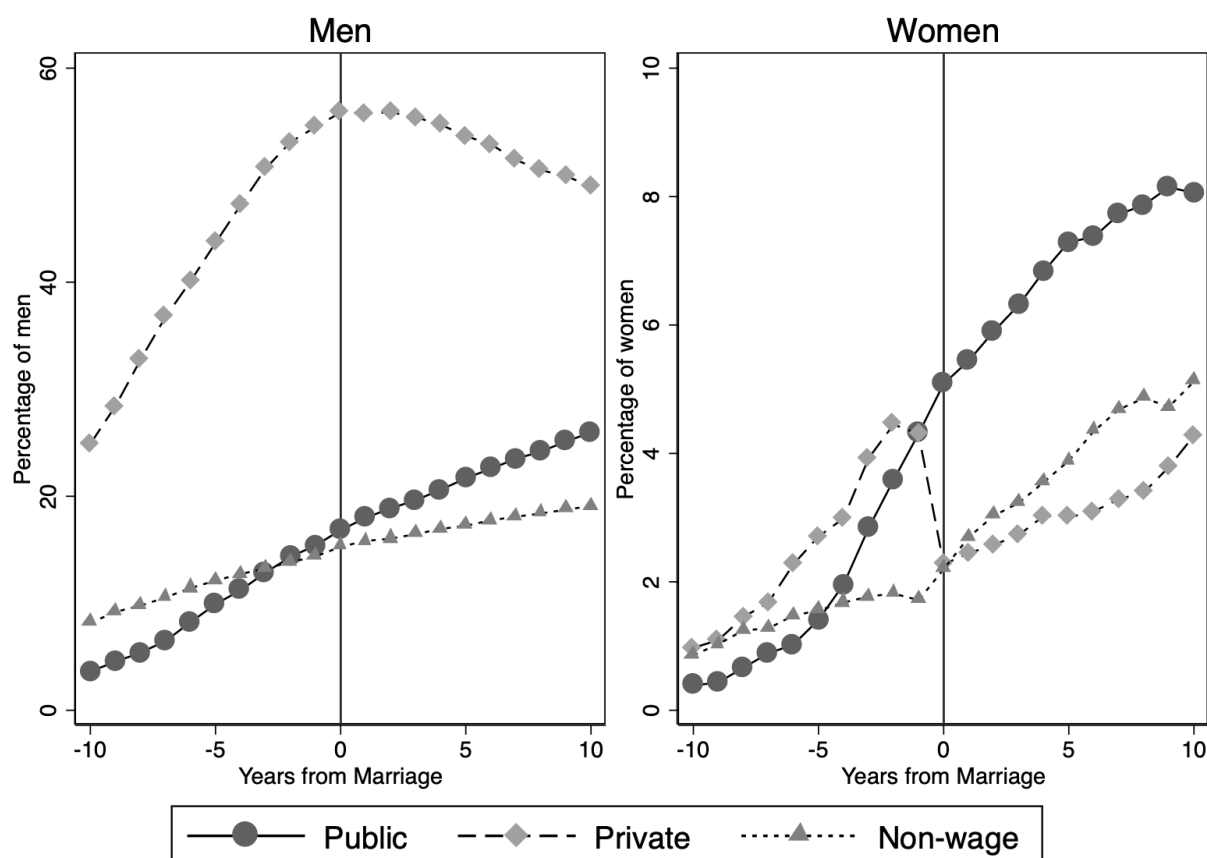
Notes: Ever-married women includes women who are married, divorced, and widowed. Employment is based on a 7-day reference period.

Women exit the private sector at marriage, contributing to lower employment rates among married women. For those who have been married in the last 20 years, Figure 19 shows labor market status by years since marriage for men and women.<sup>15</sup> Zero represents the year of marriage. Men's employment rises in the run-up to marriage (negative years). Private sector employment peaks right at marriage and remains stable for a few years thereafter before falling; this decrease is likely men transitioning into public sector and non-wage jobs. The high rates of employment in the years preceding marriage, for men, allow them to both be promising marital prospects and accumulate the resources necessary to marry (Krafft and Assaad 2017). Women's participation in private sector employment peaks two years before marriage, drops slightly one year before marriage as

<sup>15</sup> Note the difference in the y-axis scale between the two panels.

women anticipate marriage, and then is cut in half from 4% to 2% the year of marriage. In contrast, public sector employment continues to rise with time and is hardly affected by the timing of marriage. Non-wage work also rises for women, more so at and after marriage, as new opportunities may open up as well as non-wage work, which is often home-based, being easier to reconcile with marriage. These trends strongly underscore the lack of compatibility between private sector wage work and women's marital responsibilities (Assaad, Krafft, and Selwaness 2017; Hendy 2011, 2015).

**Figure 19. Employment status by years since marriage and sex (percentage), married in the last 20 years, ages 15-64, 2018**



Source: Authors' calculations based on data from ELMPS 2018.

Note: The y-axis scale is different across the two panels

## 6. The Evolution of Unemployment in Egypt

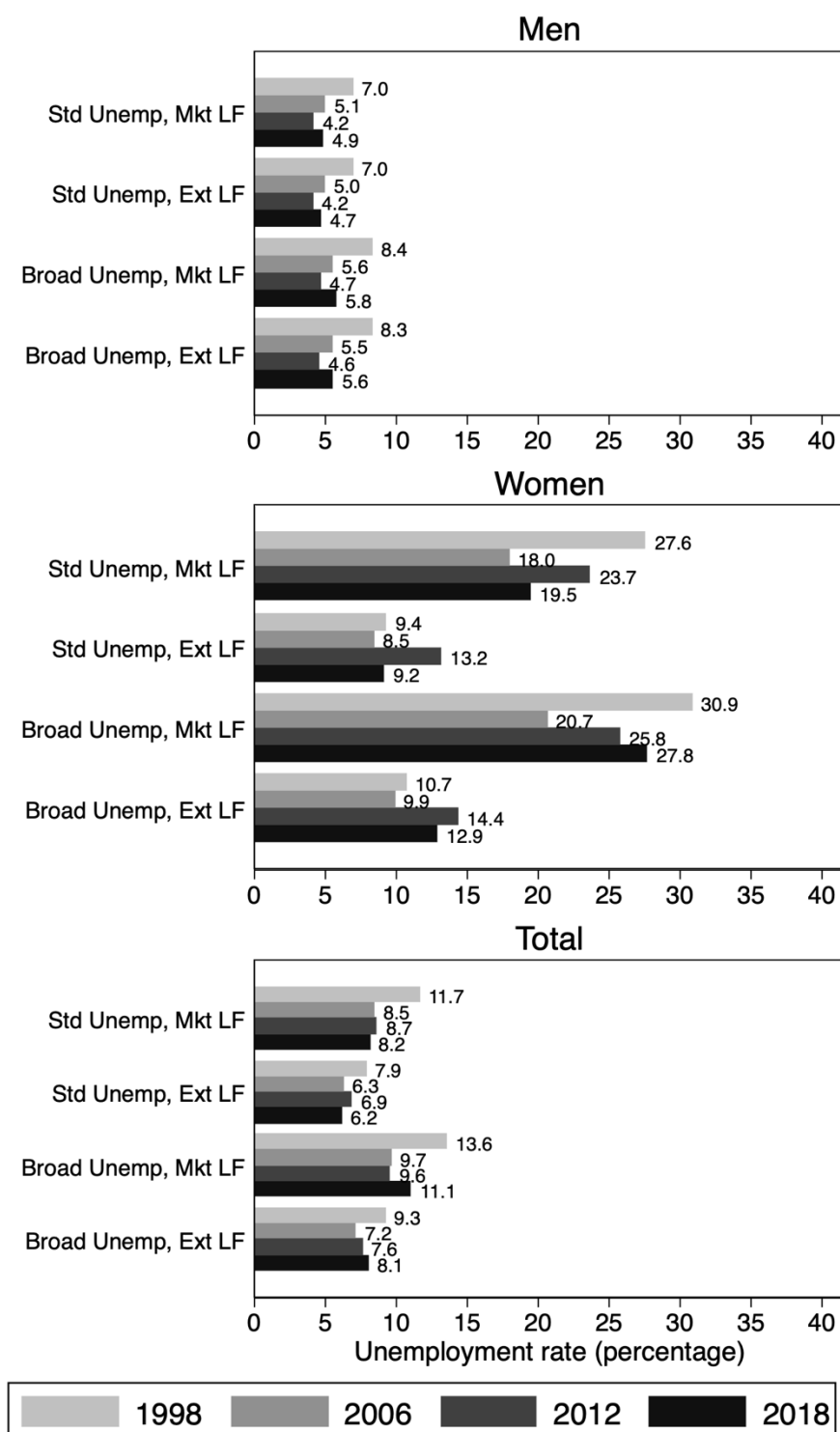
Unemployment in Egypt is primarily a structural challenge, rather than a cyclical phenomenon (Krafft and Assaad 2014b). The age and education profile of the labor force, as well as the number of new entrants, are key drivers of unemployment rates. We begin this section by examining trends in unemployment rates by definition and sex. We follow with age and education profiles of the standard market definition of unemployment by sex.

### **6.1. Trends in Unemployment**

Since 2006, the standard (search required) market rate of unemployment has been relatively stable, varying between 8.2% and 8.7%, after having come down from 11.7% in 1998 (Figure 20). Since differences in trends across the extended and market definitions of employment were similar, we focus here on the market definition. The broad definition of unemployment, which includes the discouraged unemployed, tells a slightly different story. While broad, market unemployment was 9.7% in 2006 and 9.6% in 2012, it increased in 2018 to 11.1%, an increase of almost two percentage points from 2012, although it is still below 1998 rate of 13.6%.

The overall unemployment rate masks the large differences in unemployment between men and women in Egypt. Men's standard market unemployment rate in 2018, at 4.9%, was the same as in 2006 and slightly above where it was in 2012 (4.2%), but well below 1998 (7.0%). Broad market unemployment rates were up in 2018 for men, rising from a low of 4.7% in 2012 to 5.8% in 2018. Women's unemployment rates were four times those of men (19.5% using the standard market definition in 2018). Although women's standard market unemployment rate fell from 2012 (23.7%) to 2018 (19.5%), the broad market unemployment rate has been rising since 2006 to 25.8% in 2012 and 27.8% in 2018. The rise in broad unemployment, wherein individuals want to work but were not actively searching, suggests that an increasing share of individuals in the labor force were discouraged about their job opportunities.

**Figure 20. Unemployment rate (percentage), by sex, definition and wave, ages 15-64**



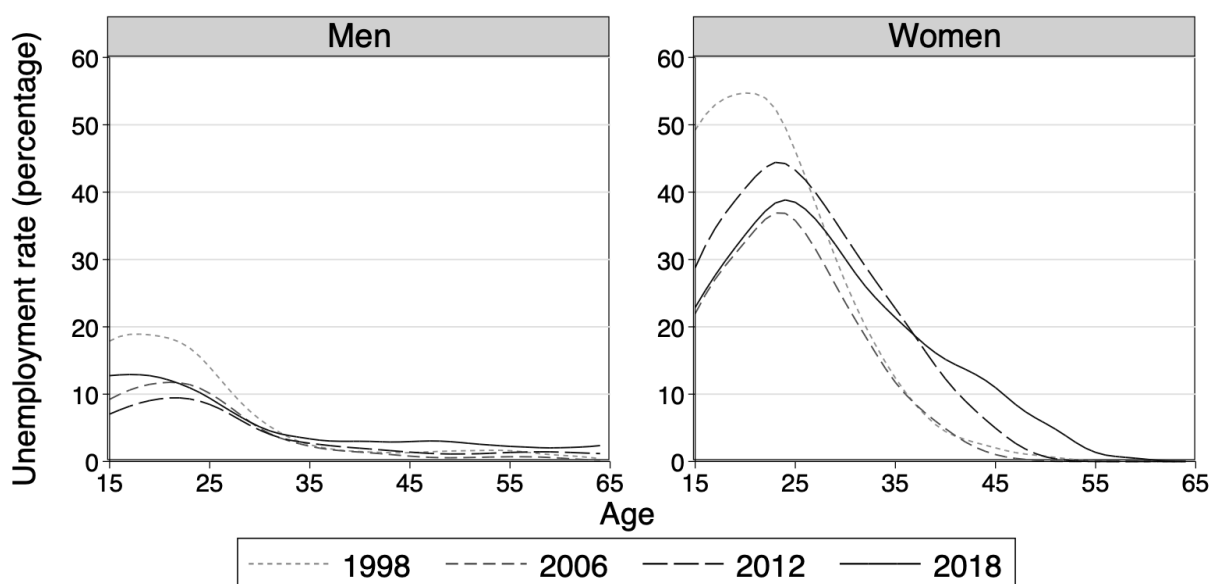
Source: Authors' calculations based on data from ELMPS 1998-2018.

Notes: Unemployment uses a 7-day reference period.

## 6.2. The Age Profile of Unemployment

Unemployment is primarily a new entrant phenomenon in Egypt. As shown in Figure 21, unemployment rates for men peaked at earlier ages, in the late teens, in 2018, and were higher for the youngest men in 2018 than in 2006 or 2012. In those years, the peak unemployment rate for men was closer to age 22-25. As we shall see below, these patterns are closely linked to changes in unemployment by education. Unemployment in the 35+ range, for men, was notably higher in 2018 than in previous waves, albeit still much lower than at young ages. In 2018, unemployment peaked at almost 40% for women aged 25 and remained over 20% through age 35. Although the peak around age 25 was similar to 2006 and 2012, rates were higher at older ages (35+) than in previous rounds. Unemployment for women was extending into older ages, the counterpoint to falling employment rates at these ages.

**Figure 21. Unemployment rate (percentage), standard market definition, by sex, age and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

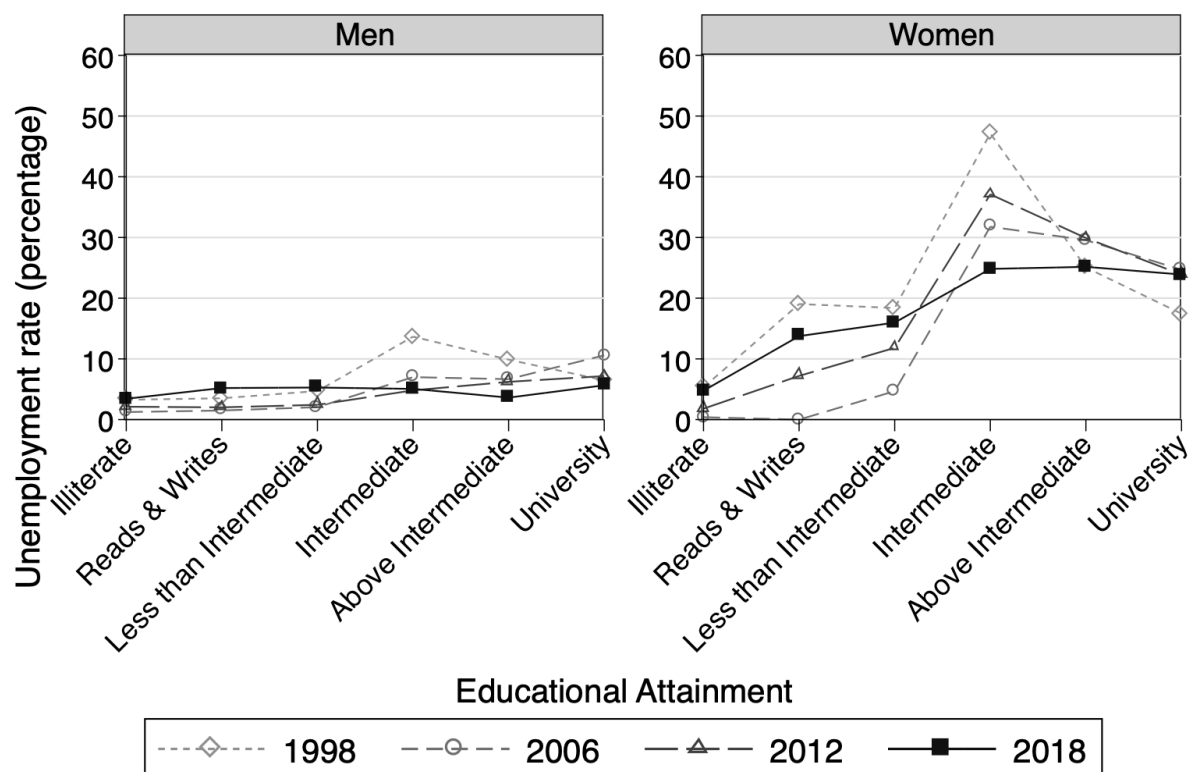
Notes: Unemployment is based on a 7-day reference period. Lowess smoothed running mean with bandwidth 0.4.

## 6.3. The Education Profile of Unemployment

In 2018, the male unemployment rate had increased for the less educated but remained similar to 2012 for those with intermediate and higher education (Figure 22). The rise in less-educated unemployment is linked with the rise in late teen unemployment, as less educated young men enter the labor market early. While historically unemployment was a young, educated new entrant phenomenon, for men at least, the unemployment-education relationship has weakened considerably over time. The female unemployment rate in 2018 had also increased for the less educated, but unemployment rates remained highest among those with intermediate and higher education, around 25%. This rate has prevailed for the university educated since 2006. Notably, the unemployment rate for those with intermediate education fell substantially between 2012 and

2018. Since these women have not increased their employment, they are particularly likely to be withdrawing from participation.

**Figure 22. Unemployment rate (percentage), standard market definition, by highest education, sex and wave, ages 15-64**



Source: Authors' calculations based on data from ELMPS 1998-2018.

Note: Unemployment is based on a 7-day reference period.

## 7. Conclusions

Over the past thirty years, Egypt has experienced demographic developments that have strongly shaped the size and composition of labor supply. The most notable among them is the emergence of the youth bulge phenomenon in the late 1980s and 1990s. The “bulge” is now well past peak labor market insertion ages. The aging of the bulge has led to very slow growth or even contraction of the youth and young adult populations in recent years and therefore attenuated labor supply pressures. Nevertheless, these pressures will soon start building again as the large “echo” generation, the children of the youth bulge generation, reach labor market entry age in the next ten to fifteen years. The size of this generation was made even bigger by a temporary but substantial increase in fertility that occurred between 2008 and 2012. This generation, centered around school entry age, has placed enormous pressures on the schooling system and this pressure will soon be transmitted to labor markets. Policymakers need to prepare for these forthcoming challenges. Education levels continue to rise in Egypt, albeit less rapidly than before, as secondary education has massified and university enrollments have reached higher levels.

The attenuation of demographic pressures on labor supply has been compounded by decreasing participation (and employment) rates among both men and women. The decline in participation among women has been ongoing for a while despite the closing of the gender gap in education and the historically strong relationship between participation and education for Egyptian women. In fact, falling participation rates among educated women have more than made up for the shifting composition toward higher education groups, leading to an overall drop in women's participation. The decline in participation among educated women can in turn be explained by declining employment opportunities in the public sector at a time when the private sector continues to be inhospitable to women, particularly married women (Assaad et al. 2018).

The decline in participation among men is a more recent phenomenon that is less well understood. The falling participation spanned a variety of ages well beyond the ages of schooling, suggesting that it was not just a delay due to rising levels of education. Some of it was at the older end of the age distribution, suggesting earlier retirements. The decline involved men at all education levels and not just those who may be pursuing more schooling. Coupled with evidence about rising rates of discouraged unemployment, it suggests that the declining trend in participation may be due, at least in part, to deteriorating opportunity structures, but this is clearly a trend in need of further investigation.

Unemployment, by the standard definition, has remained very stable, however, broad unemployment, which does not require active job search, has increased, implying higher levels of discouragement. The increase in discouragement is much higher among women than among men, further suggesting that declining participation is due to a less hospitable labor market. There are signs that unemployment has decreased for educated men but risen for the less educated as well as those in their teens and prime aged; this constitutes an important shift in the nature of male unemployment away from educated new entrants. For women, unemployment remains predominantly an educated, new entrant phenomenon, although now persisting into even later ages. Continuing to track and further research these developments will be critically important for understanding the future of Egypt's labor market and economy.

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