

Paper prepared for the 22<sup>nd</sup> Annual Conference of the Economic Research Forum

Cairo, Egypt

## **Where Has All the Education Gone? Analyzing Trends in Labor Force Participation in MENA**

By

Ragui Assaad<sup>1</sup>,  
Rana Hendy<sup>2</sup>,  
Moundir Lassassi<sup>3</sup> and  
Chaimaa Yassine<sup>4</sup>

### **Abstract**

Despite rapidly rising female educational attainment and the closing if not reversal of the gender gap in education, female labor force participation rates remain low and stagnant. Even if increases in participation are observed, they are typically in the form of rising unemployment. We argue in this paper that female labor force participation among educated women in four MENA countries – Algeria, Egypt, Jordan and Tunisia -- is constrained by adverse developments in the structure of employment opportunities on the demand side. Specifically, we argue that the contraction in public sector employment opportunities has not been made up by a commensurate increase in opportunities in the formal private sector, leading to increases in female unemployment or declines in participation. We use multinomial logit models estimated on annual labor force survey data by country to simulate trends in female participation in different labor market states (public sector, private wage work, non-wage work, unemployment and non-participation) for married and unmarried women of a given educational and age profile. Our results confirm that the decline in the probability of public sector employment for women with higher education is associated with either an increase in unemployment or a decline in participation.

**Keywords:** Labor markets, female labor force participation, sectoral choice, gender, marriage, human capital, MENA.

---

<sup>1</sup> Professor, University of Minnesota, 301 19<sup>th</sup> Ave. S., Minneapolis MN 55455, USA. E-mail: [Assaad@umn.edu](mailto:Assaad@umn.edu).

<sup>2</sup> Economist, ERF, 21 El-Sad El-Aali St., Dokki, Giza, Egypt. E-mail: [rhendy@erf.org.eg](mailto:rhendy@erf.org.eg).

<sup>3</sup> Lassassi, Moundir, Researcher and Team leader, Center for Research in Applied Economics for Development (CREAD) - Algiers - ALGERIA. Tel: (+213) 21 94 12 72 - Ext: 141. E-mail: [moundir81m@yahoo.fr](mailto:moundir81m@yahoo.fr).

<sup>4</sup> University of Paris I Panthéon-Sorbonne, Paris School of Economics and University of Maine. E-mail: [cyassine.eco@gmail.com](mailto:cyassine.eco@gmail.com).

## 1. Introduction

Despite the dramatic narrowing of the gender gap in education over the past three decades in the Middle East and North Africa region, the region continues to suffer from deep deficits in gender equality in economic participation. Despite a long-standing pattern linking women's economic participation with education, rising education levels have not translated into higher levels of labor force participation for women, and, where there has been an increase in participation, it usually takes the form of increasing unemployment not employment. While the literature has emphasized supply-side factors, such as conservative gender norms and heavy domestic burdens, as limiting female participation in MENA, we argue that the failure of participation to increase with educational attainment is due to adverse developments on the demand side of the ledger. The dramatic slowdown of government hiring of educated women (and men) has not been counterbalanced by a commensurate increase in employment opportunities in the formal private sector. Neither informal private employment nor non-wage employment have constituted viable options for educated women in MENA, leaving unemployment and non-participation as the remaining options.

The very low levels of female labor force participation in the MENA region have been welldocumented. The World Economic Forum's Global Gender Gap Report of 2014 ranks countries on the basis of the economic participation and opportunity sub-index of the overall gender gap index. Fifteen of the bottom 20 countries out of the 142 countries covered by the report are MENA countries. In contrast, only one MENA country, Yemen, is in the bottom 20 based on the educational attainment sub-index (World Economic Forum 2014). Region-wide, the share of women in the workforce barely changed from 19 percent in 1990 to 23 percent in 2013 (World Bank 2015).<sup>5</sup> Several countries, such as Egypt, Morocco, and Syria have actually experienced a decline in female participation over the same period according to the ILO modeled estimates.<sup>6</sup>

Previous work has shown that different types of work are differentially accessible to women in MENA countries depending on the stage in their life course and the education levels they have achieved (Hendy 2015a; Hendy 2011; Assaad and El-Hamidi 2001, 2009; Assaad and Zouari 2003; Assaad, Hendy and Yassine 2014). Specifically, less educated women tend to have limited access to wage work in general and are often confined to home-based self-employment or unpaid family work, if they participate in the labor force at all. More educated married women strongly prefer work in the public sector because of its

---

<sup>5</sup> These figures are for the MENA region (all income levels), as defined by the World Bank and are based on the ILO modeled estimate of the labor force participation rate for women ages 15-64.

<sup>6</sup> Measurement of female labor force participation suffers from a number of methodological problems and data collection practices often change over time making the measurement of such trends problematic. We discuss some of these issues with respect to Egypt and Jordan below.

shorter hours and generous maternity and family leave policies, and they generally shun work in the private sector. Unmarried women can sometimes engage in private sector wage work, but will often quit that work upon marriage (Hendy 2015a). Participation patterns also differ significantly by urban/rural location as well, with the threshold for participation being significantly lower in rural areas where there is a less distinct separation between women's economic work and their domestic responsibilities. In examining female labor force participation over time in MENA, it is therefore essential to distinguish between different types of work (Assaad and El-Hamidi 2001), control for marital status, educational attainment and stage in the life course, and account for urban/rural differences. Controlling for compositional shifts in the population is critical to being able to distinguish underlying trends driving participation from compositional effects.

This is precisely what we attempt to do in this paper for four MENA countries -- Algeria, Egypt, Jordan and Tunisia -- for which multiple cross sections of microdata from official labor force surveys have recently become available. We begin by documenting the very rapid increase in educational attainment in these countries and the closing of the gender gap in education. We note in particular that in all four countries, the proportion of female university graduates in the population has already exceeded that of male university graduates for the youngest cohorts that have already completed their education. Despite this narrowing or even reversal of the gender gap in education, we show that the trend in overall participation rates is quite stagnant and, where it is rising, the increase is coming entirely from an increase in female unemployment. We then examine the relationship between educational attainment and participation showing that, while there is a strong positive gradient between participation and educational attainment in all four countries, this relationship has generally been weakening over time. Where it is not weakening, such as in the case of Tunisia, it is because educated women are increasingly likely to be unemployed.

To further investigate the causes of declining participation and rising unemployment among educated women, we investigate the change in the structure of employment opportunities that educated new entrants were facing in all four countries since the mid-1970s. We do so by looking at the distribution of first jobs obtained by educated new entrants every year by type of employment using retrospective data on first jobs and year of first entry into employment. This analysis reveals very clearly that for all educated new entrants, males and females, public sector employment is making up an increasingly smaller share of first jobs, although the declining trend in public sector employment has slowed since the mid-2000s. Private formal employment has only taken up very little of the slack in public employment in Egypt and Algeria and made up less than half the decline in Jordan and Tunisia. The share of private informal employment, which is generally considered a very inhospitable kind of

employment for women, and especially married women, grew and the rest was taken up by non-wage employment. Faced by the contracting opportunity structure brought about by the decline in public sector employment opportunities and the slow growth of formal private employment, we argue that educated female new entrants were increasingly forced to either join the ranks of the unemployed or to exit the labor force altogether.

To confirm the trends suggested by the preceding descriptive analysis, we conduct multivariate analyses of the determinants of different types of participation over time in the four countries. Specifically, we estimate annual multinomial logit models, separately for each country, relating the probability of participation in public sector work, private wage work, private non-wage work, unemployment and non-participation to individual characteristics, such as educational attainment, age, marital status, urban/rural location and region. Using these annual models we simulate the probability of participation in each of these 5 states for a reference married and unmarried female (a 30-year old university graduate) in each country in each year. This not only allows us to control for compositional differences in the female population over time, but also to examine how trends in different kinds of participation have contributed to the overall trend.

Our results confirm that the predicted probability of participation is indeed decreasing for married and unmarried university-educated women in Algeria, and Jordan. Overall participation shows no clear time trend in Egypt, but is rising in Tunisia. In all four countries, the probability of participating in public sector employment is declining markedly. This decline is not being made up by increases in the probability of private wage employment, which anyway is a very limited option for married women. Probabilities of private wage employment are either increasing slightly, stagnant, or even declining in the most recent years. The probabilities of non-wage employment for educated women are really low, well below 3 percent in all four countries, suggesting that non-wage employment is not much of an option for university-educated women. The only component of participation that appears to be rising consistently for university-educated women in three of the four countries is unemployment. In fact, in Tunisia, the increase in the probability of unemployment more than makes up for the increase in participation observed there. In Jordan, where unemployment has been stable in recent years, participation has been falling steadily.

Our findings clearly show that structures of economic opportunity have been contracting significantly for educated women in these four MENA countries. The loss of employment opportunities in the public sector has not been made up by a commensurate increase in the private sector resulting in either an increase in unemployment or a reduction in participation. This increasing exclusion of educated women from economic opportunity in the MENA region does not only have enormous implications for gender equity, but also has serious efficiency implications for the way in which human capital is deployed in MENA economies. If the large investments in human capital that MENA is undertaking are to bear fruit in terms of sustainable

growth and prosperity in the region, barriers to the economic participation of educated women would have to be addressed.

The outline of the paper is as follows. After the introduction, Section 1 will review the existing literature on female labor force participation in MENA and identify gaps in the literature. Section 2 describes our data sources and methodology. Section 3 discusses descriptive results to motivate our analyses. Section 5 presents our empirical results and simulations and Section 6 concludes.

## **2. Literature Review<sup>7</sup>**

Much of the literature trying to explain the low levels of female participation in MENA has emphasized supply-side constraints to participation. The most common supply-side factor discussed in the literature is the conservative gender norms in the region. Some authors simply attribute women's limited participation in the public sphere in general to the influence of "Islamic culture" (Clark, Ramsey and Adler 1991, Inglehart and Norris 2003). This assertion fails to account for the wide variation in female participation observed across the Islamic world, from Yemen to Malaysia. Others have highlighted the role social norms that place a high value on women's modesty and emphasize the primacy of the family and the domestic sphere in women's lives; a set of norms that has variously been referred to as the "gender system" (Miles 2002) or the "traditional gender paradigm" (World Bank 2004).

The role of oil and oil-related revenues in perpetuating these conservative social norms, and therefore the restriction in female labor supply, is brought up by some author to explain the specificity of MENA. Karshenas and Moghadam (2001) and Moghadam (2004a) argue that income from oil revenues and related income, such as remittances, typically flows into the hands of male heads of households, allowing them to perpetuate the traditional male breadwinner/female homemaker model.

Given the very high and rising rates of unemployment among educated female new entrants and the large wage penalties women incur in the private sector (Said 2014, 2015), it seems unlikely that the low participation rates could be simply attributed to restrictions in supply. It is however quite possible that conservative gender norms shape the sort of employment that is deemed socially acceptable in a given society, thus closing off large segments of the labor market to women. This would lead to the overcrowding of women into the segments that are deemed socially acceptable, which would be consistent with the observed high unemployment rates and the wage penalties women experience (Assaad and ElHamidi 2009, Assaad, Hendy and Yassine 2014).

---

<sup>7</sup> This review is based in part on Assaad (2014)

Some recent empirical work examined the macro and micro-level determinants of female participation in selected Arab Countries. Spierings, Smitts and Verloo (2010) examined individual and household level determinants as well as societal determinants captured at the district-level. The individual and household factor they accounted for include own education, partner's education, care duties and the presence of alternative care givers, measures of family traditionalism, such as extended family arrangements, age difference between couples and age at first birth. The district-level variables attempted to capture economic development and the structure of opportunities as well as societal norms. They measure economic development by means of a summary variable of the major household assets households in their sample. They construct a traditionalism index at the district level based on the percentage of households with polygynous marriages, the percentage of extended family households and the average household size. They estimated multi-level logistic models to examine the relative importance of factors at the individual, household and district levels on data from PAPFAM and DHS surveys, jointly, for six Arab countries, Algeria, Egypt, Jordan, Morocco, Syria and Tunisia. Their findings at the individual and household level are in line with expectations and previous findings, namely that education raises women's participation significantly, the presence of a living partner and children reduces it, so do higher care-giving loads. They find that partner's education does not significantly affect participation, but that partner's occupation does (lowest for agriculture and highest for white collar). The age difference between partners, which they use as an indicator of traditionalism, reduces participation, as does being part of a polygynous marriage. At the district level, the results are less compelling. Economic development does have a positive effect on participation, but, contrary to their expectations, the proportion of non-agricultural employment among men has a negative effect. Urbanization, the gender ratio of secondary education, and the traditionalism index have no statistically significant effects at the district level.

A major gap in the empirical literature on female labor force participation in MENA has been in research that analyzes trends in participation using microdata to correct for compositional shifts. Because microdata from comparable surveys in multiple years had so far been mostly unavailable, much of the discussion of trends in the literature relies on aggregate data (cf. Tansel 2001, Tsani et al. 2012). A recent study that makes use of microdata for this purposes is Hendy (2015b). She uses data from the Egypt Labor Market Panel Surveys of 1998, 2006 and 2012 to examines participation trends in Egypt over 25 years and how the determinants of participation have changed over time. She confirms that participation has declined over time for educated women and that much of this decline is due to declining participation for married women.

This paper contributes to the literature by attempting to fill the gap relating to ascertaining trends in participation and the factors behind these trends. We use a unique trove of micro-data spanning a decade

and a half from four MENA countries to control for compositional differences and simulate participation trends in various type of employment and unemployment in each country.

## **2. Data**

We compiled and harmonized microdata from official labor force surveys in the four countries spanning the period from 2000 to 2014. The longest series of surveys is available for Egypt where we have a continuous series of Labor Force Surveys from 2000 to 2014 (CAPMAS various years). For Jordan we have data from the Employment and Unemployment Survey for 2000-2003, 2005-2010 and 2013 (DoS various year). For Algeria, we have data from 2001 to 2007 and 2010 (ONS various years). Finally for Tunisia, we have data from 2005 to 2008 and 2010 to 2013 (INS various years).

## **3. Methodology and Analysis**

The main analysis consists of estimating a series of multinomial logit mode on a polychotomous outcome variable indicating five different labor market statuses, namely public sector employment, private sector wage work, non-wage work (which includes self-employment and unpaid family work, as well as small number of employers), unemployment and non-participation. The explanatory variables we include in these models are age and age squared, own education (four categories), marital status (ever married vs. never married), and region (including the urban-rural distinction). These models are estimated separately by country and by year. The estimates from these models are then used to simulate the probability of participation in each labor market states in each country and for every year separately for a never-married and an ever-married reference woman who is university-educated, lives in an urban area in the region that includes the capital (the urban part of the Central region in Jordan, Greater Cairo in Egypt, the urban part of the North-Central region in Algeria, and urban Greater Tunis in Tunisia). The samples for the four countries are composed of women aged between 20 and 59 years. We also compute 95% confidence intervals around these simulated probabilities. We use these over-time estimates to compare the trends of participation in each labor market state across the four countries.

## **4. Rising Educational Attainment but Stagnant Participation: A Paradoxical Trend**

We start this section by examining the substantial progress made in the four countries under consideration in terms of educational attainment and the essential closing if not reversal of the gender gap. As shown in Figure 1, the average years of schooling for both men and women have increased steadily with

birth cohort in all four countries. The first among the four countries to reach gender parity in years of education was Jordan where parity was reached as early as the 1970 birth cohort. By the 1980 cohort women in Jordan had already surpassed men in terms of average years of schooling, but men began to catch up again and parity was re-established at an average of 12 years of schooling by the 1985 cohort, which is the last cohort we consider. Gender parity was achieved next in Algeria by the 1982 birth cohort, and in Tunisia by the 1989 birth cohort, both at about 10 years of education on average. Egypt is just short of gender parity, but is moving in this direction as well. Figure 2 shows the proportion of individuals attaining an above secondary and a secondary (but less than above secondary) level of education by year of birth and sex in the four countries under consideration. It is notable that in all four countries the proportion of women with above secondary education has already exceeded the proportion of men at that level of attainment. Again, this happened fairly early in Jordan (by the 1970 birth cohort). By the 1985 birth cohort, nearly 40% of Jordanian women have a post-secondary education, compared to just over 30% of men. Again, Algeria came next with the proportion of post-secondary women exceeding that of men prior to the 1980 birth cohort. However, the fastest gains in the proportion of postsecondary graduates among recent cohorts have been in Tunisia, where the proportion has reached 33% among women and only 23% among men born around 1989. Gender parity in the proportion of postsecondary graduates was reached most recently in Egypt, where nearly 28% of the 1987 cohort of women have post-secondary education as compared to about 26% of men.

Given the strong positive relationship between female education and female labor force participation, the expectation was that such rapid increases in educational attainment would translate into rapid increases in female participation. This has not been the case. Figure 3 shows the trend in female labor force participation and the unemployment rate in each of the four countries from the early 2000s. Algeria is the only country that experienced an increasing trend in participation, albeit from very low initial rates. This was coupled with a decreasing trend in unemployment, suggesting that the female employment rate was actually rising there. Egypt has a slowly rising female participation rate, with rising female unemployment rates since the mid-2000s.<sup>8</sup> Notably much of the increase in participation and unemployment occurred after the January 25<sup>th</sup> uprisings. These trends indicate that the increase in participation in Egypt was clearly not due to increasing employment opportunities for women. Jordan initially saw a flat participation trend with rising unemployment, followed by a declining participation trend

---

<sup>8</sup> There is a break in the Egyptian data in 2007 due a change in data collection methodology. We therefore fit linear trends separately for the periods before and after the break.

with flat unemployment.<sup>9</sup> Again, this points to a reduction in employment rates in Jordan. Finally Tunisia exhibits a very slow increasing trend in participation from 2006 to 2013, with a rapidly rising unemployment rate. The increase in unemployment in Tunisia began before the Tunisian revolution, but made a substantial jump in 2011, only to subside a bit in 2012 and 2013. The overall trend, however, reveals a substantial decline in employment opportunities for women in Tunisia since 2006.

We move next to an examination of trends in participation and unemployment by educational attainment for women in all four countries. As shown in Figure 4, participation increases strongly with education in each of the four countries, especially at the tertiary level of education. There is also a strong positive relationship between education and unemployment, with the exception that, in Egypt, unemployment rates are higher for secondary educated women than for those with tertiary education. Unemployment among tertiary educated women is exhibiting a rising trend in all countries, reflecting the rapid increase in the supply at that level without a commensurate increase in employment opportunities. In Algeria, participation rates are flat for all educational levels, which means that the rising trend observed in Figure 3 was due to a compositional shift toward the more educated groups. The recent increase in unemployment rate for the tertiary education group in Algeria is in contrast to the declining unemployment rates for all other groups. In Egypt, participation rates are clearly falling for both the secondary and tertiary education groups and, as mentioned previously, the unemployment rate is rising rapidly for the tertiary group. In Jordan, like in Egypt, participation is declining among the two most educated groups and unemployment rates are essentially flat after having risen in the early part of the period. In Tunisia, participation rates are rising somewhat among the most educated, but unemployment rates for this group are rising even faster. They increased by over 10 percentage points from 2005 to 2011. These trends taken together all suggest a severe contraction of employment opportunities among educated women in all four countries, especially those educated at the tertiary level, at the same time that their numbers were soaring.

We argue that the deterioration in employment opportunities for educated women can be attributed to the shifting labor market structure facing educated new entrants in all four countries in the era of structural adjustment. We examine this shifting structure by looking at the type of jobs educated new entrants were able to obtain since the mid 1970s in each country, exploiting data on characteristics of first jobs and date of entry into the labor market from various surveys (Figure 5). We do this for all new entrants with secondary education or above (left panel) and female new entrants with that level of education (right panel). As shown in Figure 5, all countries have experienced a sharp decline in the proportion of public sector

---

<sup>9</sup> In Jordan as well there was a break in the data in 2007 due to changes in the way the sampling frame was constructed. We therefore show trend lines before and after this break.

employment for educated new entrants since the mid 1970s. In the mid 1970s 60-80% of educated new entrants were obtaining employment in the public sector. By 2010, this proportion had dropped, most rapidly in Egypt (down to 25%) and most slowly in Algeria (to 55%). Egypt was the first to experience the decline as early as the late 1970s, followed by Tunisia in the early 1980s and then by Jordan and Algeria in the late 1980s. Algeria, Egypt and Jordan experienced a slowing, if not halting, of the decline in the 2000s, but Tunisia saw an acceleration of the decline from 2005 to 2010. Female new entrants, who were even more reliant on public sector employment also experienced a sharp decline in the share of public employment in first jobs. They continue to be more reliant on such employment in the 2000s than the average worker in both Algeria and Egypt.

The decline in public sector employment was not made up by commensurate increases in the proportion of private formal wage employment. Although such employment increased substantially in Jordan and Tunisia, it remained very anemic in Egypt and Algeria, where it was only making up between 10-15% of overall employment for new entrants by 2010. However, even in Jordan and Tunisia where private formal employment was more dynamic, the increase in the proportion of private formal employment is only making up a fraction of the decline in the proportion of public employment. The trends for all new entrants is reflected for female new entrants albeit with greater fluctuations due to the smaller sample sizes.

Much of the slack in employment has been taken up by private informal wage employment.<sup>10</sup> The role of this type of employment is most pronounced in Egypt, where it was absorbing over 40% of educated new entrants by 2010, but it also plays a substantial role in other countries where it absorbs in the vicinity of 20% of educated new entrants. Private informal wage employment is typically an inhospitable kind of employment for educated young women. This is reflected in the right panel, where the role of that sector is much more limited for female new entrants. In Egypt, Algeria and Tunisia, the share of female new entrants entering this type of employment is about half the share of all new entrants.

Only in Jordan does the share among females approach the share among all new entrants.

The preceding analysis has clearly shown that the economic restructuring that occurred away from public sector employment in all four countries did not succeed in creating sufficient formal private sector jobs to compensate for public employment opportunities. The resulting growth of informality created an adverse labor market environment for educated women, many of whom preferred to either remain unemployed or simply withdraw from the labor force altogether. There were clear variations in this pattern among the four countries. Algeria experienced much less of a decline in public sector employment

---

<sup>10</sup> The residual category, which is not shown in the figures, is non-wage employment, which includes selfemployment and unpaid family labor.

opportunities than the other countries, but there is evidence that with the latest sharp declines in oil prices, the Algerian government is getting ready to substantially cut recruitment into the public sector.<sup>11</sup> Jordan and Tunisia were much more successful than Egypt in creating opportunities in the formal private sector, even though these opportunities were not sufficient to absorb all the educated new entrants no longer being accommodated in the public sector.

## **5. Simulation Results on Participation Trends by Type of Employment for Educated Females**

As indicated in the methodology section we estimated a series of annual multinomial logit models by country on a polychotomous outcome variables that has five states: (i) public sector employment, (ii) private wage employment, (iii) non-wage employment, (iv) unemployment, and (v) non-participation. We then use these models to undertake simulations of the probability of participating in each of these states by year and country separately for never married and ever married women of a given profile, as a way to correct for compositional differences in the working age population. The profile we simulate for is a 30-year old, university educated female, who lives in an urban area in the region of her country that includes the capital city. Illustrative results from the regression models for the year 2010 by country are shown in Appendix Table 1. The simulations themselves are presented graphically in two ways. First, we show separate results for each country and labor market state, together with the 95% confidence intervals around our estimates in Figure 6. We also fit four-period median spline through the estimates to smooth the trend over time. Second, we show in Figure 7 the results of the simulation for all four countries on the same chart to facilitate comparisons.

As mentioned above, we will use results from 2010 to illustrate the regression results, keeping in mind that similar regressions are run for each year for which we have data. Appendix Table 1 shows odds ratios (OR) from multinomial logit regressions. The reference state for the dependent variable is inactivity. The probability of each of the other four states exhibits a concave relationship with age. Both the probability of government employment and unemployment rise rapidly with age relative to the probability of inactivity in all four countries. The next highest set of odds ratios for the age variable is for private wage work. We set the reference level for educational attainment to be university education.

Relative to that level, all other educational levels have much lower odds of government employment. They also have lower odds of private sector wage employment in Egypt and Jordan. In Algeria, those without certificates and those with less than secondary certificates have lower odds of private wage employment, but there is no significant difference in odds of that kind of employment between those with secondary

---

<sup>11</sup> News Press, November 28, 2015.

education and those with university education. In Tunisia, the pattern is quite different. Women with lower levels of education have higher odds of private wage employment relative to those with university education. The odds of non-wage employment do not exhibit a regular relationship with education in all four countries. In Algeria, they are highest for secondary educated women and lowest for university-educated women. In Egypt, they are highest for women with no education and lowest for women with less than secondary education. In Jordan, they are highest for university educated women and lowest for those with less than secondary education. In Tunisia, they are highest for secondary educated women and lowest for those with no education or less than secondary education. Like the probability of government employment, the odds of being unemployed is strongly increasing with education in all four countries. Having never been married is positively associated with the odds of all four labor market states relative to the reference state inactivity. The only exception to this rule is that being married is associated with higher odds of being in non-age work in Egypt relative to inactivity.

This pattern generally confirms that marriage is associated with lower levels of participation in general. However, the odds of two labor market states are particularly strongly associated with not being married, namely private wage work and unemployment, suggesting that upon marriage women leave private sector wage employment and, if unemployed prior to marriage, they quit seeking work.

We move to a country-by-country discussion of the simulation results, after which we compare trends across countries. As shown in Panel A of Figure 6, the probability of government employment for university-educated women in Algeria was quite stable from 2001 to 2007 and then declined substantially by 2010. This declining trend is likely to continue in Algeria as falling oil prices put the government budget under severe fiscal pressures. In a recent announcement, the minister of labor in Algeria announced a freeze on recruitment in the civil service.<sup>12</sup> The probability of private wage work has generally been low for female university graduates in Algeria, especially for married graduates. It has increased slightly in the mid-2000s, but the trend has flattened again in recent years. Because the probability of non-wage work is extremely low for university graduates in all four countries, we have blown up the scale of this part of the figure 20-fold. The expanded scale shows an increase in this probability over time in Algeria, but it remains under 2 percent for female university graduates. After an initial decline, the probability of unemployment in Algeria began increasing since 2005. Finally the probability of non-participation is showing a generally increasing trend, interrupted by a few years of decline from 2005 to 2007, a time when government employment was rising. In sum, inactivity and unemployment in Algeria have both risen significantly when government employment opportunities for university-educated women were curtailed.

---

<sup>12</sup> News Press, November 28, 2015

The results for Egypt are shown in Panel B of Figure 6.<sup>13</sup> Unlike Algeria, Egypt has experienced a slow declining trend in the probability of government employment for university-educated women throughout the 14-year period for which we have data, with the exception of slight increasing trend from 2004 to 2006. The trend in the probability of private wage work was essentially flat in Egypt, but is almost three times higher for never married women than for ever-married women. The probability of nonwage work is very low in general (note the change in scale), but is rising for married women in recent years. The probability of unemployment has been rising for both married and unmarried women in Egypt since 2008. It is now higher than the probability of either public sector or private sector work for either married or unmarried women with university education. The probability of inactivity is not exhibiting a regular trend in Egypt. It fluctuates between 20 and 305 for never married university-educated women. For ever-married women it initially increased from 50% to over 60% and then declined again to at or below 50%. The pattern in Egypt therefore is that the decline in public sector employment opportunities and the lack of growth in private sector opportunities is essentially showing up as increased unemployment.

University-educated female in Jordan have experienced a sharp decline in the probability of government employment in the period under consideration. As shown in Panel C of Figure 6, the probability of government employment for the reference women in Jordan has declined from nearly 55 percent in 2000 to under 30% in 2013, and the extent of decline appears to be virtually identical for never married and ever-married women.<sup>14</sup> Private sector wage work did increase somewhat for never-married women, but is far from making up the decline in public sector employment. Again, the probability of non-wage work is very low and generally exhibits a declining trend. There was a significant increase in the probability of unemployment in Jordan in the first half of the 2000s, followed by a very slight declining trend in the second half. The most notable pattern in Jordan is the secular increase in the probability of non-participation throughout the period under consideration. Again, the reduction of opportunities in the public sector shows up primarily as reduction in participation rather than an increase in unemployment in Jordan.

Like in Jordan, Tunisian university-educated women experienced a sharp decline in the probability of government employment, which was nearly halved over the course of 8 years (2005-2013) for both never married and ever-married women. In contrast to the other three countries, however, private wage work initially increased rapidly in Tunisia, but experienced a sharp drop right at the time of the 2011 revolution, and was flat thereafter. Even prior to the negative shock of the revolution, its increase was insufficient to

---

<sup>13</sup> Note that we break the median spline in 2007 to reflect the change in data collection methodologies that occurred in Egypt at that point.

<sup>14</sup> We break the spline in 2007 in Jordan to reflect the change in data collection methodology that occurred then.

make up even a fraction of the decline in public sector employment. Non-wage work increased as well, but from very low levels. Like private wage employment, it experienced a substantial negative shock at the time of the 2011 revolution, but then recovered somewhat. These negative shocks due to the revolution manifested themselves as sharp increases in the probability of unemployment, which went from about 25% to nearly 45% for never married women and from about 10% to over 20% for evermarried women. The probability of non-participation declined steadily in Tunisia over the period under consideration, but less so for ever-married women than for never married women. Thus, in the case of Tunisia the adverse opportunity structure was experienced as rising unemployment probabilities rather than rising inactivity.

Bringing the results of all four countries together in Figure 7, we only show the median splines rather than the individual estimates and confidence intervals. First, note the relatively higher reliance of university-educated women on public sector employment in Algeria and Jordan relative to Egypt and Tunisia, which experienced their structural adjustment process earlier. However, we note the continued heavy reliance of married Tunisian women on the public sector. Private sector wage employment is low in all four countries for ever-married women, but is highest in Egypt among never-married women. The probability of unemployment is rising everywhere, but nowhere as fast as in Tunisia. The probability of inactivity for university-educated women was initially lowest for never-married women in Jordan, but rose to catch up with the other countries. For ever-married women, the probability of inactivity is highest and relatively flat in Algeria and Egypt and lower but rising in Jordan.

## **6. Conclusions**

We argued in this paper that the failure of female labor force participation to rise in the four MENA countries under consideration despite the rapid increases in educational attainment is due to the dramatic deterioration of the employment opportunities available to educated women. The decline in public sector opportunities observed clearly in all four countries was only weakly compensated by an increase in wage employment in the private sector. This inability of the private sector to make up for lost opportunities in the public sector is particularly pronounced for married women for whom private sector wage employment is very hard to reconcile with their familial responsibilities. In two countries, Algeria and Jordan, the adverse opportunity structure resulted in declines of participation. In the case of Egypt, there was no particular trend in participation, but the probability of unemployment increased substantially. In the Tunisian case, participation actually increased, but that increase was entirely made up of increases in unemployment.

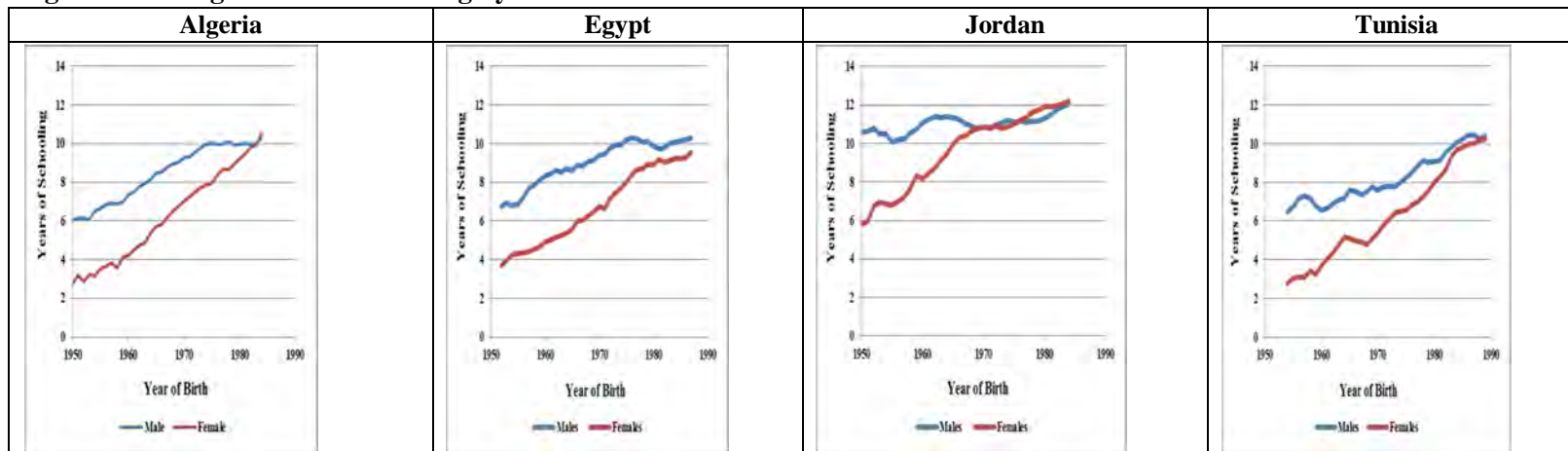
Understanding the driving forces behind the trend in female labor force participation in MENA is essential to devising policies to increase women's involvement in the economy. For decades, increasing

opportunities in the public sector for educated women had brought these women into the paid labor force in large numbers and, in turn, provided a powerful impetus for increased educational attainment. With the slowdown in the growth of public sector employment, if not its retrenchment, employment opportunities for educated women have been seriously curtailed. Based on these trends, we argue that female economic opportunities are increasingly constrained by demand-side factors in MENA rather than the supplied-side factors traditionally emphasized in the literature.

## References

- Al\_Qudsi, S. (1998): "Labour Participation of Arab Women: Estimates of the Fertility to Labour Supply Link". *Applied Economics*, 931\_941, 30.
- Assaad, Ragui and Fatma El-Hamidi (2009), Women in the Egyptian Labor Market: An Analysis of Developments, 1988–2006. In *The Egyptian Labor Market Revisited*. Ragui Assaad (Ed.). Cairo: American University in Cairo Press, pp. 117–56
- Assaad, R., & El-Hamidi, F. (2001). Is all work the same? A comparison of the determinants of female participation and hours of work in various employment states in Egypt. *The economics of women and work in the Middle East and North Africa*, 4, 117-150
- Assaad, R., Hendy, R., & Yassine, C. (2014). "Gender and the Jordanian Labor Market." In *The Jordanian Labor Market in the New Millennium*. R. Assaad (Ed.). Oxford: Oxford University Press.
- Assaad, R., & Zouari, S. (2003). Estimating the impact of marriage and fertility on the female labor force participation when decisions are interrelated: Evidence from urban Morocco. *Topics in Middle Eastern and North African Economies*, 5.
- Hendy, R. (2015a). "Women's participation in the Egyptian labor market: 1998-2012." In *The Egyptian Labor Market in an Era of Revolution*. R. Assaad and C. Krafft (Eds.). Oxford: Oxford University Press.
- Hendy, R. (2015b). "A Quarter Century of Changes in Labor Force Participation." ERF Working Paper No. 973. Economic Research Forum, Cairo, Egypt.
- Hendy, R. (2011). On Marriage and Labor Market Transitions: A Structural Dynamic Model. The World Bank, Washington DC (mimeo)
- Tansel, A. (2001). Economic Development and Female Labor Force Participation in Turkey: Time-Series Evidence and Cross-Province Estimates." Middle East Technical University Working Paper.
- World Bank (2015) World Development Indicators. World Bank, Washington DC.
- World Economic Forum (2014). *The Global Gender Gap Report 2014*. Geneva: The World Economic Forum.

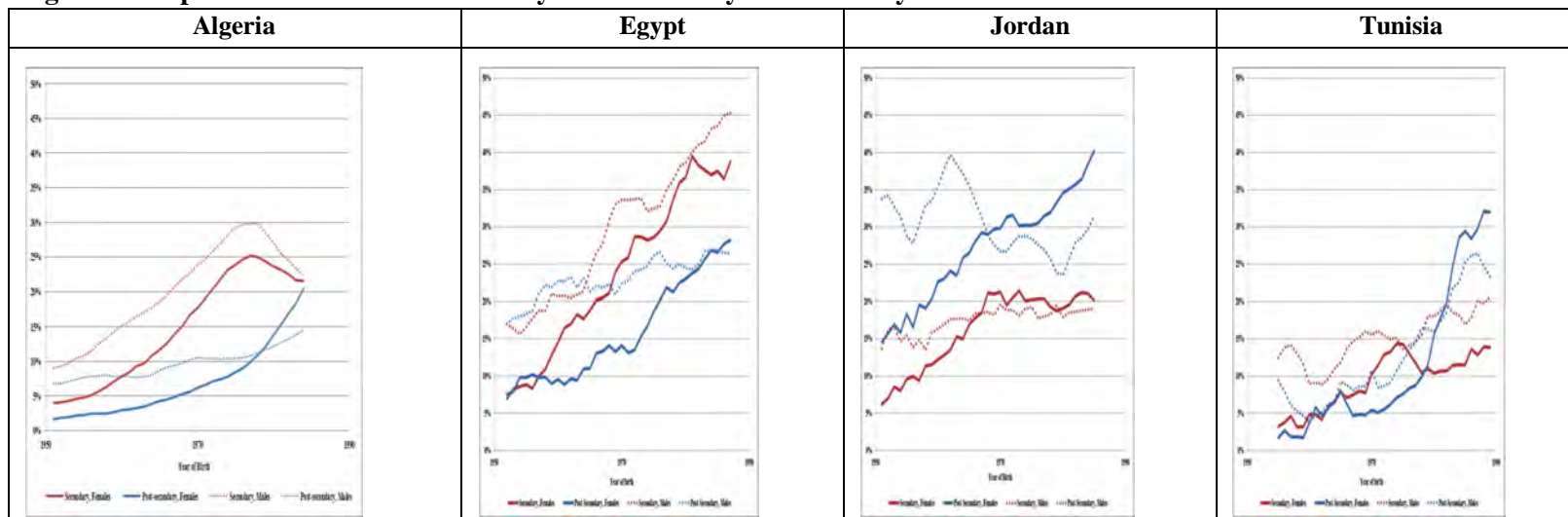
**Figure 1. Average Years of Schooling by Year of Birth and Sex**



Source: Computed by the authors from the official labor survey in Algeria, the Egypt Labor Market Survey of 2012 for Egypt, the Jordan Labor Market Panel Survey of 2010 for Jordan and the Tunisia Labor Market Panel Survey of 2014 for Tunisia.

Note: curves are smoothed using a 5-period moving average trendline.

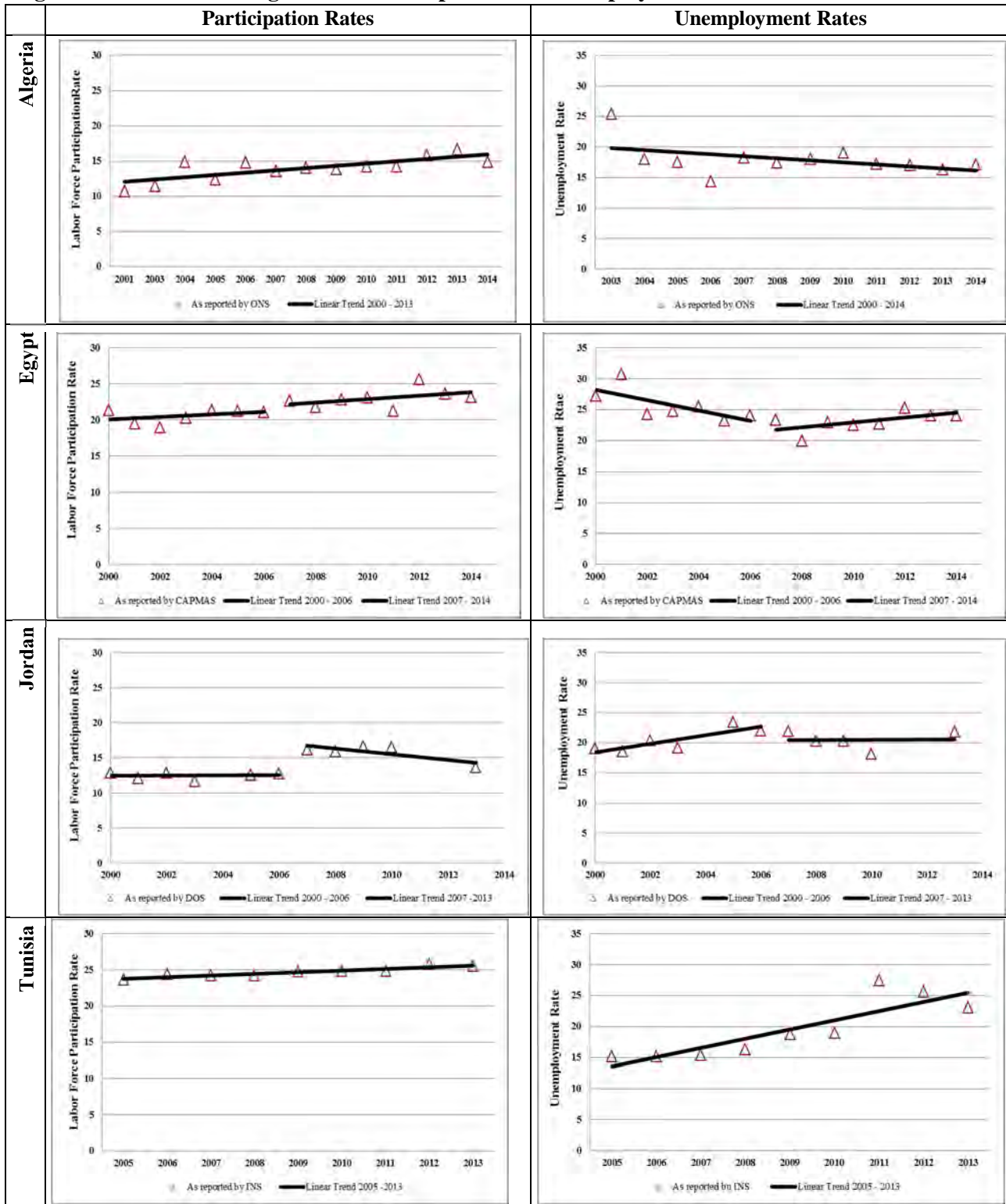
**Figure 2. Proportion with Above Secondary and Secondary Education by Year of Birth and Sex**



Source: Computed by the authors from the official labor survey in Algeria, the Egypt Labor Market Survey of 2012 for Egypt, the Jordan Labor Market Panel Survey of 2010 for Jordan and the Tunisia Labor Market Panel Survey of 2014 for Tunisia.

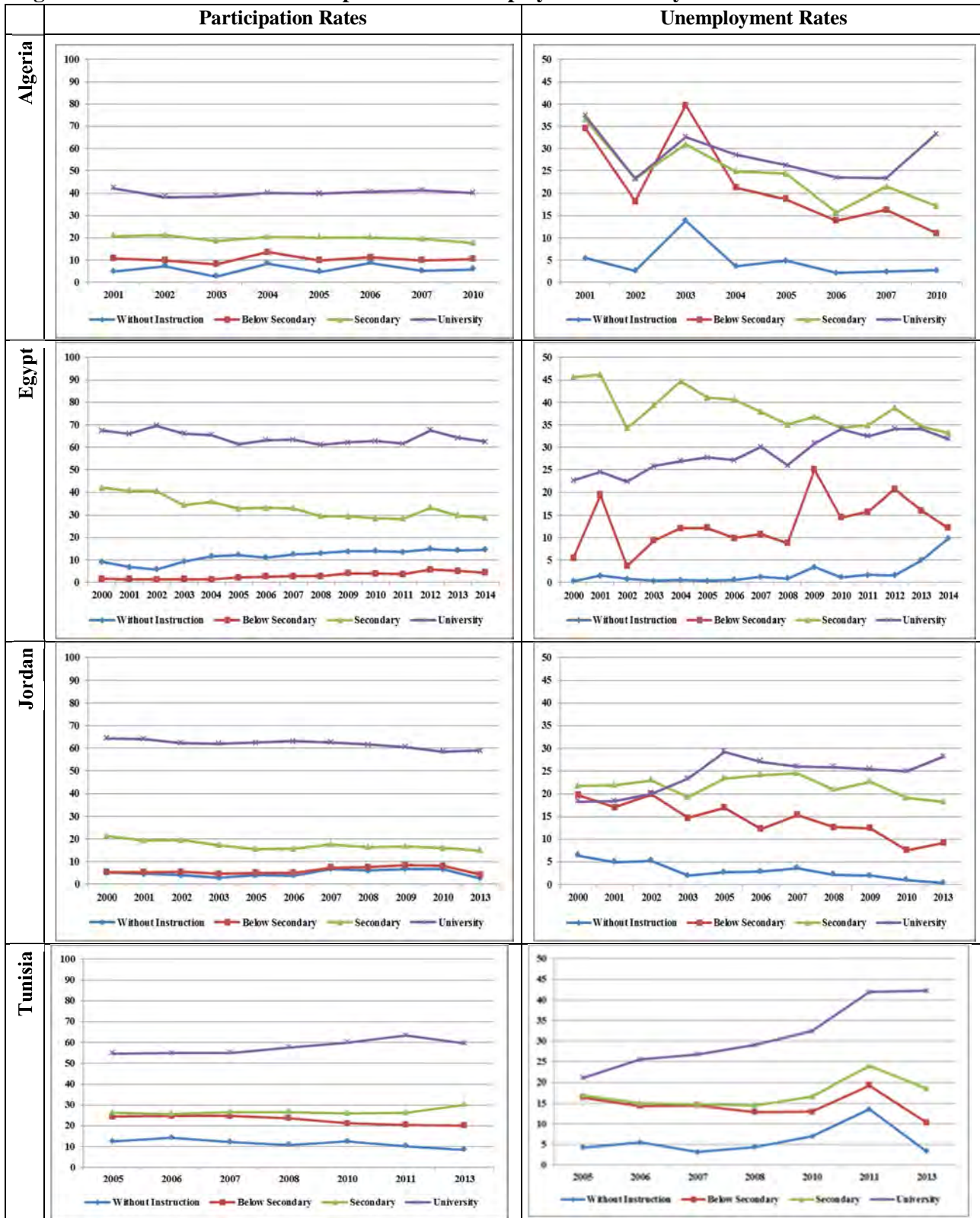
Note: curves are smoothed using a 5-period moving average trendline.

**Figure 3. Trends in Average Female Participation and Unemployment Rates.**



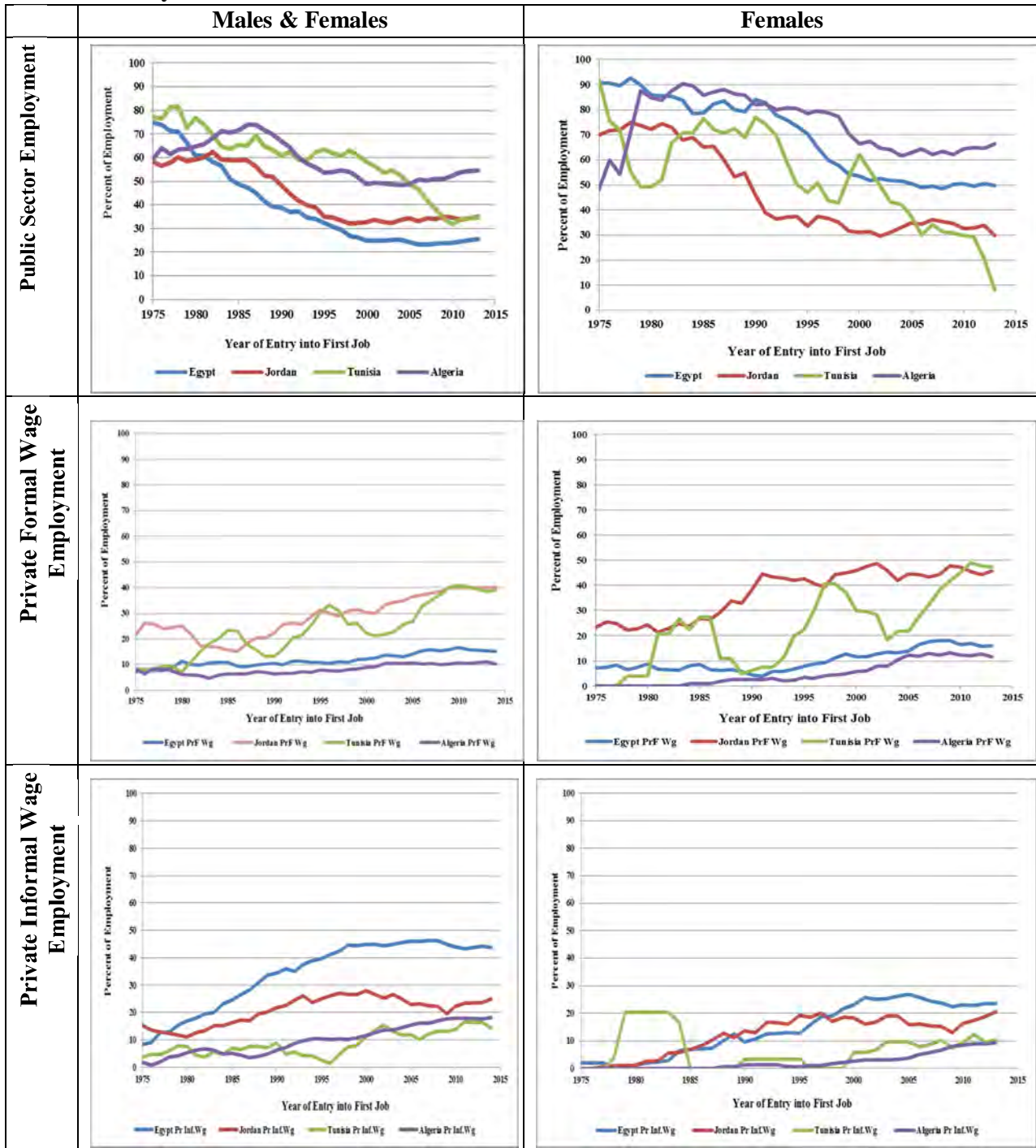
Source: Computed by the authors based on data from official labor force surveys in the four countries. See data section in text for details.

**Figure 4. Trends in Female Participation and Unemployment Rates by Educational Attainment**



Source: Computed by authors based on data from official labor force surveys in each of the four countries. See data section in text for details.

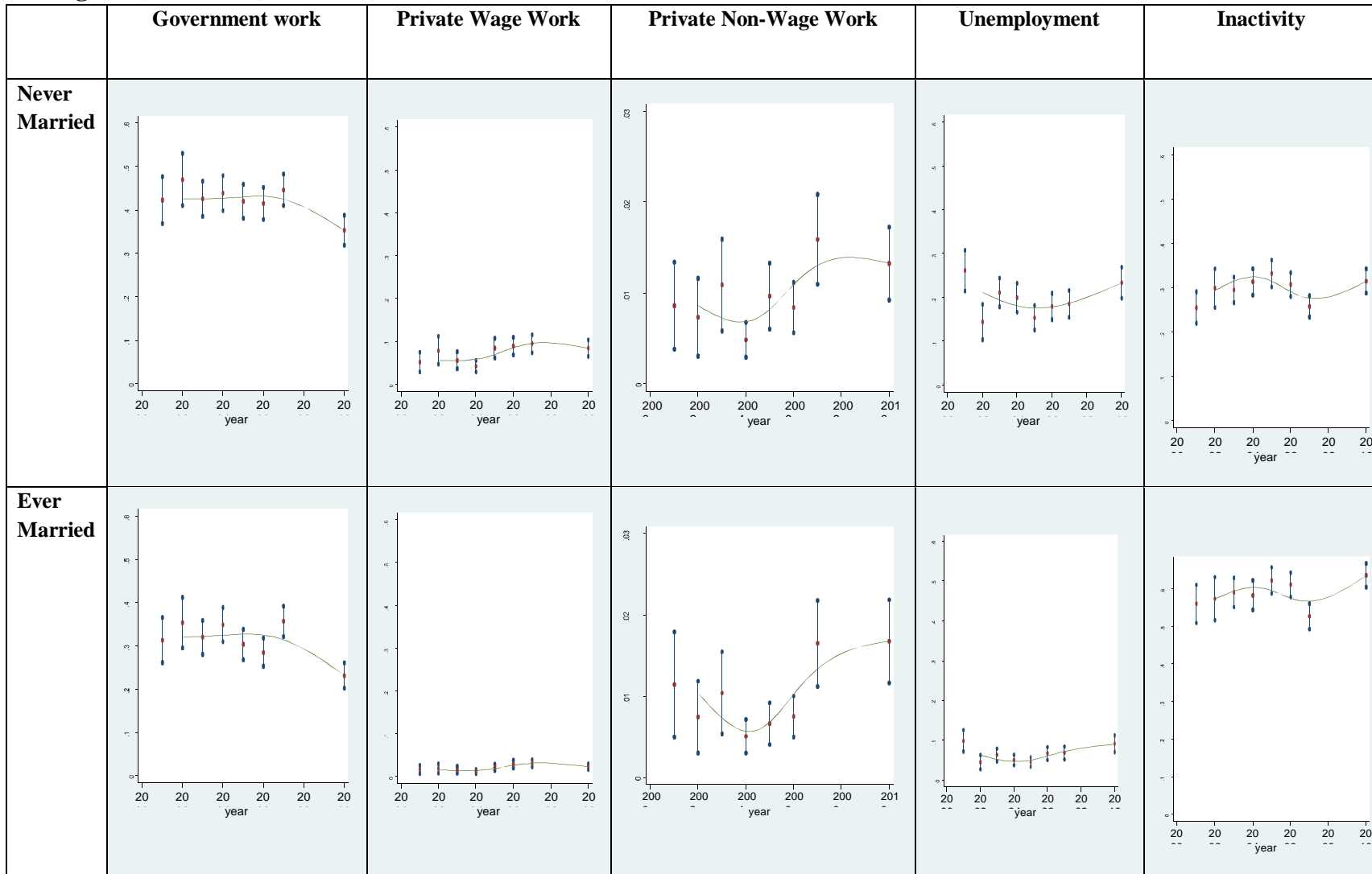
**Figure 5. Proportion of Employment in Different Sectors for the First Job by Year of Entry. Individuals with Secondary Education or Above.**

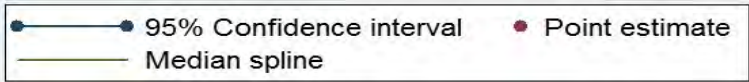


Source: Computed by the authors from the official labor force survey in Algeria (2010), the ELMPS 2012 for Egypt, the JLMPS 2010 for Jordan and the TLMPS 2014 for Tunisia.

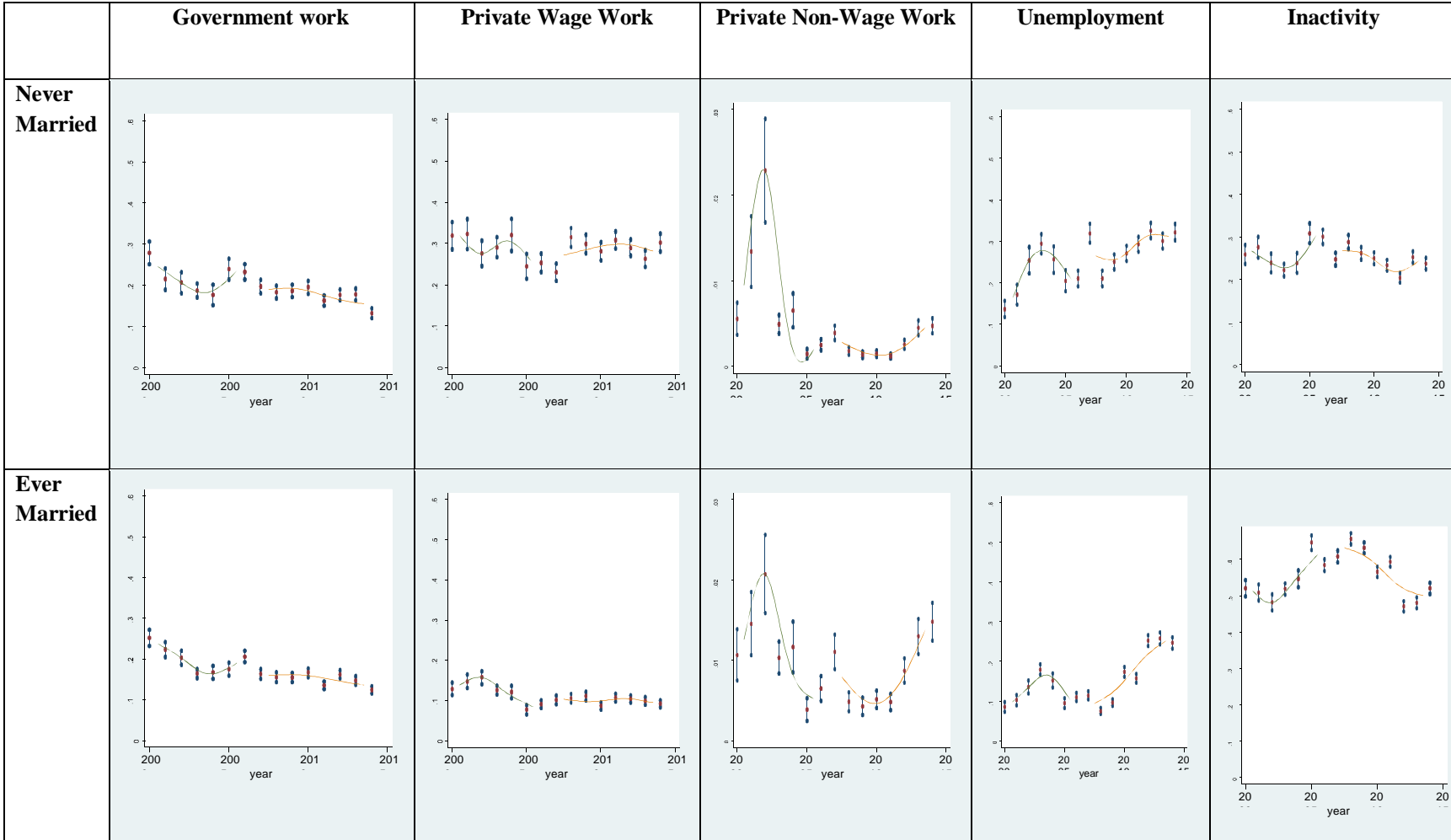
Note: A six-period moving average trend line is used to smooth the fluctuations in the data.

**Figure 6. Simulated Probabilities of Five Labor Market States for a 30-Year Old University-Educated Female, by Country Panel**  
**A: Algeria (2001-2010)**



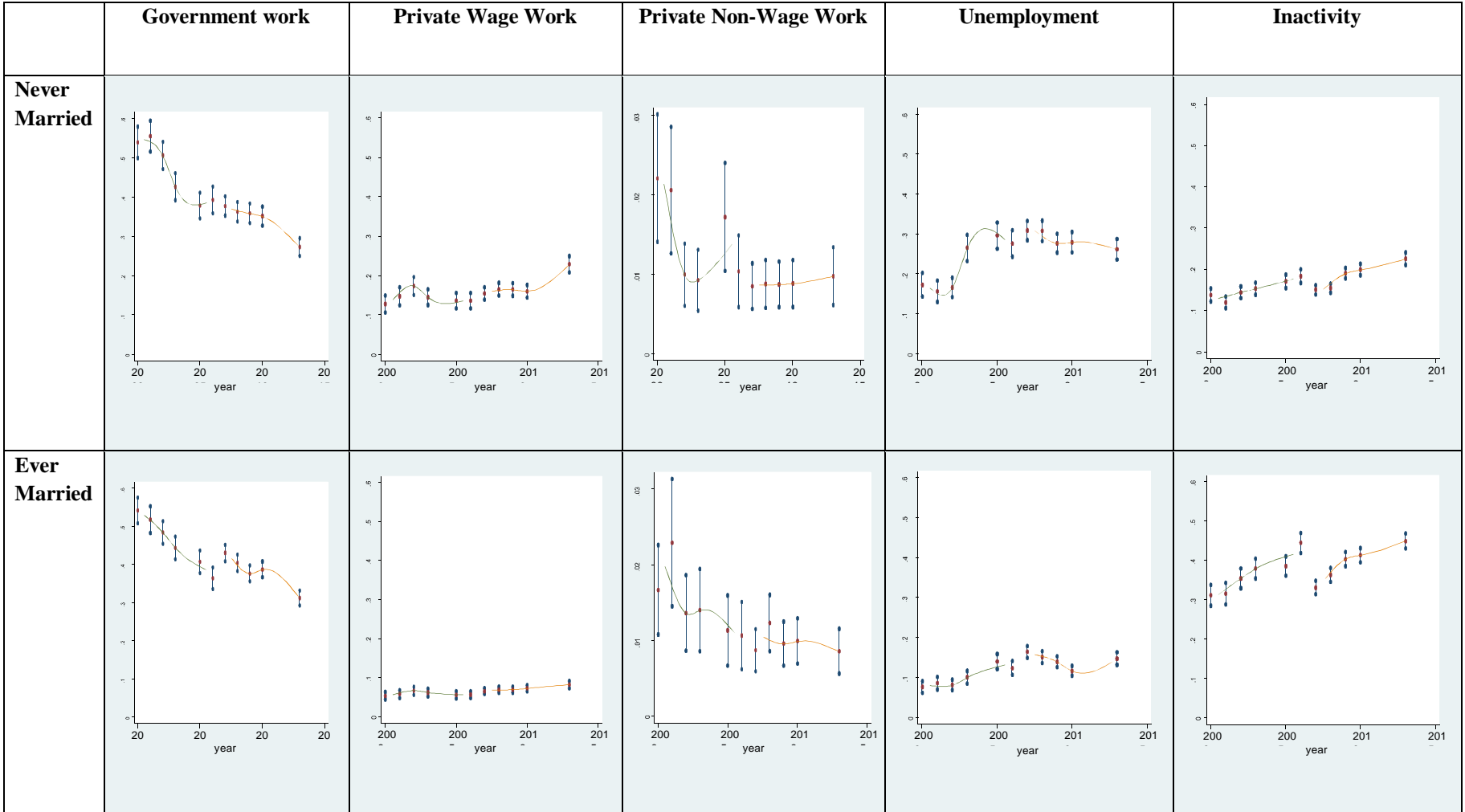


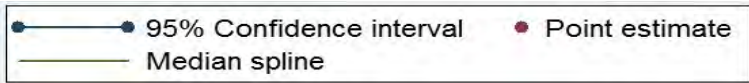
**Panel B: Egypt (2000 - 2014)**



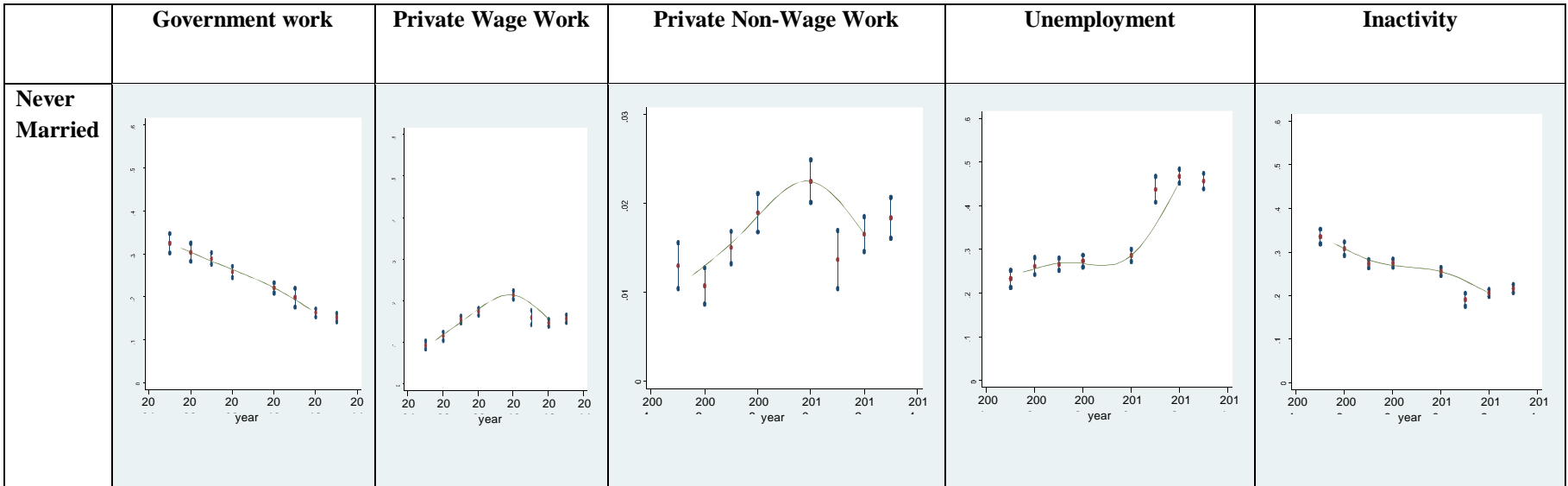


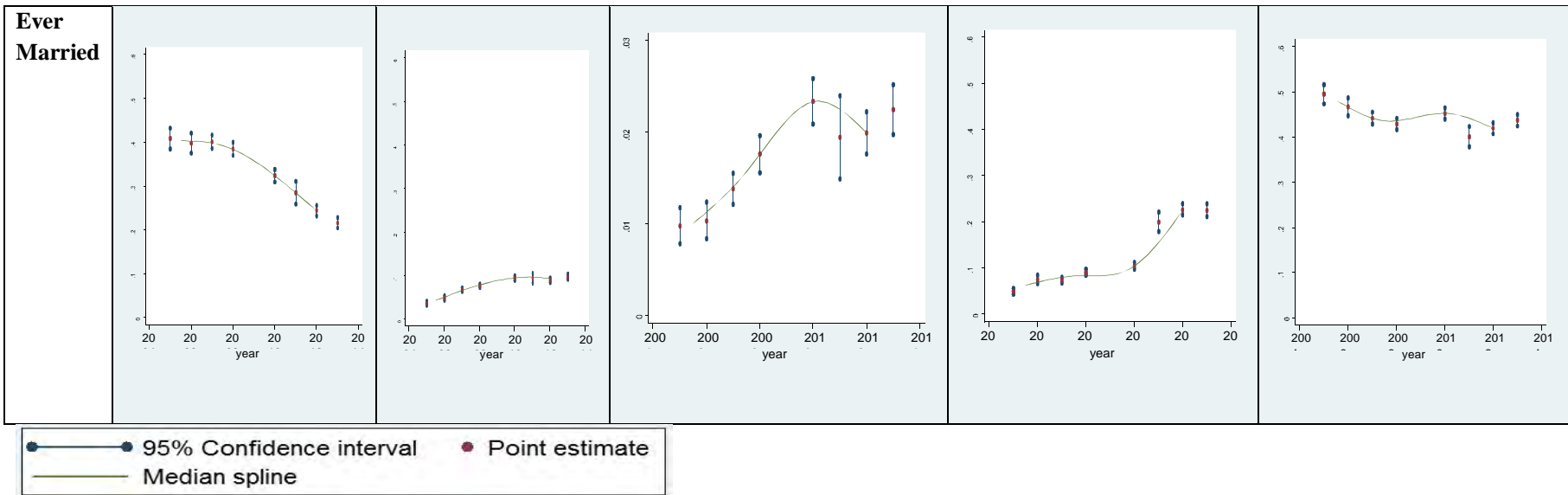
**Panel C: Jordan (2000 - 2013)**





**Panel D: Tunisia (2005 - 2013)**



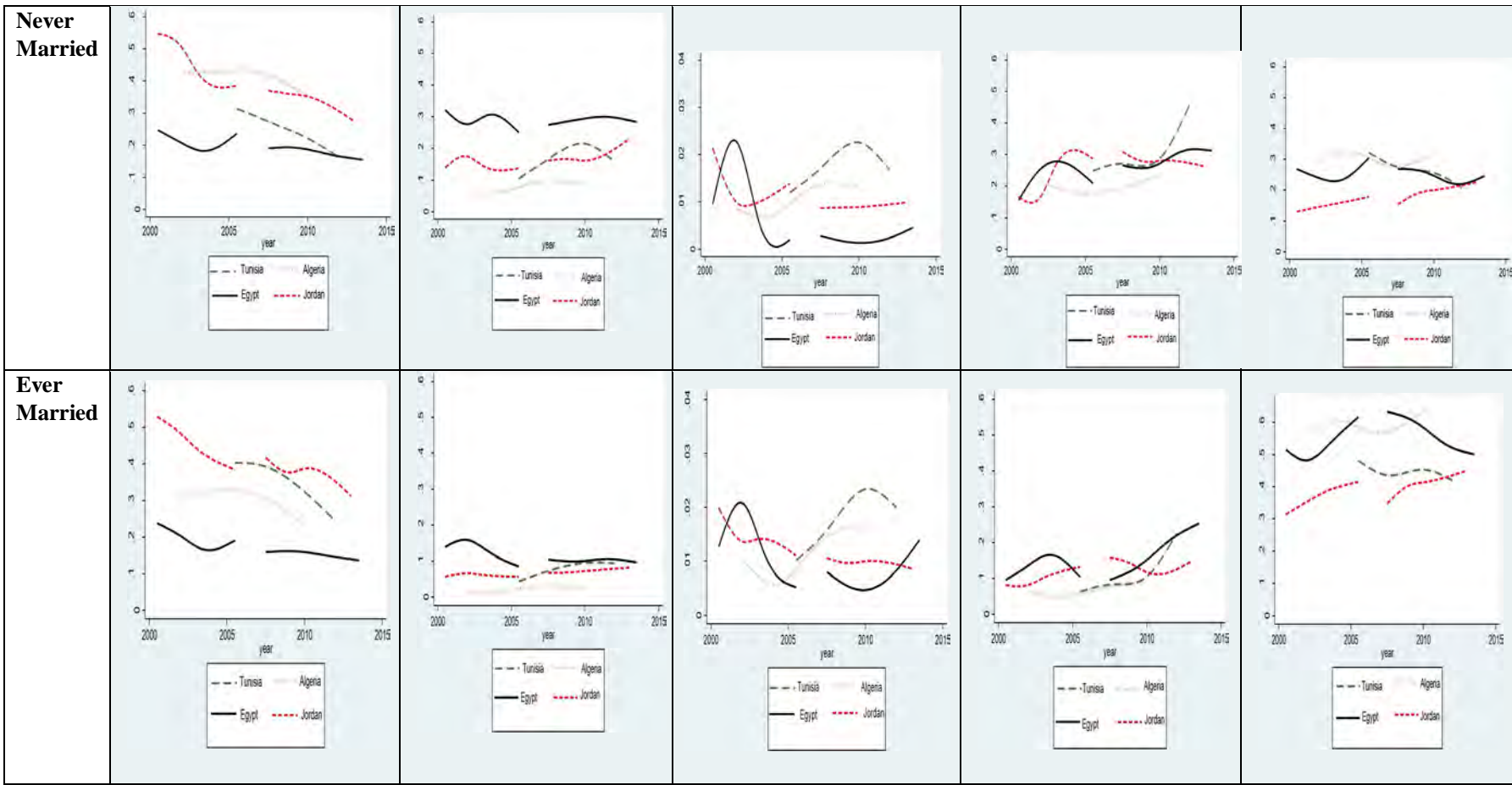


Source: Computed by authors based on data from official labor force surveys in each of the four countries. See data section in text for details.

Note: Simulations are carried out for a 30-year old university-educated female residing in an urban area in the region of her country that includes the capital city. Four-period splines are used to smooth fluctuations in the simulation results.

**Figure 7. Simulations of the Probability of Participation by Type of Participation for Never Married and Ever Married Women in Algeria, Egypt, Jordan and Tunisia – Consolidated Chart**

	Government work	Private Wage Work	Private Non-Wage Work	Unemployment	Inactivity
--	-----------------	-------------------	-----------------------	--------------	------------



Source: Computed by authors based on data from official labor force surveys in each of the four countries. See data section in text for details.

Note: Simulation are carried out for a 30-year old university-educated female residing in an urban area in the region of her country that includes the capital city. Four-period splines are used to smooth fluctuations in the simulation results.

**Appendix Table 1: Odds Ratios from Multinomial Logit Estimates of the Probabilities of Participation in Government Work, Private Wage Work, Private Non-Wage Work, Unemployment. Reference State: Inactivity. Year: 2010. Females 15-64.**

	Government work				Private Wage Work				Private Non-Wage Work				Unemployment			
	DZ	EG	JO	TN	DZ	EG	JO	TN	DZ	EG	JO	TN	DZ	EG	JO	TN
Age	1.665*** (0.0410)	1.532*** (0.0203)	1.908*** (0.0367)	1.877*** (0.0213)	1.428*** (0.0623)	1.260*** (0.0267)	1.482*** (0.0256)	1.336*** (0.00950)	1.300*** (0.0307)	1.098*** (0.0104)	1.475*** (0.0628)	1.282*** (0.0102)	1.904*** (0.106)	1.615*** (0.0489)	1.490*** (0.0410)	1.676*** (0.0258)
Age squared	0.580*** (0.0185)	0.660*** (0.0110)	0.425*** (0.0114)	0.494*** (0.00702)	0.618*** (0.0393)	0.745*** (0.0212)	0.563*** (0.0142)	0.652*** (0.00642)	0.721*** (0.0221)	0.889*** (0.0108)	0.628*** (0.0347)	0.753*** (0.00740)	0.372*** (0.0342)	0.426*** (0.0218)	0.510*** (0.0224)	0.454*** (0.0111)
<i>Educational Attainment (ref: university)</i>																
No certificate	0.0138*** (0.00187)	0.00188*** (0.000158)	0.00565*** (0.000792)	0.00353*** (0.000229)	0.191*** (0.0465)	0.0977*** (0.00761)	0.224*** (0.0161)	1.070* (0.0406)	1.405** (0.219)	1.415*** (0.114)	0.199*** (0.0365)	0.897* (0.0519)	0.0256*** (0.00722)	0.00939*** (0.00117)	0.0198*** (0.00316)	0.0503*** (0.00344)
Less than secondary certificate	0.0299*** (0.00285)	0.0119*** (0.00142)	0.0115*** (0.000718)	0.00793*** (0.000372)	0.576*** (0.0745)	0.153*** (0.0171)	0.134*** (0.00683)	1.548*** (0.0493)	1.803*** (0.257)	0.599*** (0.0630)	0.159*** (0.0229)	0.890** (0.0496)	0.0777*** (0.00886)	0.0281*** (0.00441)	0.0345*** (0.00212)	0.186*** (0.00670)
Secondary certificate	0.196*** (0.0153)	0.233*** (0.00801)	0.0962*** (0.00395)	0.0963*** (0.00291)	0.935 (0.127)	0.252*** (0.0154)	0.183*** (0.00916)	1.757*** (0.0534)	1.873*** (0.282)	0.778*** (0.0654)	0.224*** (0.0328)	1.181*** (0.0660)	0.294*** (0.0291)	0.331*** (0.0136)	0.118*** (0.00570)	0.290*** (0.00901)
Marital status (ref.: Ever Married)	3.075*** (0.229)	2.935*** (0.156)	1.933*** (0.0867)	1.168*** (0.0398)	7.434*** (0.922)	6.143*** (0.430)	5.201*** (0.216)	3.680*** (0.0773)	1.596*** (0.118)	0.865*** (0.0443)	2.147*** (0.275)	1.765*** (0.0485)	5.160*** (0.563)	6.840*** (0.328)	4.149*** (0.202)	5.816*** (0.205)
Constant	1.11e-05*** (5.15e-06)	3.48e-05*** (9.06e-06)	1.09e-05*** (3.65e-06)	3.27e-06*** (7.18e-07)	6.18e-05*** (4.47e-05)	0.00189*** (0.000740)	0.000260*** (7.65e-05)	0.00122*** (0.000156)	0.000193*** (8.74e-05)	0.00316*** (0.000646)	1.48e-05*** (1.19e-05)	0.000230*** (3.73e-05)	4.25e-06*** (3.56e-06)	0.000231*** (0.000105)	0.00136*** (0.000584)	3.79e-05*** (9.24e-06)
<b>Region x urban/rural dummies</b>	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included
<b>Observations</b>	<b>1558</b>	<b>7720</b>	<b>4592</b>	<b>10806</b>	<b>489</b>	<b>1782</b>	<b>3687</b>	<b>19005</b>	<b>1232</b>	<b>8249</b>	<b>397</b>	<b>10930</b>	<b>809</b>	<b>4784</b>	<b>3048</b>	<b>7792</b>

Source: Computed by authors based on data from official labor force surveys in each of the four countries. See data section in text for details. Note: Separate regressions are run for Algeria, Egypt, Jordan, and Tunisia



The main reason for the drop in participation among educated women is the dramatic drop in public sector employment opportunities.

The growth of private sector formal wage employment only partially made up for the slowdown in public hiring. And these private sector jobs are much less hospitable to women!

Private informal wage employment has also grown significantly, especially in Egypt. This represents an even less hospitable environment for educated women, especially married women.



