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Explaining the MENA Paradox: Rising Educational Attainment, Yet Stagnant Female Labor Force Participation

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ABSTRACT

Explaining the MENA Paradox: Rising Educational Attainment, Yet Stagnant Female Labor Force Participation

Despite rapidly rising female educational attainment and the closing if not reversal of the gender gap in education, female labor force participation rates in the MENA region remain low and stagnant, a phenomenon that has come to be known as the “MENA paradox.” 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.

JEL Classification: J16, J21, J22, J82

Keywords: labor market, female labor force participation, sectoral choice, human capital, public employment, MENA

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1. Introduction

Over the past four decades, countries in the Middle East and North Africa (MENA) have made impressive strides in achieving gender parity in education (World Bank, 2012). Since 1970, countries in the region have recorded the fastest progress in the world in human development (United Nations, 2010). According to the World Bank report (2012), five MENA countries (Oman, Saudi Arabia, Tunisia, Algeria and Morocco) were among the top 10 fastest movers over this period. During the same period, growth rates of key indicators— such as female literacy rate—on average exceeded those of most other developing regions. The region as a whole is close to achieving gender parity in primary and secondary enrollment rates, comparing favorably to Low and Middle Income (LMI) countries worldwide.

Paradoxically, these considerable investments in human capital have not been matched by increases in women’s economic participation (World Economic Forum 2016). Recent data illustrates that the MENA region continues to rank the lowest in the world in terms of women’s economic participation and opportunity (Global Gender Gap Index 2012). Compared to the other developing economies, while more than 50 percent of the female population aged 15 and above participates in the labor market in Sub-Saharan Africa, East Asia and the Pacific, Europe and Central Asia, and Latin America and the Caribbean, the corresponding figure in MENA is only 25 percent. Rates of female labor force participation are low throughout the region; almost all MENA countries have participation rates below the LMI average (World Bank, 2012). The disconnect between rising educational attainment and low and stagnant rates of economic participation has been dubbed by the World Bank as the “MENA paradox” (World Bank 2013).

The very low levels of female labor force participation in the MENA region have been well established. The World Economic Forum’s Global Gender Gap Report of 2016 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 144 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 2016). Region-wide, the share of women in the workforce barely changed from 19 percent in 1990 to 23 percent in 2013 (World Bank 2015).¹ Several countries, such as Egypt, Morocco, and Syria

¹ 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.

have actually experienced a decline in female participation over the same period according to the ILO modeled estimates.²

Where there has been an increase in participation, it typically 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 the Middle East and North Africa (MENA) region, we argue that the failure of participation to increase with educational attainment is due to adverse developments on the demand side of the ledger rather than to changes in these supply-side factors. If anything, we argue that supply-side factors, such as age at marriage, fertility and even patriarchal gender norms have evolved in a direction that is conducive to greater participation among educated women.³ On the other hand, public sector employment, which had been the main source of employment for educated workers in MENA for a long time has been severely curtailed in recent years (Assaad 2014; Yassin and Langot 2017). Our results show that the dramatic slowdown of government hiring of educated women (and men) has not however been counterbalanced by a commensurate increase in employment opportunities in the formal private sector. Neither informal private employment nor non-wage employment has constituted viable options for educated women in MENA, leaving unemployment and non-participation as the remaining options.

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 (Nazier and Ramadan 2016; Hendy 2015b, 2011, Assaad and El-Hamidi 2001, 2009; 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 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, 2015b). Participation patterns also differ significantly by urban/rural location as well, with

² 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.

³ See Assaad and Krafft (2015); Salem (2012, 2015); Assaad, Krafft, and Selwaness (2016); Assaad, Ghazouani, and Krafft (2016); Krafft (2016) for evidence relating to delayed marriage and falling fertility.

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 spite of restrictive gender norms in the MENA region, women aspire to be employed, irrespective of marital status. In a 2010 World Bank survey of Jordanian female community college graduates entering the workforce (Jordan New Work Opportunities for Women pilot), 92 percent said they planned to work after graduation and 76 percent said they expect to be working full time. This is consistent with attitudes reflected in the World Values Surveys where 80 percent of women in Egypt and Jordan disagreed with the statements that "A woman with a full time job cannot be a good mother" and that "Having a full-time job interferes with a woman's ability to have a good life with her husband" (World Bank, 2010).

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 jobs⁴ 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 the underlying mechanism for our results. 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.⁵

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 does not only allow 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

⁴ First jobs are assumed here a plausible proxy for the distribution of employment in the MENA region where the labor market reveals very high levels of rigidity and lack of job-to-job mobility once a worker accesses his/her first job (Yassine 2015; Assaad, Krafft, and Yassin 2017; Yassin 2013)

⁵ These results are in line with theoretical predictions by Yassin and Langot (2017) who use matching models to analyze the effects of declining public sector employment in segmented labor markets. They predict that private sector wage employment will not make up for shrinking public sector employment and, as a result, unemployment will increase.

trend in Egypt, but is rising in Tunisia. The probability of participating in public sector employment is declining in all four countries, although the decline has been slower in Algeria until recently. 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.

To sum up, our findings show that the employment opportunity structures have been contracting significantly for educated women in the four MENA countries in question. 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 rest of the paper is organized as follows. In Section 2, we review the existing literature on female labor force participation in the MENA region identifying the relevant gaps in the literature. Section 3 describes the data sources and methods adopted in our analysis. Section 4 discusses the descriptive results to contextualize and motivate our analyses. Section 5 presents our empirical results and simulations, and Section 6 finally concludes.

2. Literature Review

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 et al. 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. Clark et al. (1991) used a cross-national analysis to find that culture as represented by different religious and ethnic categories has a significant influence on female participation in the labor market. Hayo and Caris (2013) use the “identity economics” approach of Akerlof and Kranton (2009) to explain the low labor force participation of females in the MENA region. Relying on a game-theoretic framework, they show that women from traditional families in the region breach their identities when taking a job. In their empirical analyses, they conclude that this identity as shaped by Islam and cultural traditions significantly affects labor decisions. Yet, in the MENA region, traditions are more influential than Islam in lowering female labor force participation. Others have highlighted the role of social norms which 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” (The World Bank 2004). More recently, Diwan and Vartanova (2017) analyzed data from the World Values Surveys to examine the links between patriarchal culture and low female participation in MENA. They find that differences in women’s education, personal values and country norms relating to patriarchy explain most of the regional variations in female labor force participation around the world.

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 authors to explain the specificity of the MENA economies. 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 (Karshenas and Moghadam 2001; Moghadam 2004a). Despite the economic boost of oil economies in the region, female labor supply and demand have remained sparse and significantly supported by a “patriarchal contract” (Moghadam 2004a). This patriarchal culture is also important in explaining gender outcomes in the region including labor market behavior (Moghadam 2004b). On a similar basis, Ross (2008) shares the idea that oil and not Islam is behind the low female labor force and political participation in oil producing countries of the MENA region, using a comparison between oil-producing Algeria and non oil-producing Tunisia and Morocco. However, Groh and Rothschild (2012) re-examine Ross’s data and confirms that Islam is more influential than oil when it comes to the low female labor force participation in the MENA region. In contrast to previous literature, Esfahani and Bahramitash (2015) explain that the flow of financial resources from oil rents tend to enable women to be self-employed and open their own firms. Moreover, customs and traditions which made the male the breadwinner in MENA region are behind the low FLFP, and not Islam. Examining a dataset of 74 countries, the authors show that

while educational attainment increases labor participation and entrepreneurship for both males and females, an increase in the average years of schooling for males yields a significant higher competition and decreases women employment opportunities. Unlike previous studies,

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 El-Hamidi 2009; Assaad, Hendy, and Yassine 2014). The evolution of gender norms is also an indicator to the evolution of the female labor supply in general, and of these preferences in particular, in the MENA region. With a significant negative relationship between social norms and female labor force participation (Chamlou, Muzi, and Ahmed 2011), as social norms become less conservative – which tends to be the case in most of the MENA countries, the constraining effects of conservative gender norms of female labor supply should ⁶

Some recent empirical work examined the macro and micro-level determinants of female participation in selected Arab Countries. Spierings, Smits, 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 in their sample. They construct a traditionalism index at the district level based on the percentage of households with polygynous marriages,

⁶ In Figure A.9 in appendix A, we show the proportion of women that can tolerate domestic violence as an indicator of the trend in gender norms and conservative social attitudes. The data are from the Demographic and Health Surveys in Egypt in 2005, 2008, 2012, the Demographic and Health Surveys in Jordan in 2002, 2007, 2012, and the UNICEF Multiple Indicator Cluster Surveys in Algeria in 2006 and 2012. The trends clearly show that gender norms have become less conservative over time in all three countries.

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 the MENA region has been in research that analyzes trends in participation rather than levels. Most of the arguments about the role of patriarchal culture and religion and even oil are based on cross-sectional variation across countries rather than changes over time. We fill that gap by analyzing these participation trends using microdata to correct for compositional shifts in the population over time. 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 types of employment and unemployment in each country. Because microdata from comparable surveys in multiple years has been hitherto unavailable, much of the discussion of trends in the literature relies on aggregate data (cf. Tansel (2002); Tsani et al. (2013)). A recent study that makes use of microdata for this purposes is Hendy (2015b), where data from the Egypt Labor Market Panel Surveys of 1998, 2006 and 2012 is used, shows that participation has declined over time for educated women and that much of this decline is due to declining participation for married women. Spierings, Smits, and Verloo (2010) uses the data of six Arab countries to study what determines women employment from a socio-economic perspective. They stress the importance of education in increasing female employability in the region, and also bring to surface the influence of domestic time use in these labor decisions. Finally, Chapman (2015) examines how economic development in the MENA region has affected female labor force participation using a panel data of 20 different countries and over the time span of 1990-2012. She bases her analysis on the U-shape hypothesis and finds that the low labor force participation of women in

the region can be explained in part by the country's economic phase resulting in a transition towards the bottom of the U-shaped curve.

3. Data and Methods

We compiled and harmonized microdata from official labor force surveys⁷ in four countries, namely Egypt, Jordan, Algeria and Tunisia, 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 and OAMDI 2018). For Jordan, we have data from the Employment and Unemployment Survey for 2000-2003, 2005-2010 and 2013 (DoS various year and OAMDI 2017). 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 and OAMDI 2016).

The main analysis consists of estimating a series of multinomial logit models on a polychotomous outcome variable indicating five different labor market statuses, namely public sector employment (which includes government and public enterprise wage work), private sector wage work (which includes both formal and informal wage work⁸), non-wage work (which includes self-employment and unpaid family work, as well as a 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 state 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 (Greater Cairo in Egypt, the urban part of the Central region in Jordan, 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%

⁷ Unlike Hendy (2015b), we use the official labor force surveys and not the labor market panel surveys (ELMPS, TLMPS and JLMPS), to obtain the longest possible time series for each of the three countries and also to ensure comparability with Algeria, for which only the official labor force surveys are available.

⁸ Informal wage work is defined by the absence of both a contract and a social insurance associated with the occupied job.

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 the 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 post-secondary 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 post-secondary 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 (Salem 2016).

[Figures 1 and 2 about here]

Given the strong positive relationship between female education and female labor force participation (Chamlou, Muzi, and Ahmed 2011), 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.⁹ Notably much of the increase in participation and unemployment occurred after the January 25th uprising. 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 with flat unemployment.¹⁰ 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.

[Figure 3 about here]

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

⁹ 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.

¹⁰ 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.

rate 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.

[Figure 4 about here]

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 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.

[Figure 5 about here]

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 trend 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.¹¹ The role of this type of employment is most pronounced in Egypt¹², 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

¹¹ The residual category, which is not shown in the figures, is non-wage employment, which includes self-employment and unpaid family labor.

¹² This result goes in line with findings by Assaad, Krafft, and Yassin, (n.d.) revealing using firm-level data that most of job creations in Egypt are driven by small-sized informal low productivity firms.

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 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.¹³ 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.¹⁴ 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 city¹⁵. Illustrative results from the regression models for the year 2010 by country are shown in Appendix 37A Table A.1. The simulations themselves are presented graphically in two ways. First, we show separate results for each country and each 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. In Appendix Table A.2, we calculate the t-statistics to test for the statistical

¹³ News Press, November 28, 2015.

¹⁴ We are unable to distinguish in our analysis between formal and informal private wage employment because a number of the surveys we use do not include information about either social insurance coverage or the presence of written contracts.

¹⁵ In Appendix A, in Figures A.1 - A.4, we conduct a sensitivity analysis to changing the profile (in terms of age and education) of the chosen reference group. We obtain robust results in all cases.

significance of differences across the first and the last point, the middle to last point and the first to the middle point in our time series for each country, for each state and for both married and un-married women.

[Figures 6 and 7 about here]

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 A.1 shows the 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 the odds of that kind of employment between those with secondary 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-wage 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 in particular are 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 after marriage.

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 by 2010. However, the t-test shows no significant changes in the probability of government employment in Algeria for either never or ever married women. We suspect, however, that the declining trend observed in very recent years might continue as falling oil prices since 2014 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.¹⁶ 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. The t-test shown in Table A.2 shows a mildly significant increase (at the 10% level) across the first and last year for never married women, but not across other sub-periods and not for ever married women.

The probability of non-wage work is extremely low for university graduates in all four countries, but one can still discern some trends. There is an increase in this probability over time in Algeria, although it remains below 2 percent. The increase is statistically significant from the middle to the last year for ever married women, but not for other sub-periods and not for never married women.

After an initial decline, the probability of unemployment in Algeria began increasing again since 2005. The initial decline was large enough to result in a statistically significant decline in unemployment across the whole period for never married and ever married women. 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. The increasing trend in non-participation is statistically significant across the entire period for both never and ever married women and is clearly due to the increase in inactivity in the first half of the period. In sum, the decline in the probability of unemployment in the first half of the period in Algeria appears to be due to an increase in inactivity rather than a change in the probability of employment.

¹⁶ News Press, November 28, 2015

The results for Egypt are shown in Panel B of Figure 6.¹⁷ 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 a slight increasing trend from 2004 to 2006. This declining trend in the probability of government employment is highly significant statistically, over the entire period and across the first and second half as shown in Table A2 for both never and ever married women. The trend in the probability of private wage work looks fairly flat in Egypt, but statistical tests shown in Table A2 reveal differences in trends across never and ever married women. Never married women experience no overall trend over the entire period, but a falling trend in the first half and a rising trend in the second half. Ever married women experienced a significant decline in their already low levels of private wage work throughout the period, a decline that was significant in both sub-periods.

The probability of non-wage work for university graduates in Egypt is very low in general, but is rising significantly in the second half of the period for both never and ever married women. The probability of unemployment has been rising significantly for both never and ever married women in Egypt since 2008. By 2014, it was higher than the probability of either public sector or private sector wage work. The increase in the probability of unemployment is particularly pronounced for ever married women in Egypt in the second half of the period.

The probability of inactivity is not exhibiting a regular trend in Egypt. It increased in the first half of the period under consideration and then declined. Statistical tests reveal a significant increase in inactivity for both never and ever married women in the first half and a statistically significant decrease in the second half. Over the whole period the probability of non-participation was unchanged for never married women, but decreased for ever married women. However, this was mostly due to the significant increase in their unemployment rather than in any form of employment.

Like in Egypt, university-educated women 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% in 2000 to under 30% in 2013, and the extent of decline appears to be virtually identical for never married

¹⁷Note that we break the median spline in 2007 to reflect the change in data collection methodologies that occurred in Egypt at that point.

and ever-married women.¹⁸ The decline is highly significant statistically for both sub-periods and for both never and ever married women (Table A2). Private sector wage work did increase somewhat in Jordan for never-married women, but is far from making up the decline in public sector employment. The increase in such work is particularly significant in the second half of the period. Again, the probability of non-wage work is very low in Jordan and generally exhibits a declining trend, which is statistically significant for never married women over the entire duration. There was a significant increase in the probability of unemployment in Jordan in the first half of the 2000s, especially for never married women. This increase reversed for never married women in the second half but continued apace of ever married women. Thus over the entire period, the increase in unemployment was more pronounced for ever married women in Jordan.

The most notable pattern in Jordan is the secular increase in the probability of non-participation throughout the period under consideration. The probability inactivity increase significantly in the first half for ever married women and then increased significantly in the second half for never married women. Over the entire period, the increase in inactivity is highly significant for both groups. Thus, the reduction of opportunities in the public sector in Jordan has manifested itself in a reduction in participation rather than as an increase in unemployment.

Similarly to Jordan and Egypt, 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. The decline in government employment is highly significant statistically for both groups and across both sub-periods (Table A2). 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 make up even a fraction of the decline in public sector employment. Statistical tests reveal a significant increase in private wage work for both never and ever married women in the first half of the period but a significant decline for both groups in the second half. Over the entire period under consideration, the probability of private wage work increased significantly for never married women, but declined for ever married women.

¹⁸ We break the spline in 2007 in Jordan to reflect the change in data collection methodology that occurred then.

Non-wage work in Tunisia exhibits contradictory trends. In the first half, there is a strong declining trend for never married women but an increasing trend for ever married women. In the second half, the trend is strongly declining for both groups. These negative shocks to both wage and non-wage employment associated with the revolution manifested themselves as sharp increases in the probability of unemployment in Tunisia, which went from about 25% to nearly 45% for never married women and from about 10% to over 20% for ever-married women. These increases in the probability of unemployment in Tunisia are highly significant statistically for both never married and ever married women, especially in the second half of the period under consideration.

Unlike unemployment, which increased steadily throughout the period, the probability of inactivity exhibited somewhat contradictory trends in Tunisia. In the first half, the probability of inactivity increased for never married women but declined for ever married women. In the second half, the opposite was true. Over the entire period, inactivity declined sharply for never married women, but declined only mildly for ever married women.

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 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 wage employment is very

hard to reconcile with their familial responsibilities. In two countries, Algeria and Jordan, the adverse opportunity structure resulted in declines in 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 failure of participation to increase in line with rapidly rising educational attainment for women can be attributed to the observed change in opportunity structures for educated women rather than the supplied-side factors traditionally emphasized in the literature to explain low participation in MENA.

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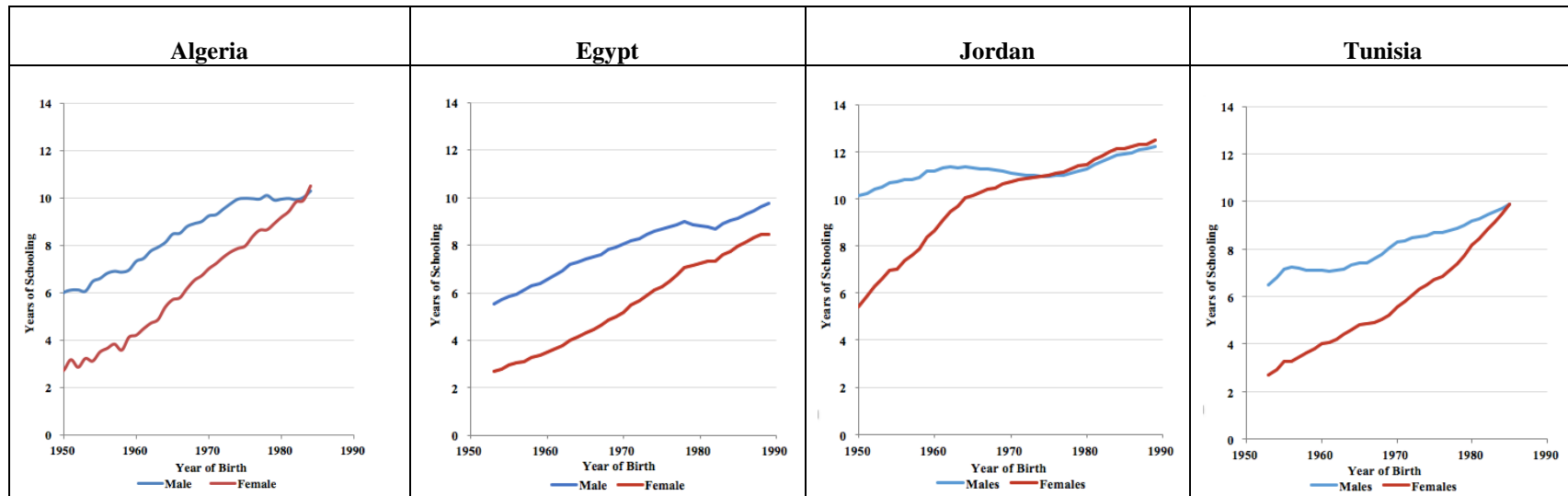
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Figures

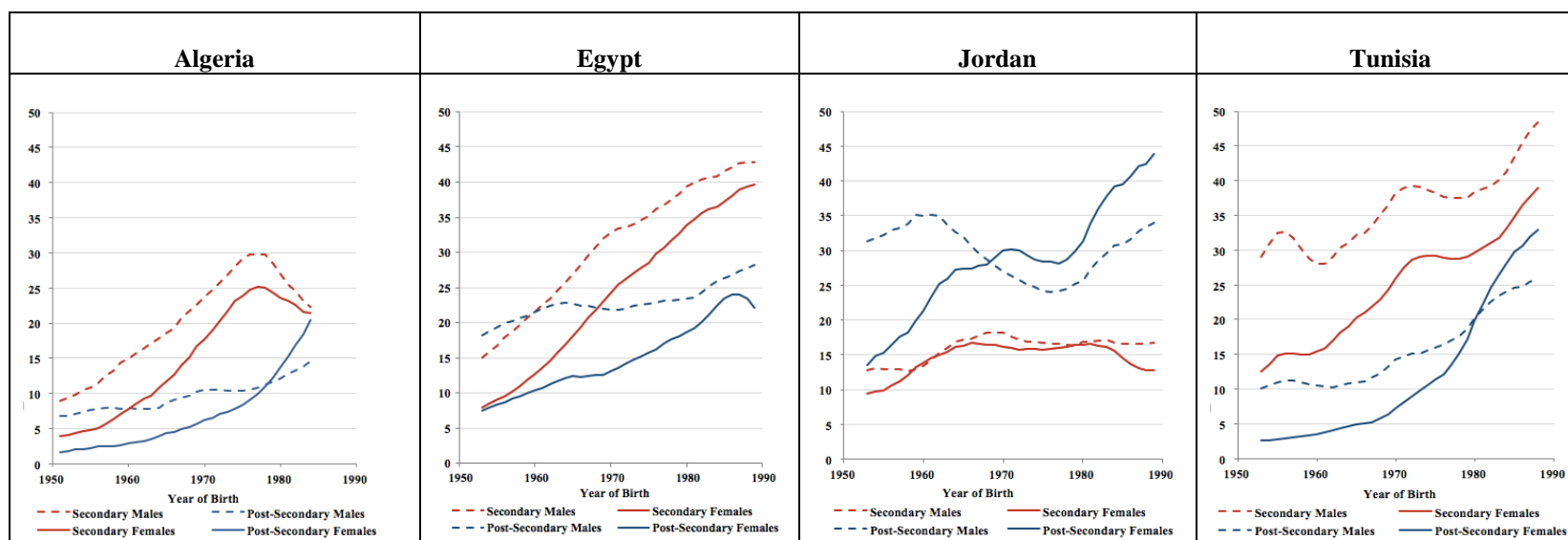
Figure 1. Average Years of Schooling by Year of Birth, Sex and Country



Source: Computed by the authors from the official labor surveys of Algeria (2001-2007, 2010), Egypt (2008-2014), Jordan (2000-2014) and Tunisia (2010).

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

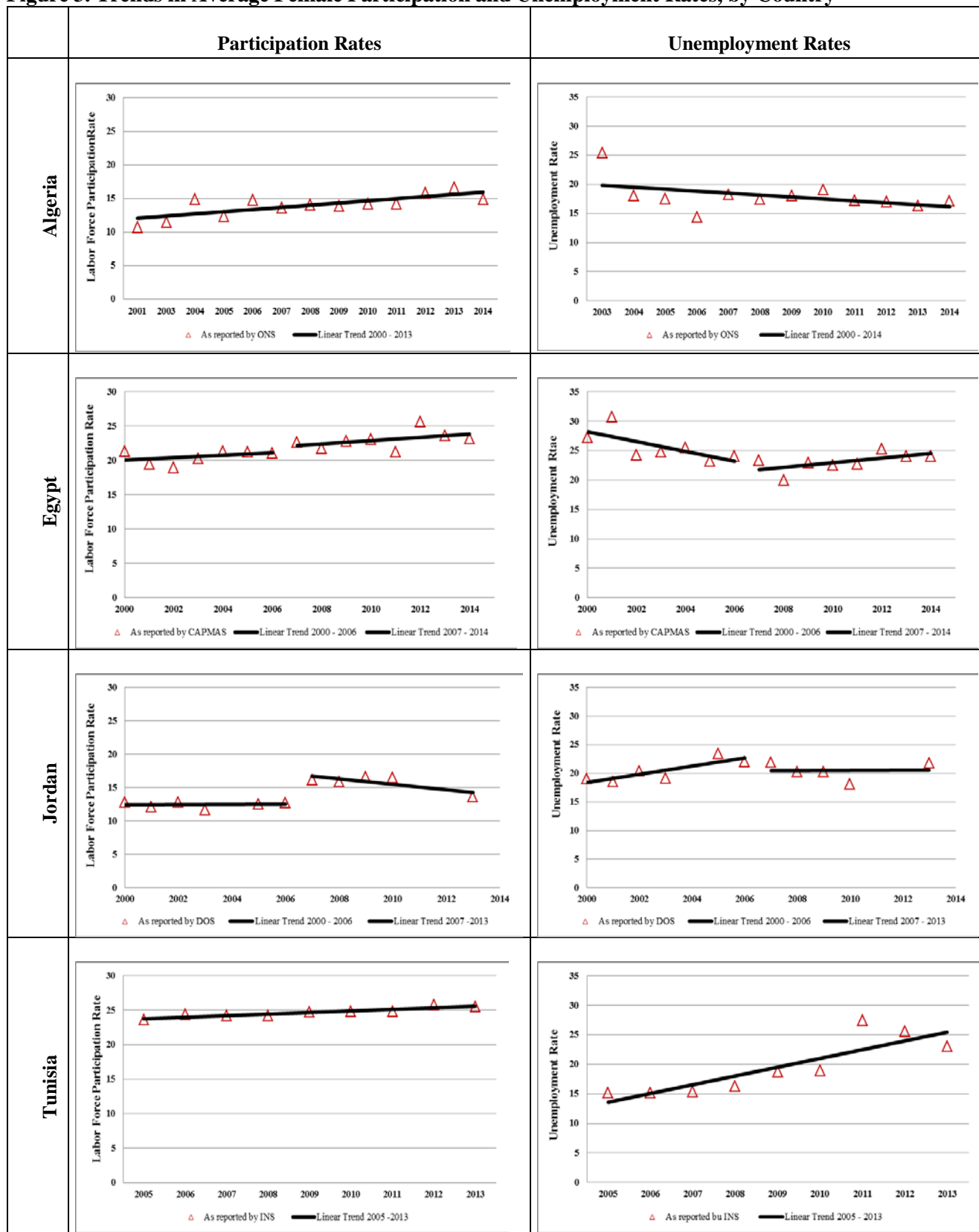
Figure 2. Proportion with Above Secondary and Secondary Education by Year of Birth, Sex and Country



Source: Computed by the authors from the official labor surveys of Algeria (2001-2007, 2010), Egypt (2008-2014), Jordan (2000-2014), Tunisia (2005, 2006, 2008, 2010, 2013).

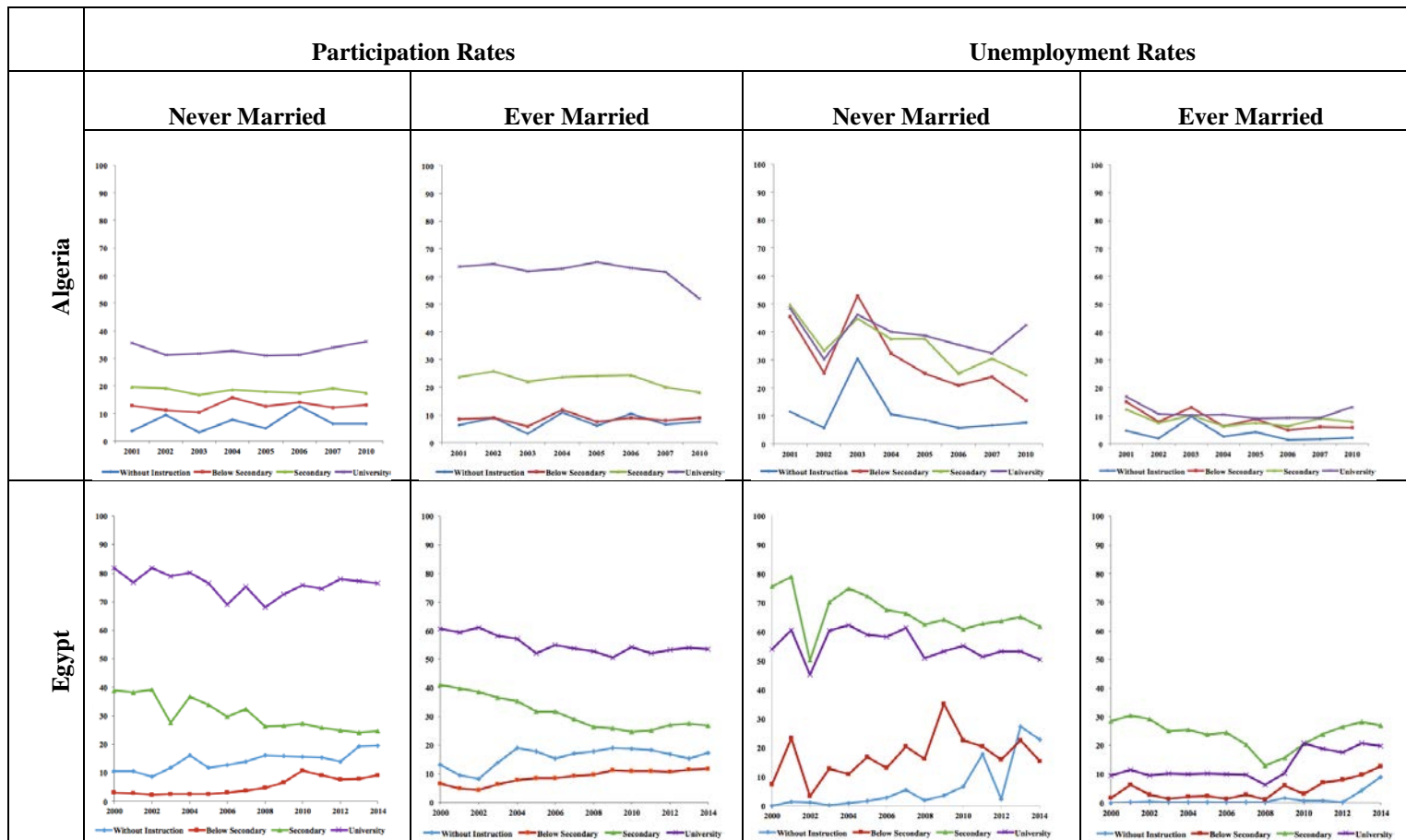
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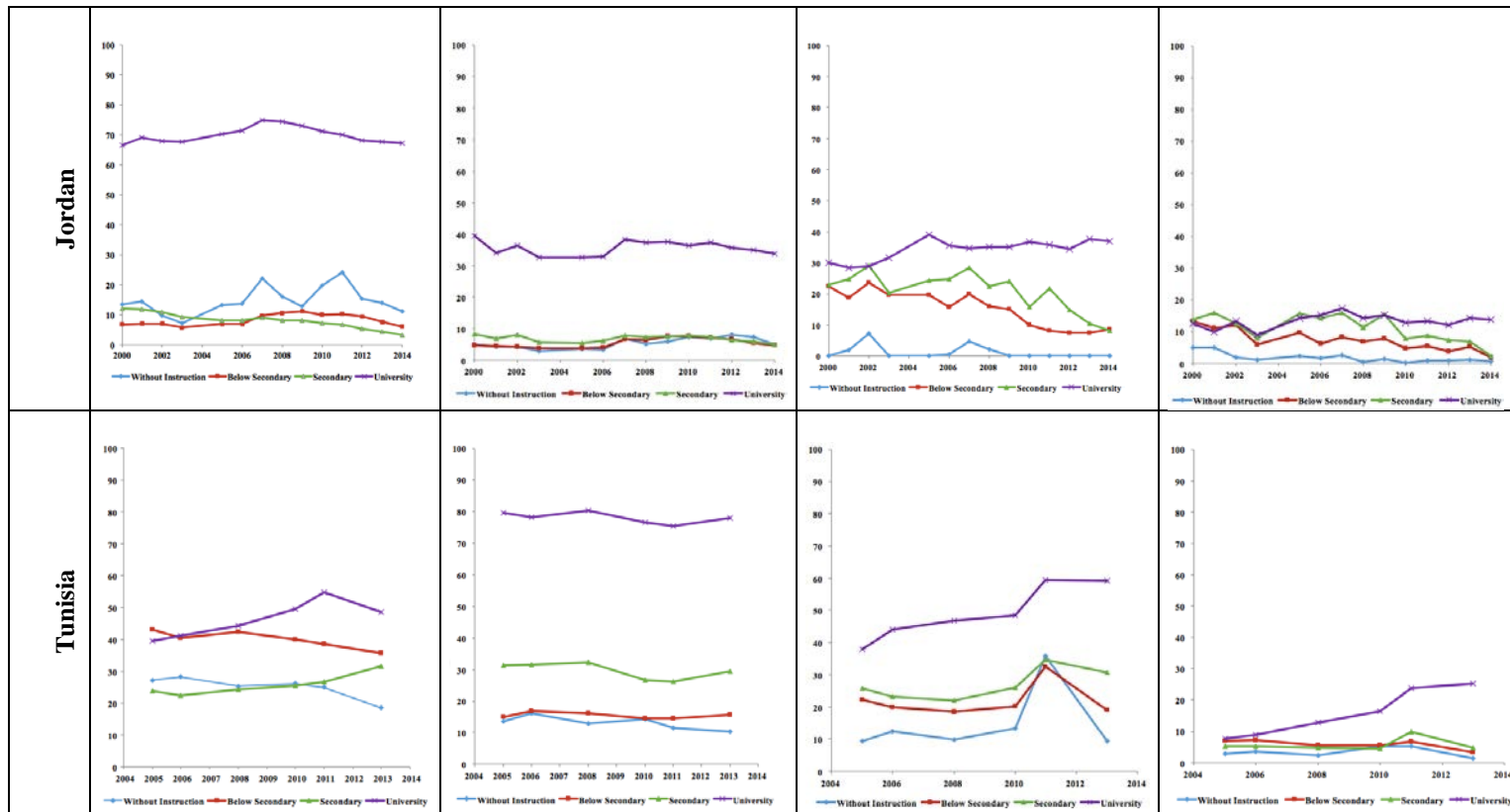
Figure 3. Trends in Average Female Participation and Unemployment Rates, by Country



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

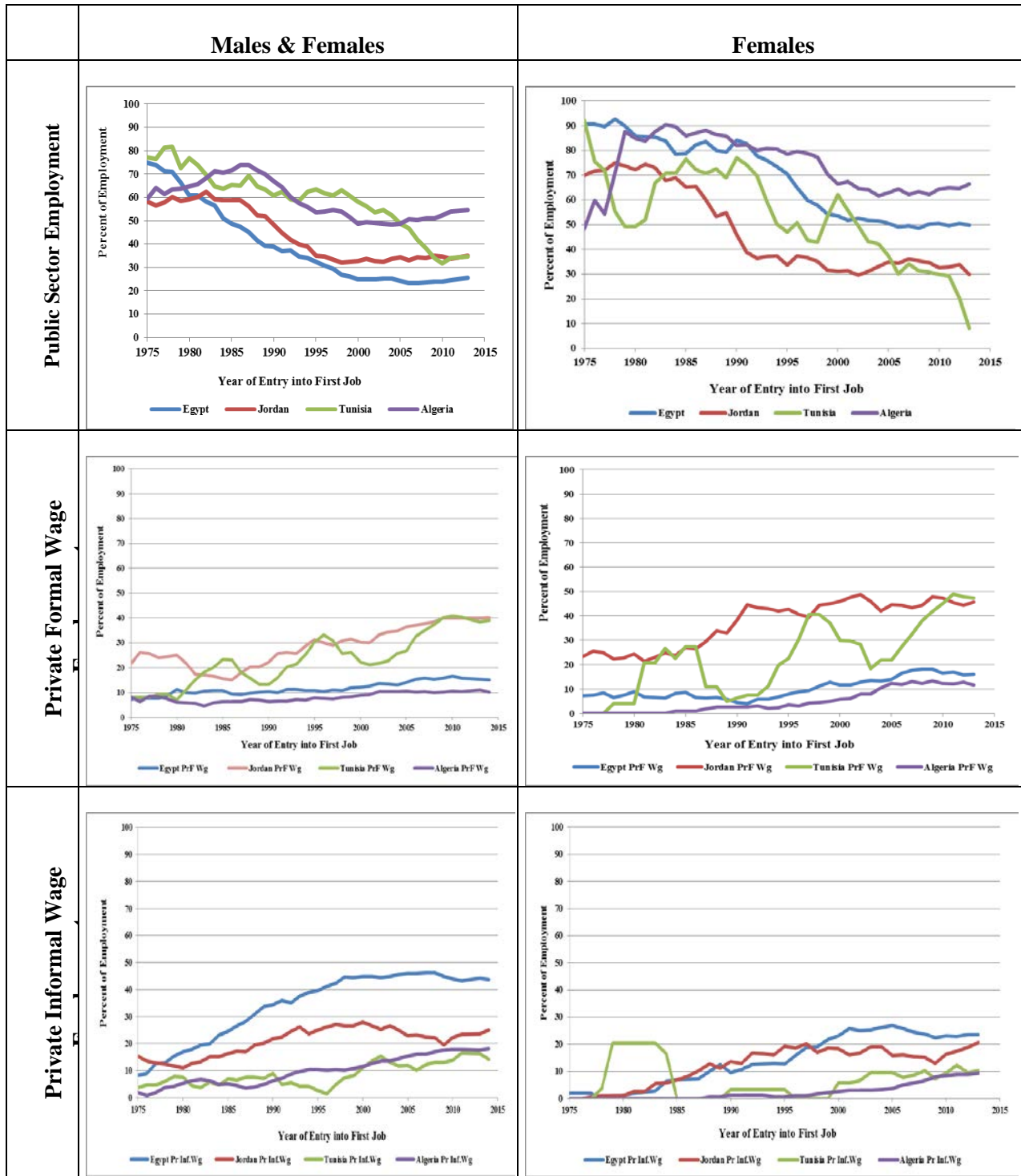
Figure 4. Trends in Female Participation and Unemployment Rates by Educational Attainment and Country (Ages 15-64)





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.

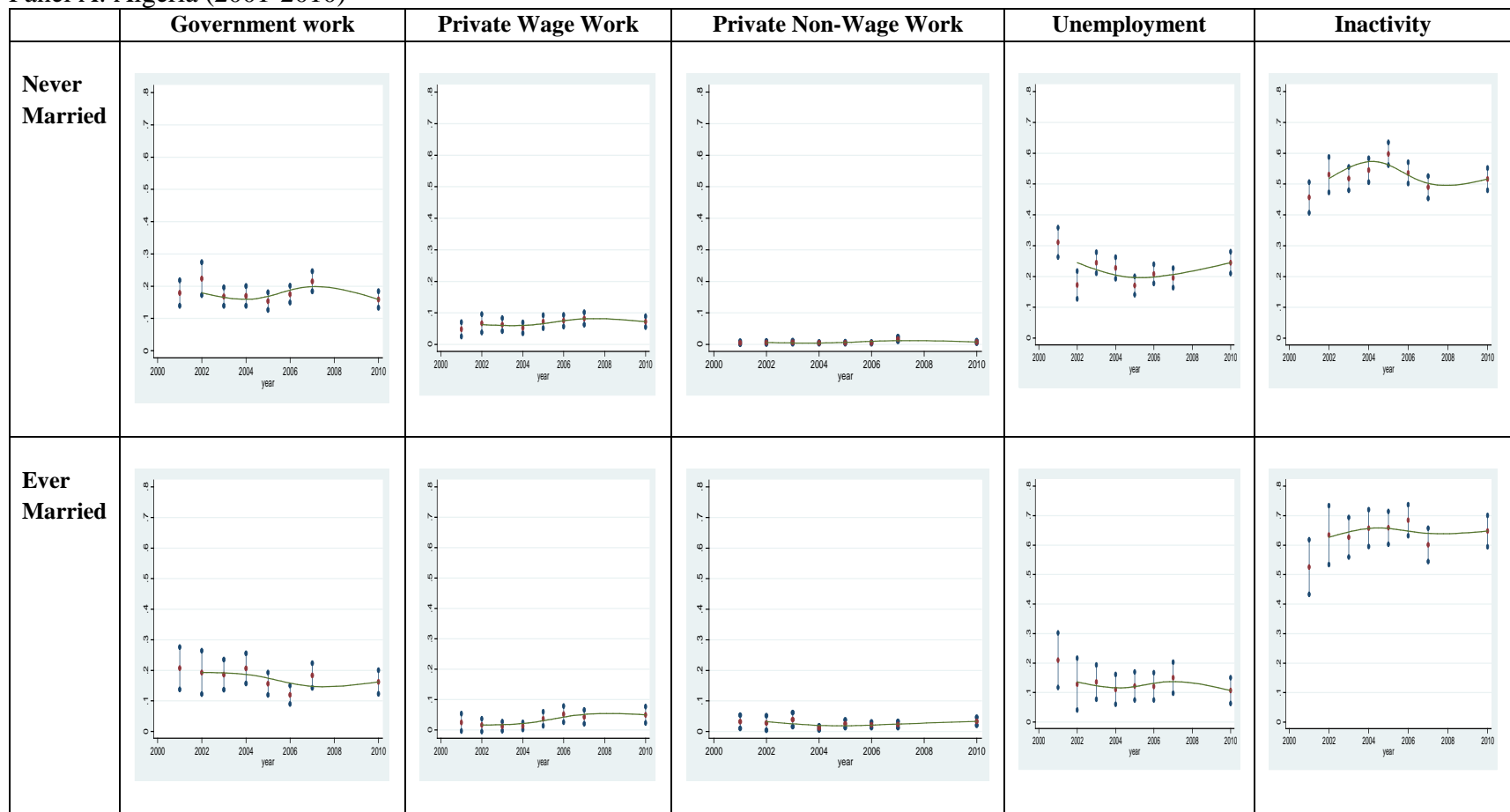
Figure 5. Proportion of Employment in Different Sectors for the First Job by Year of Entry and Country (Individuals with Secondary Education or Above)



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.

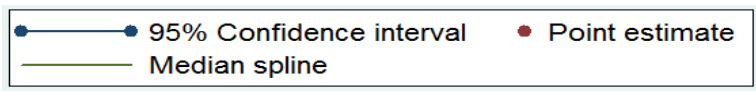
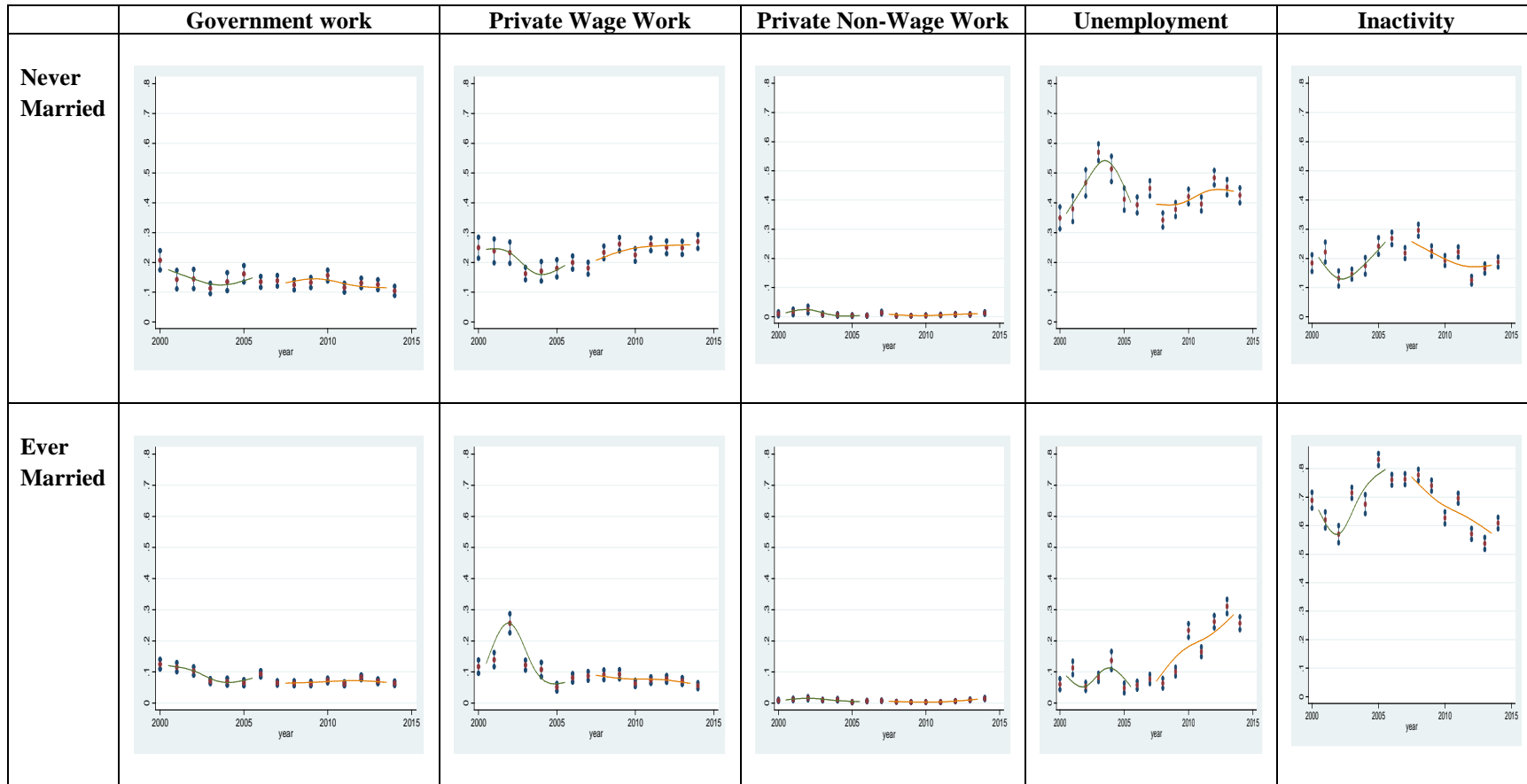
Note: A six-period moving average trend line is used to smooth the fluctuations in the data.

Figure 6. Simulated Probabilities of Five Labor Market States for a 25-Year Old University-Educated Female, by Marital Status and Country
Panel A: Algeria (2001-2010)

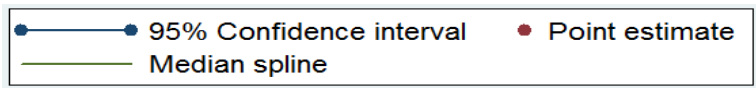
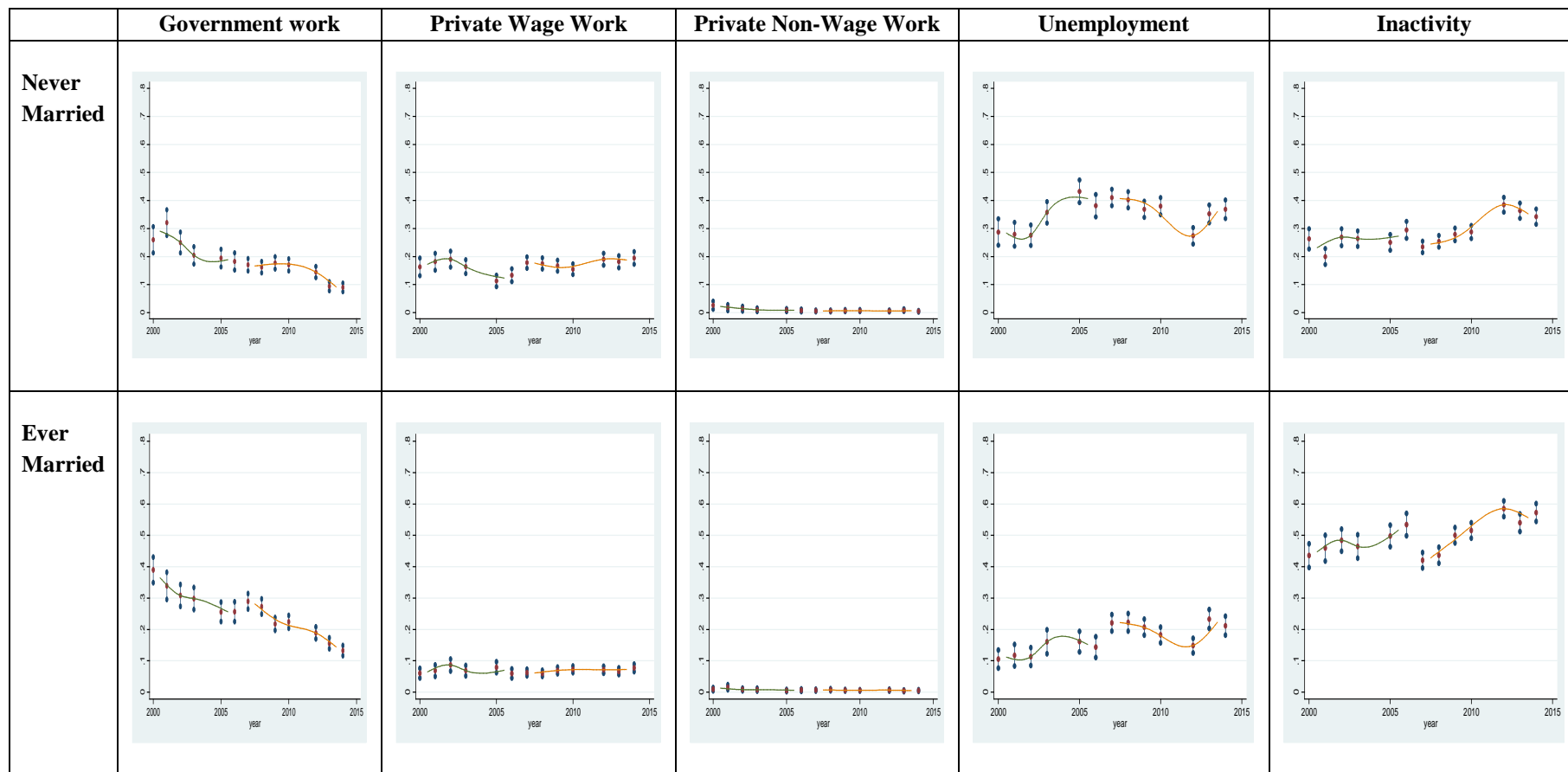


● — ● 95% Confidence interval ● Point estimate
— Median spline

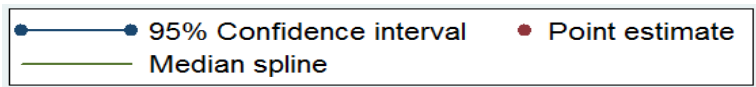
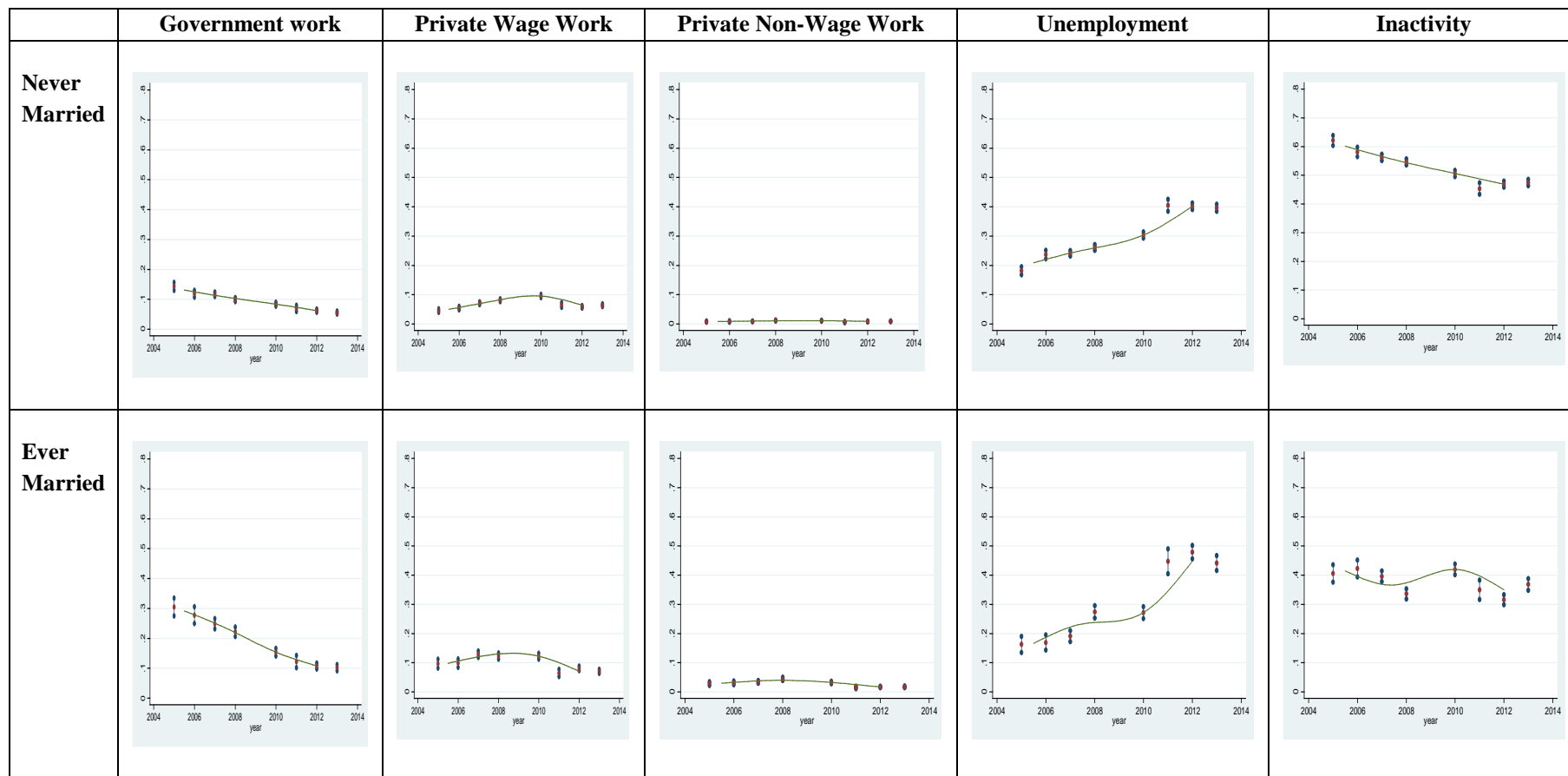
Panel B: Egypt (2000 - 2014)



Panel C: Jordan (2000 - 2014)



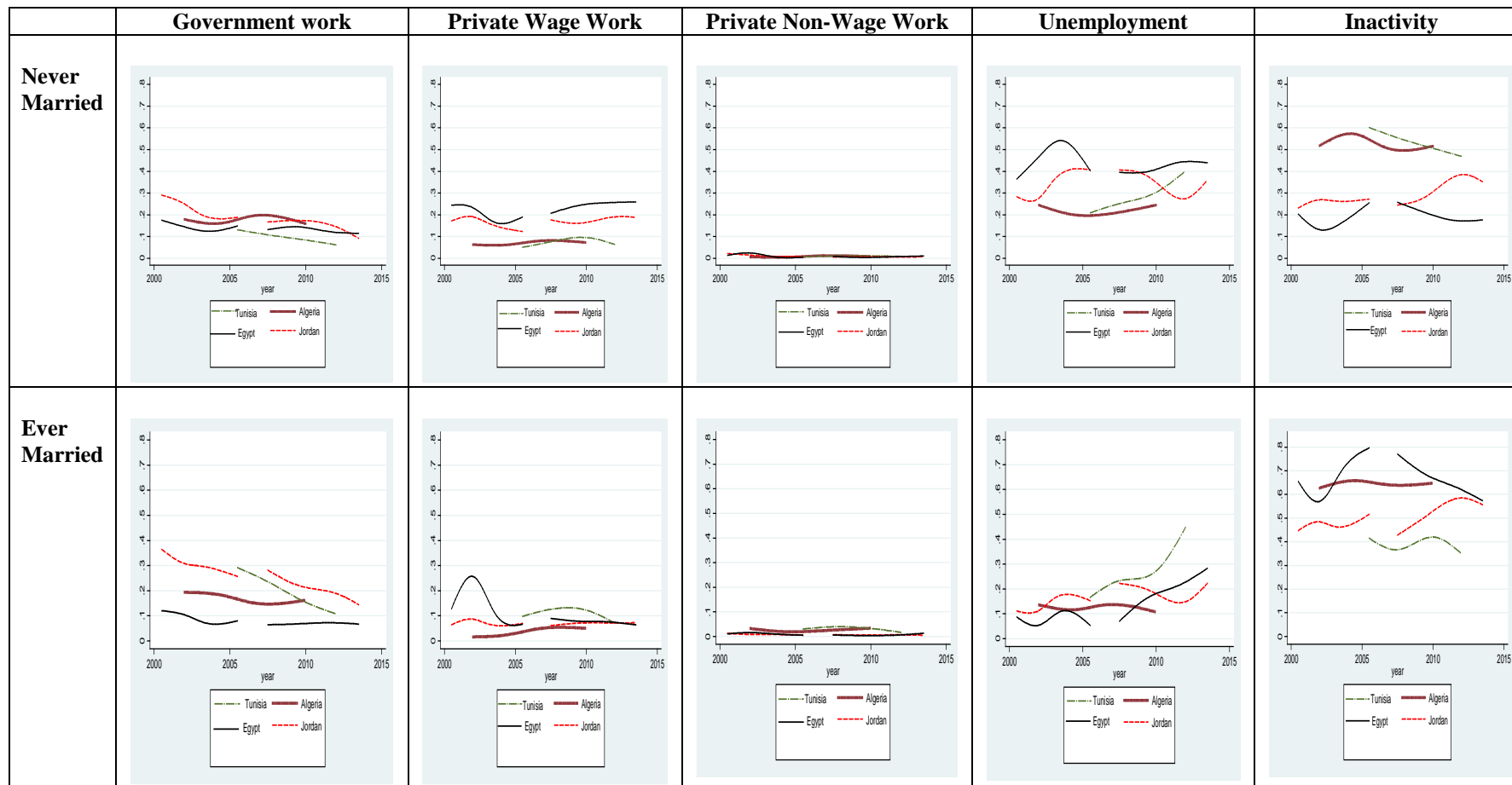
Panel D: Tunisia (2005 - 2013)



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 for Never Married and Ever Married Women in Algeria, Egypt, Jordan and Tunisia



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.

A. Appendix A

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

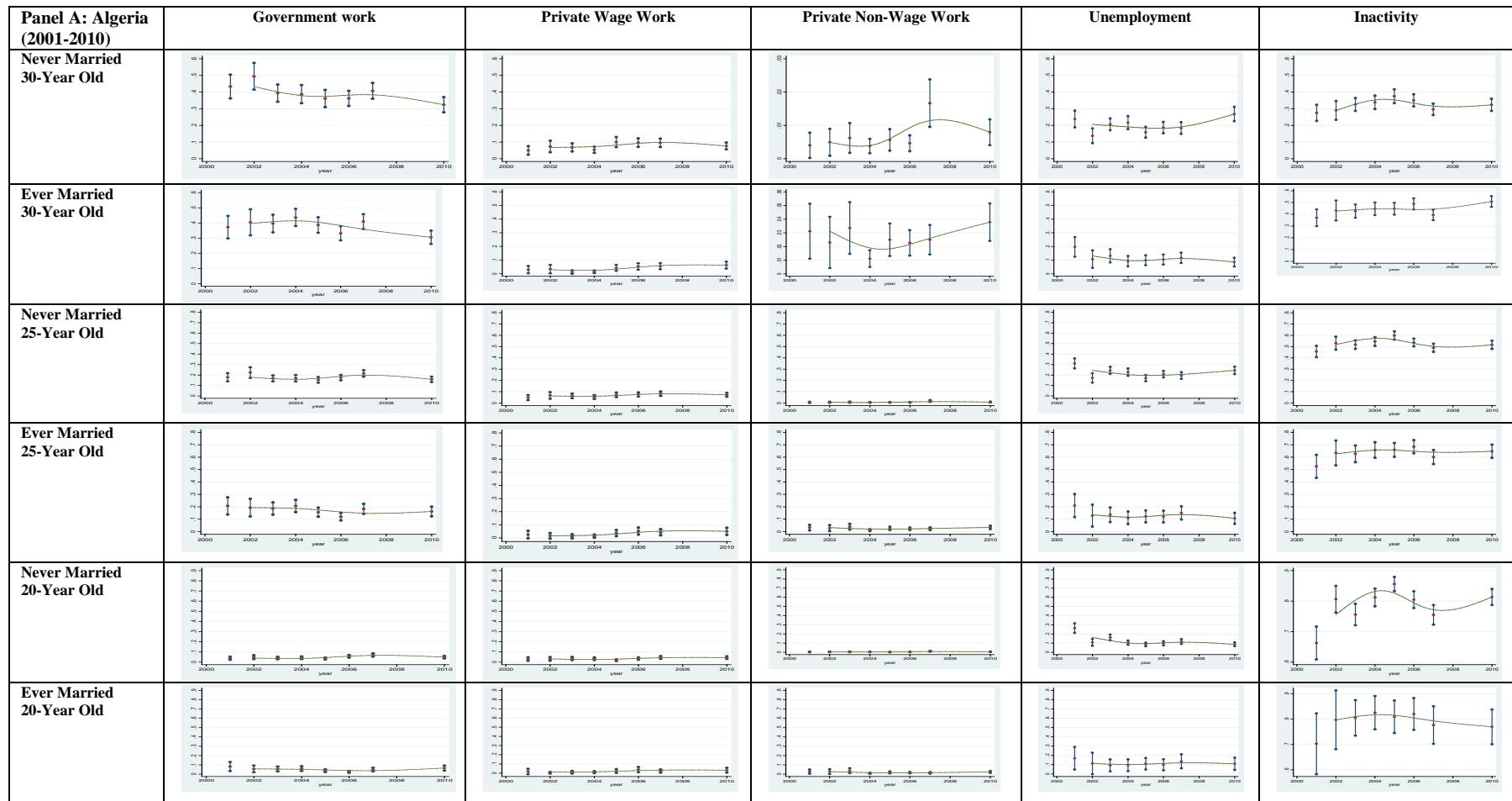
	Government work				Private Wage Work				Private Non-Wage Work				Unemployment			
	DZ	EG	JO	TN	DZ	EG	JO	TN	DZ	EG	JO	TN	DZ	EG	JO	TN
Never Married																
Age	2.093*** (0.102)	1.630*** (0.0602)	2.027*** (0.0722)	2.276*** (0.0600)	1.759*** (0.126)	1.512*** (0.0630)	1.714*** (0.0514)	1.738*** (0.0257)	1.393*** (0.0735)	1.196*** (0.0540)	1.598*** (0.156)	1.582*** (0.0288)	3.109*** (0.304)	1.348*** (0.0633)	1.885*** (0.114)	2.182*** (0.0508)
Age squared	0.401*** (0.0295)	0.578*** (0.0318)	0.394*** (0.0211)	0.371*** (0.0144)	0.433*** (0.0496)	0.562*** (0.0375)	0.454*** (0.0212)	0.442*** (0.0102)	0.650*** (0.0520)	0.788*** (0.0519)	0.545*** (0.0775)	0.563*** (0.0145)	0.156*** (0.0272)	0.595*** (0.0497)	0.335*** (0.0355)	0.301*** (0.0118)
<i>Educational Attainment (ref: university)</i>																
No certificate	0.00885*** (0.00312)	0.00322*** (0.000881)	0.00427*** (0.00166)	0.00502*** (0.001000)	0.140*** (0.0537)	0.0765*** (0.0108)	0.143*** (0.0176)	0.666*** (0.0391)	1.543 (0.423)	0.910 (0.162)	0.0955*** (0.0520)	1.116 (0.0994)	0.0151*** (0.00694)	0.00694*** (0.00141)	0.00243*** (0.00173)	0.0675*** (0.00525)
Less than secondary certificate	0.0484*** (0.00657)	0.00881*** (0.00305)	0.0246*** (0.00273)	0.0151*** (0.00174)	0.886 (0.128)	0.126*** (0.0198)	0.186*** (0.0132)	1.502*** (0.0621)	4.185*** (0.926)	0.459*** (0.107)	0.200*** (0.0522)	1.616*** (0.131)	0.0892*** (0.0116)	0.0170*** (0.00338)	0.0316*** (0.00324)	0.168*** (0.00768)
Secondary certificate	0.307*** (0.0337)	0.0899*** (0.00768)	0.132*** (0.0103)	0.154*** (0.00928)	1.460** (0.223)	0.221*** (0.0180)	0.166*** (0.0118)	1.968*** (0.0700)	4.709*** (1.096)	0.273*** (0.0506)	0.151*** (0.0430)	1.890*** (0.148)	0.404*** (0.0446)	0.158*** (0.00949)	0.101*** (0.00727)	0.363*** (0.0122)
Constant	8.91e-07*** (6.89e-07)	0.000122*** (7.25e-05)	4.21e-06*** (2.39e-06)	1.17e-07*** (5.07e-08)	1.91e-05*** (2.04e-05)	0.00139*** (0.000875)	0.000106*** (4.92e-05)	6.54e-05*** (1.50e-05)	5.69e-05*** (4.79e-05)	0.00117*** (0.000892)	8.87e-06*** (1.43e-05)	9.49e-06*** (2.99e-06)	2.56e-08*** (3.43e-08)	0.0322*** (0.0210)	0.000162*** (0.000138)	3.70e-06*** (1.26e-06)
Region x urban/rural dummies	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included
Observations	770	1040	1231	2192	378	1066	2063	9143	430	413	89	2944	673	2878	1634	6818
Ever Married																
Age	1.481*** (0.0620)	1.274*** (0.0174)	1.811*** (0.0441)	1.732*** (0.0287)	1.336*** (0.124)	1.253*** (0.0317)	1.286*** (0.0295)	1.204*** (0.0142)	1.268*** (0.0414)	1.131*** (0.0103)	1.479*** (0.0858)	1.258*** (0.0144)	1.152 (0.102)	0.849*** (0.0177)	1.039 (0.0471)	1.010 (0.0213)
Age squared	0.673*** (0.0339)	0.846*** (0.0145)	0.459*** (0.0150)	0.556*** (0.0110)	0.699*** (0.0821)	0.755*** (0.0245)	0.680*** (0.0211)	0.754*** (0.0113)	0.741*** (0.0301)	0.854*** (0.00994)	0.631*** (0.0456)	0.777*** (0.0104)	0.799** (0.0954)	1.151*** (0.0351)	0.835*** (0.0564)	0.924*** (0.0257)
<i>Educational Attainment (ref: university)</i>																
No certificate	0.0106*** (0.00173)	0.00155*** (0.000151)	0.00747*** (0.00124)	0.00145*** (0.000123)	0.0650*** (0.0234)	0.212*** (0.0175)	0.441*** (0.0401)	0.222*** (0.0130)	0.550*** (0.107)	3.465*** (0.311)	0.221*** (0.0517)	0.163*** (0.0107)	0.0258*** (0.0103)	0.00715*** (0.00111)	0.00699*** (0.00408)	0.0246*** (0.00217)
Less than secondary certificate	0.0179*** (0.00238)	0.00813*** (0.00103)	0.0132*** (0.000963)	0.00265*** (0.000171)	0.0956*** (0.0255)	0.145*** (0.0194)	0.190*** (0.0126)	0.254*** (0.0129)	0.566*** (0.105)	1.361*** (0.139)	0.226*** (0.0380)	0.138*** (0.00876)	0.0471*** (0.0113)	0.0126*** (0.00280)	0.0306*** (0.00372)	0.0189*** (0.00142)
Secondary certificate	0.117*** (0.0130)	0.215*** (0.00767)	0.125*** (0.00594)	0.0389*** (0.00159)	0.180*** (0.0494)	0.244*** (0.0195)	0.285*** (0.0199)	0.348*** (0.0172)	0.563*** (0.111)	1.349*** (0.124)	0.382*** (0.0652)	0.206*** (0.0132)	0.136*** (0.0300)	0.244*** (0.0118)	0.150*** (0.0136)	0.0287*** (0.00200)
Constant	0.000161*** (0.000135)	0.000773*** (0.000205)	2.02e-05*** (8.85e-06)	1.62e-05*** (5.40e-06)	0.000520*** (0.000930)	0.00209*** (0.00100)	0.00291*** (0.00120)	0.0310*** (0.00700)	0.000884*** (0.000577)	0.000721*** (0.000149)	1.09e-05*** (1.23e-05)	0.00150*** (0.000359)	0.0226*** (0.0353)	9.153*** (3.213)	0.418 (0.309)	0.734 (0.286)
Region x urban/rural dummies	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included	included
Observations	788	6799	3494	7333	111	1201	1843	6952	802	8682	306	7907	136	2404	739	2068

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.

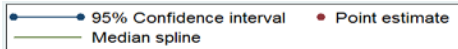
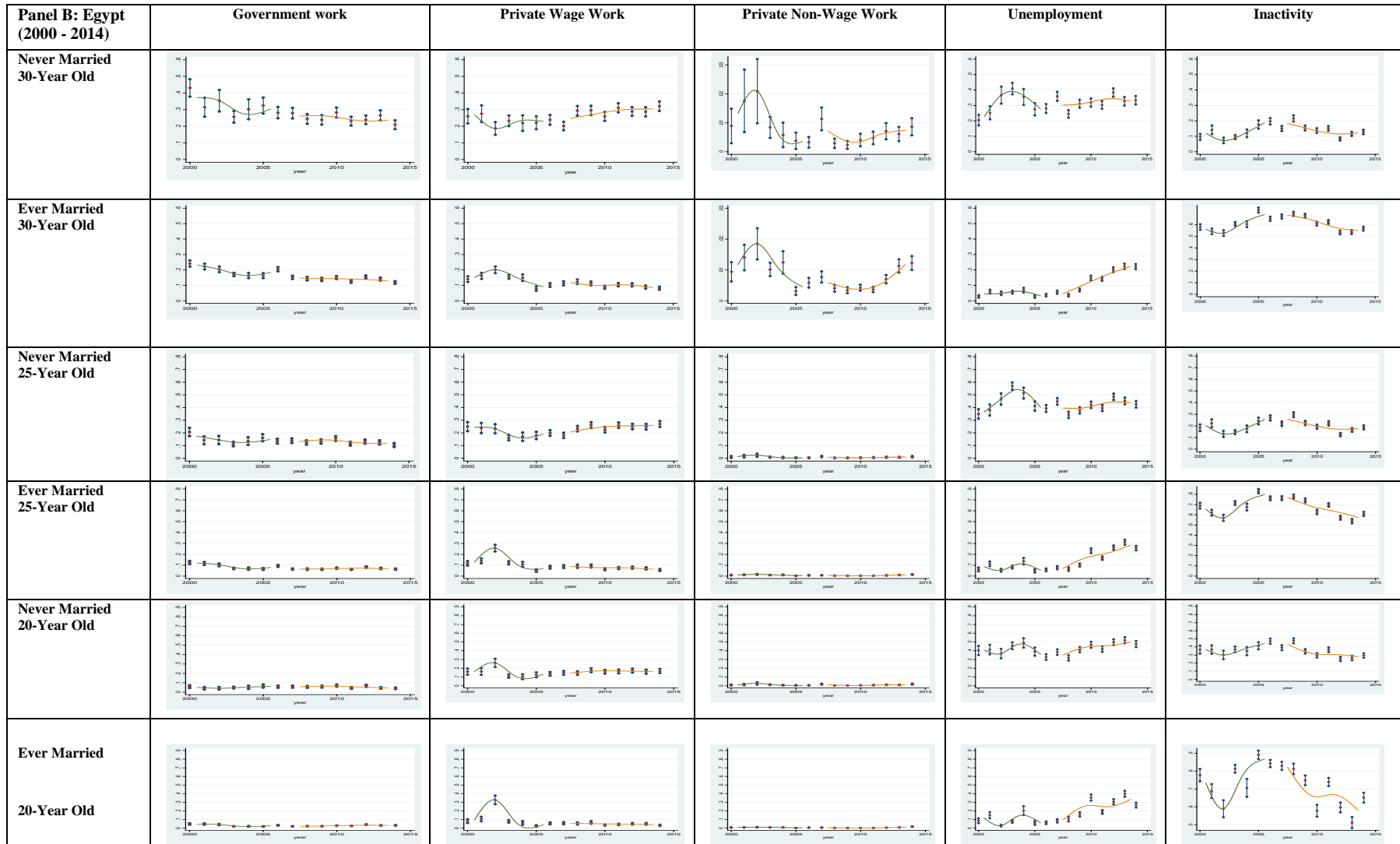
Note: - Separate regressions are run for Algeria, Egypt, Jordan, and Tunisia.

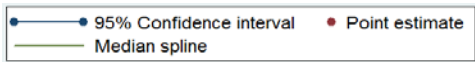
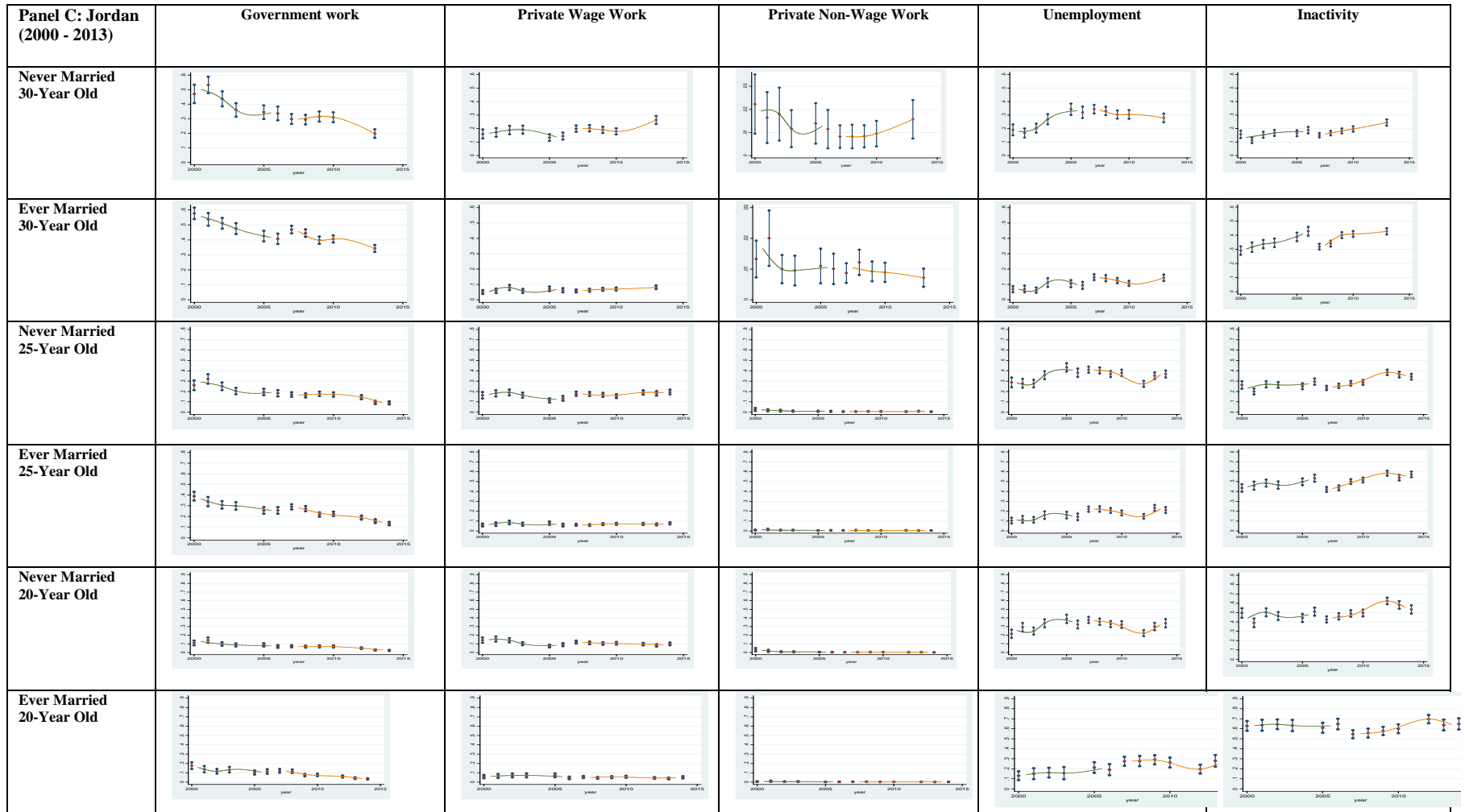
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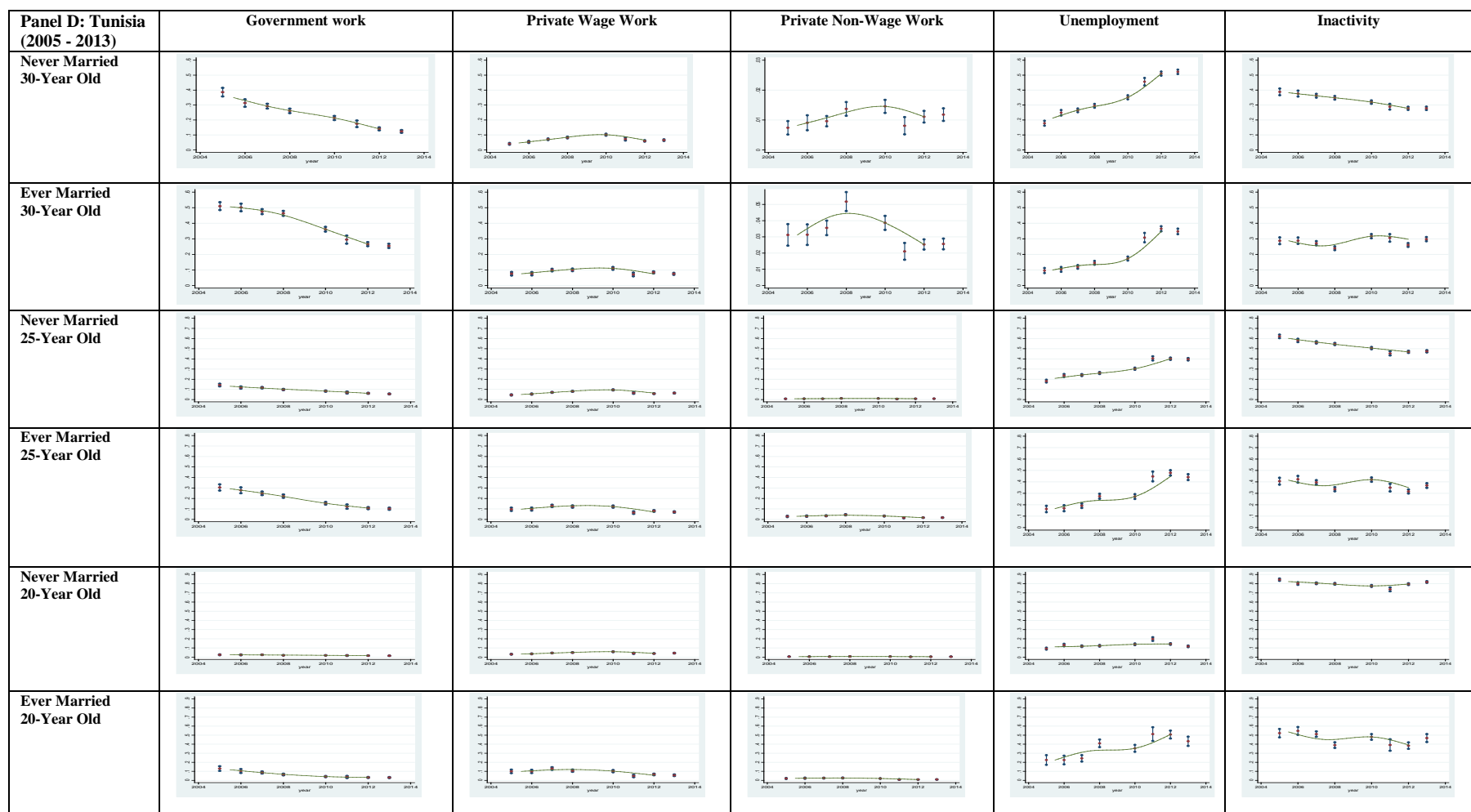
Figure A.1 Sensitivity Analysis for Reference Group Age - Five Labor Market States - University-Educated Female, by Country



95% Confidence interval
 Point estimate
 Median spline



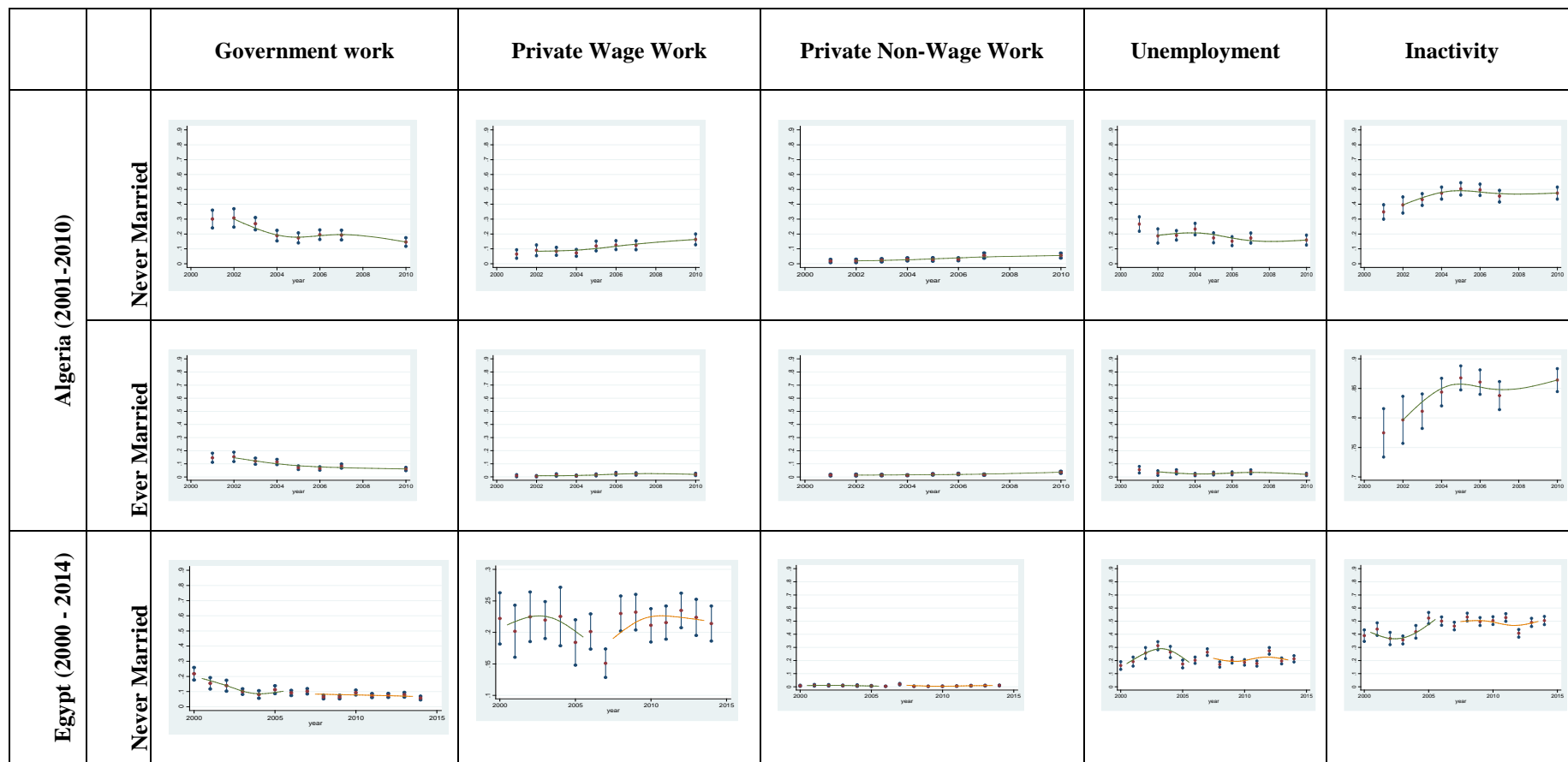




Source: Computed by authors based on data from official labor force surveys in each of the four countries. See data section in text for details.

Note: Simulations are carried out for a 20-year old (25 and 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 A.2 Sensitivity analysis for changing education of reference to secondary



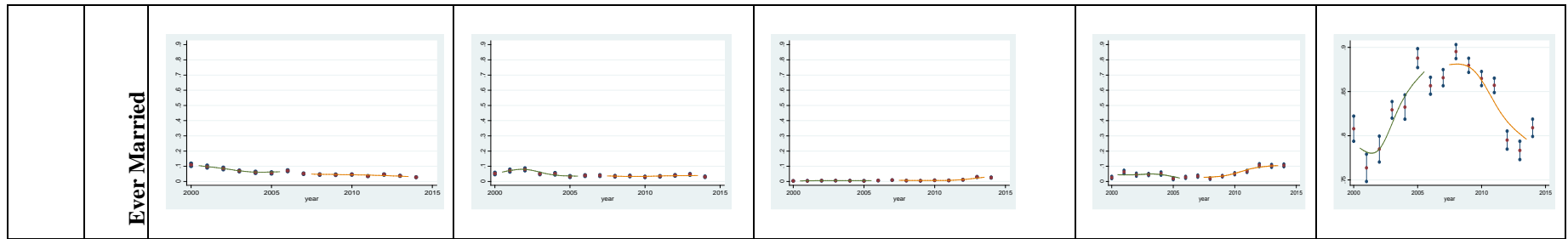
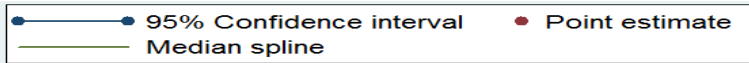
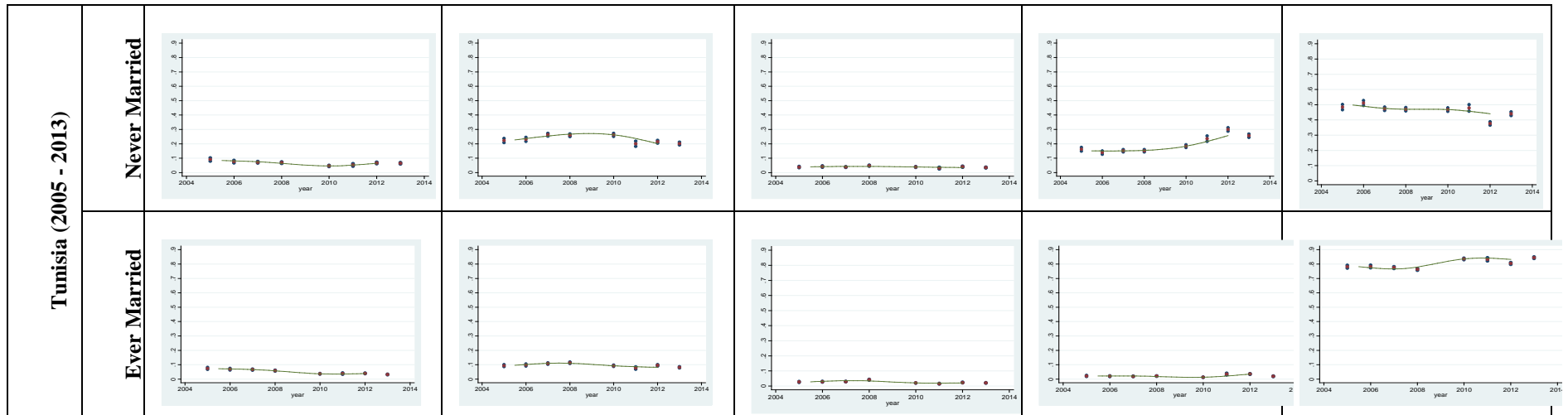


Figure A.3 (Cont'd)





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.

Table A.2 T-statistic for a test of whether differences in probabilities across first and last year, first and middle year and middle and last year are statistically significant.

		Algeria		Egypt		Jordan		Tunisia	
		Never Married	Ever Married	Never Married	Ever Married	Never Married	Ever Married	Never Married	Ever Married
First - Last Years	Government work	0.828	1.112	5.653 ***	7.104 ***	6.759 ***	11.414 ***	12.049 ***	12.708 ***
	Private Non-Wage Work	-0.850	-0.113	-0.646	-3.057 ***	2.876 ***	1.490	-0.762	3.136 ***
	Private Wage Work	-1.684 *	-1.241	-0.958	5.193 ***	-1.620	-1.742 *	-4.970 ***	3.105 ***
	Unemployment	2.179 **	1.979 **	-3.336 ***	-14.38 ***	-2.753 ***	-5.007 ***	-23.50 ***	-14.45 ***
	Inactivity	-1.900 *	-2.232 **	-0.211	4.585 ***	-3.430 ***	-5.710 ***	13.98 ***	2.064 **
Mid - Last Years	Government work	0.541	1.381	2.490 **	5.072 ***	5.357 ***	6.837 ***	10.61 ***	12.417 ***
	Private Non-Wage Work	-1.386	-2.906 ***	-3.734 ***	-5.050 ***	-2.280 **	0.459	2.264 **	8.427 ***
	Private Wage Work	-1.593	-2.472 **	-4.299 ***	3.117 ***	-3.788 ***	-1.858 *	5.094 ***	8.082 ***
	Unemployment	-0.691	0.117	-1.730 *	-16.37 ***	0.489	-2.995 ***	-17.49 ***	-9.781 ***
	Inactivity	1.073	0.241	5.812 ***	10.91 ***	-2.280 **	-1.654	9.121 ***	-2.370 **
First - Mid Years	Government work	0.355	0.013	3.816 ***	3.324 ***	2.721 ***	5.049 ***	5.772 ***	4.827 ***
	Private Non-Wage Work	0.202	1.724 *	1.806 *	1.207	2.414 **	1.017	7.266 ***	-3.582 ***
	Private Wage Work	-0.327	0.751	2.332 **	2.818 ***	1.505	0.042	-2.551 **	-2.721 ***
	Unemployment	2.765 ***	1.845 *	-1.881 *	0.288	-2.977 ***	-1.712	-9.124 ***	-6.265 ***
	Inactivity	-2.757 ***	-2.316 **	-4.705 ***	-4.227 ***	-1.336	-3.741 ***	-9.339 ***	3.982 ***

Note: significant at 10% (*), 5% (**), and 1% (***) .