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## Does Public Employment Reduce Unemployment?

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**Abstract:** We quantify the extent to which public-sector employment crowds out private-sector employment using specially assembled datasets for a large cross-section of developing and advanced countries, and discuss the implications for countries in the Middle East, North Africa, Caucasus and Central Asia. These countries simultaneously display high unemployment rates, low private-sector employment rates and high proportions of government-sector employment. Regressions of  unemployment rates on public-sector employment point to full crowding out. This means that high rates of public employment, which incur substantial fiscal costs, do not reduce overall unemployment rates.

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## I.      INTRODUCTION

As noted by Layard, Nickell, and Jackman (2005), unemployment matters because it generally reduces output and income, increases inequality, erodes human capital, and has immeasurable psychic costs. Furthermore, unemployment decreases the chances that a young democracy will survive (Kapstein and Converse, 2008).

Unemployment is an especially important problem for many countries in the Middle East, North Africa, Caucasus, and Central Asia (Middle East and Central Asia Department (MCD) countries)[2], such that it features regularly in a number of regional flagship reports.[3]  As the International Monetary Fund warned well before the events of Tahrir Square,[4] and as Campante and Chor (2012) argued thereafter, high unemployment may have contributed to the onset of an unprecedented wave of popular revolutions in the Middle East and North Africa. As shown by the recent experiences of many of the Arab countries now undergoing political transitions, and as a warning to governments elsewhere, unemployment often goes hand in hand with political and macroeconomic instability.

While many of the recent moves in unemployment have been related to the business cycle, structural unemployment remains a major component. There is an established literature investigating the importance of labor market institutions and other factors in explaining unemployment patterns.[5] Within the realm of fiscal policy, lower tax wedges, wage subsidies, and active labor market programs could boost labor demand, while targeted tax relief, together with benefit and pension reform, could increase labor supply in advanced countries (IMF, 2012a).

The contribution of this paper is to investigate the effects of public hiring of workers on labor market outcomes, specifically unemployment. In particular, does public hiring increase ("crowd in") private employment or decrease ("crowd out") private employment? If the latter, is the effect "partial crowding out," such that the net effect is a fall in unemployment; "full crowding out", such that overall unemployment is unchanged; or "more than full crowding out," such that unemployment rises?

Crowding out could occur through a number of channels. Derived labor demand can be affected through crowding out of the product market, possibly via higher taxes, higher interest

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[2] These countries refer to IMF members in the IMF's Middle East and Central Asia Department, plus Turkey and West Bank and Gaza.

[3]  See for example World Bank (2012) and various issues of the Middle East and Central Asia *Regional Economic Outlook* (IMF 2010, IMF 2011a, IMF 2011b).

[4] See IMF (2010). Furthermore, the IMF Managing Director warned in Morocco in the summer of 2010 that the youth unemployment problem in the region was a "ticking time bomb".

[5] An extensive list includes Freeman (2005), Nickell (1997), and Blanchard and Wolfers (2000).

rates, and competition from state-owned enterprises. It can occur through the labor market, where higher wages, more job security, or a higher probability of finding a public-sector job can make an individual more likely to seek or wait for public-sector employment rather than search for or accept a job in the private sector. Finally, it can occur in the education market, where individuals seek qualifications appropriate for entering the public sector rather than skills needed for productive employment in the private sector.

For these reasons, a number of policy documents suggest that public-sector hiring is inhibiting private-sector employment in the Middle East and elsewhere (World Bank, 2012; IMF, 2012a). However, to the best of our knowledge, very little empirical work in this area has been conducted other than on advanced countries. Feldmann (2009a, 2009b) analyzes the effect of government size on the unemployment rate in developing countries. Regressions on panel data show that a larger public sector is correlated with higher overall unemployment rates. However, Feldmann uses a 'size of government' sub-index from the 'Economic Freedom of the World' index. This sub-index[6] includes high income taxes, high interest rates due to government investment, and a number of other potential channels through which unemployment can be increased. It does not, however, look at the direct impacts of public hiring.

We fill this gap in the literature by investigating the effects of public employment on unemployment. An important part of our contribution lies in the assembly of the dataset to expand the number of non-OECD countries. In this paper, we pay special attention to the MCD countries.

The methodologically most related and relevant work to this paper is by Algan et al. (2002), who explore the consequences of public-sector employment for labor market performance. Using pooled cross-section and annual time-series data for 17 OECD countries from 1960 to 2000, they run regressions of the unemployment rate on the public-sector employment rate. Empirical evidence suggests that the creation of 100 public jobs crowds enough private sector jobs out to add 33 unemployed workers overall; that is, there is more than full crowding out. This paper follows a similar approach.

Regressing the unemployment rate on the public sector employment rate yields coefficients of close to zero. The coefficient estimates indicate full crowding out; that is, every public job comes at the cost of a private-sector job, and does not reduce overall unemployment. In a statistical sense, we fail to reject the hypothesis that there is full crowding out and easily reject the hypothesis that there is no crowding out. For the MCD countries, there is some evidence of larger crowding-out effects than in the rest of the world, although not with sufficient statistical power to suggest that public sector hiring increases unemployment.

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[6] This index consists of general government consumption (as a percentage of total consumption), transfers and subsidies (as a percentage of GDP), the role of state-owned enterprises in the economy, government investment (as a percentage of total investment), and income/payroll taxes.

## II. DATA DESCRIPTION

Our contribution to the literature includes the assembly of data on public and private employment and other indicators for a wide range of developing and advanced countries. The ILO LABORSTA dataset provides a collection of public-sector employment data, "Public Sector Employment". This dataset includes not only governmental agencies but also state-owned enterprises (SOEs). MCD countries' employment data is especially limited in terms of sample length, country coverage, and consistency. Taking care to generate consistent series, we supplement the above sources with MCD data from various individual country reports and specific pieces of data provided to the IMF by the country authorities.

When calculating public employment rates, we divide public employment by the labor force, which is primarily obtained from the ILO and supplemented with data from other sources. Similarly, the ILO is the principal source of unemployment data. For regression purposes, we construct another dataset consisting of control variables. Real GDP growth, the urbanization rate, and trade openness are drawn from the IMF WEO database. In addition, we extract the labor rigidity indicators from the "Economic Freedom of the World (EFW)" index.

Figure 1 demonstrates the problem and the potential cause we seek to investigate: The MCD region has higher unemployment, lower private-sector employment, and a much more prominent role for the state as an employer than the rest of the world (ROW).

Figure 1: Overview of Key Labor Statistics, 2008–2011 average
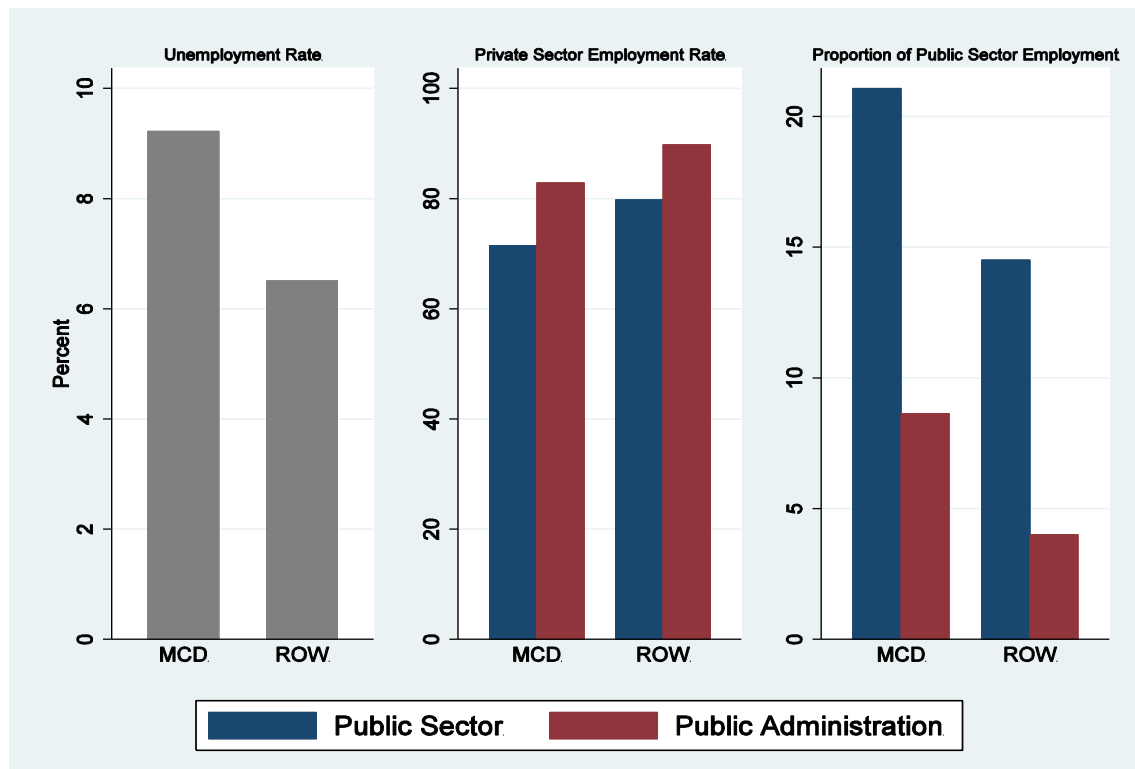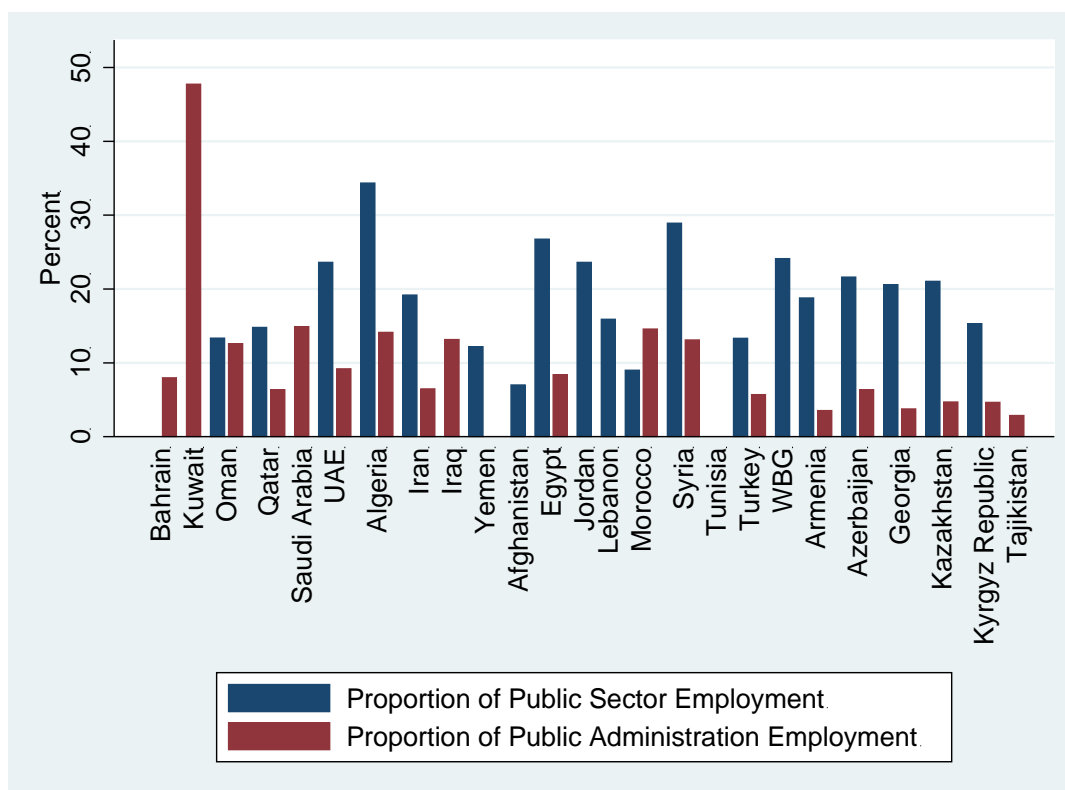


Sources: Country authorities; and International Labour Organization.

In particular, the left panel shows that the MCD unemployment rate, which averages about 9 percent, is almost one and a half times that of the ROW. If we define the private sector as those not in any public-sector employment including SOEs, the blue bar in the middle panel shows that the MCD private-sector employment rate, at about 70 percent, is almost 10 percentage points lower than in the ROW. Using the same definition, the blue bar in the right panel shows that more than 20 percent of all MCD employees are in the public sector, which is one and a half times as high as elsewhere. These statistics are very similar in the MENAP[7] countries and the CCA[8] countries. Moreover, the red bars show similar results for a narrower definition on public employment limited to the Public Administration.

Next, we consider the relative importance of public employment in individual MCD countries in Figure 2. For example, using the broad definition in blue, Algeria and many Mashreq countries have high proportions of employees in the public sector. Most CCA countries have large proportions of public employment.

Figure 2: Proportion of Public Employment in the MCD countries, latest year



Sources: Country authorities; and International Labor Organization.

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[7] Subject to data availability, MENAP refers to the countries of the Middle East and North Africa, and includes Afghanistan and Pakistan, which are IMF members in the Middle East and Central Asia Department, as well as Turkey and the West Bank and Gaza. See also IMF (2012b) for additional information.

[8] CCA denotes the following Caucasus and Central Asia countries: Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyz Republic, Tajikistan, Turkmenistan, and Uzbekistan.

Table 1: Public and Private Employment in the MCD Countries

| | Country | First Year | Recent Year | Recent Ratio | Anuual Growth rate | | |
| --- | --- | --- | --- | --- | --- | --- | --- |
| | | | | | Ratio | Public | Private |
| MENAP Oil Exporters | Algeria | 2008 | 2010 | 52.4 | -0.13 | 3.08 | 3.22 |
| | Bahrain | | | | | | |
| | Iran | 2005 | 2008 | 23.8 | 0.13 | -0.09 | -0.22 |
| | Iraq | | | | | | |
| | Kuwait | | | | | | |
| | Oman | 2000 | 2009 | 15.5 | -2.87 | 4.17 | 7.24 |
| | Qatar | 2001 | 2007 | 17.4 | -11.94 | 6.45 | 20.88 |
| | Saudi | | | | | | |
| | UAE | 2005 | 2008 | 30.9 | 7.33 | -4.21 | -10.75 |
| | Yemen | 2004 | 2007 | 13.9 | -3.25 | 3.81 | 7.30 |
| MENAP Oil Importers | Afghanistan | 2005 | 2005 | 7.6 | | | |
| | Egypt | 2001 | 2009 | 36.5 | -3.41 | -0.33 | 4.43 |
| | Jordan | 2000 | 2009 | 30.9 | -0.45 | 2.42 | 2.89 |
| | Lebanon | 2000 | 2007 | 19.0 | 3.21 | 3.02 | -0.18 |
| | Morocco | 2000 | 2008 | 9.9 | -1.61 | 0.11 | 1.75 |
| | Syria | 2000 | 2008 | 40.7 | 1.43 | 1.45 | 0.02 |
| | Turkey | 2000 | 2010 | 15.4 | -0.89 | -0.31 | 0.58 |
| | WBG | 2000 | 2010 | 31.8 | 2.56 | 4.26 | 1.66 |
| CCA | Armenia | 2000 | 2008 | 23.2 | -5.35 | -5.76 | -0.44 |
| | Azerbaijan | 2000 | 2009 | 27.6 | -6.48 | -3.75 | 2.92 |
| | Georgia | 2000 | 2006 | 26.0 | -3.11 | -3.24 | -0.13 |
| | Kazakhstan | 2000 | 2000 | 26.7 | | | |
| | Kyrgyz Republic | 2000 | 2007 | 18.1 | -5.96 | -2.18 | 4.02 |
| | Tajikistan | | | | | | |
| MEAN | | | | | | | |
| MCD | | | | | -1.81 | 0.52 | 2.66 |
| MENAP Oil Exporters | | | | | -1.79 | 2.20 | 4.61 |
| MENAP Oil Importers | | | | | 0.12 | 1.52 | 1.59 |
| CCA | | | | | -5.22 | -3.73 | 1.59 |
| Rest of World | | | | | -0.56 | 0.95 | 1.54 |
| MCD Falls | | | | | 12 | 8 | 5 |
| MCD Rises | | | | | 5 | 9 | 12 |
| Rest of World Falls | | | | | 36 | 26 | 7 |
| Rest of World Rises | | | | | 34 | 44 | 63 |

Sources: Country authorities; and International Labor Organization.

Table 1 describes how the ratio of public to private employment has varied over time for each MCD country using starting dates of 2000 or shortly thereafter and the most recent available data. Inconsistent data availability makes it difficult to make generalizations, but the data tentatively suggest a fall in the ratio of public to private employment for the MCD as a whole.

- For the MENAP countries, this has generally been because faster growth has occurred in the private sector than in public employment.
- For the CCA, there has been a substantial fall in the ratio of public employment, which was driven by downsizing in public-sector employment and reflects a trend from before 2000,

possibly because of the transition from communism. Much of the change may be due to resulting layoffs from SOEs or privatization.

• For the rest of the world, evidence for the last decade is mixed. However, reports indicate that a number of advanced countries have reduced public employment since the onset of the Great Recession (The Economist, 2012).

However, the data may not yet capture recent initiatives to increase government employment in the MENA region (IMF, 2011a, 2012b). These initiatives came from political pressure associated with the Arab Springs and/or to spend the proceeds of what until very recently were very high oil prices (Frankel, Vegh, and Vuletin, 2012).

Having described the characteristics of the key variables, we begin to investigate if they are correlated. Figure 3 shows the relationship between the unemployment rate[9] and public-sector employment rates. There is no clear relationship between unemployment and public employment. Variations in unemployment in the MCD region and elsewhere could be due to a number of structural factors. Potential causes pertinent to the MCD countries could include the demographic transition, skills mismatches, labor market rigidities, and high reservation wages (IMF, 2010).

Figure 3: Unemployment and Public Employment, 2006−11 average
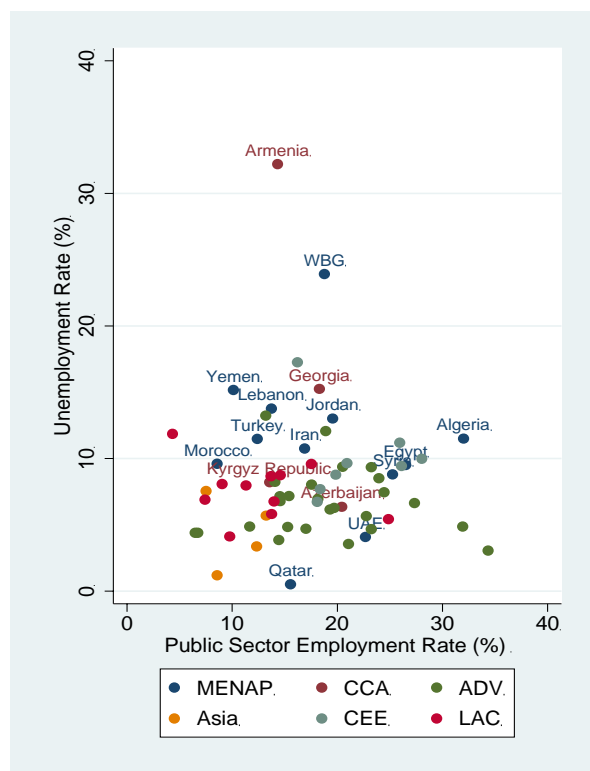


Sources: Country authorities; and International Labor Organization.

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[9] Armenia has high unemployment rates according to the ILO data, which we use for its broader coverage, but the more limited unemployment data available on the WEO database indicates rates of nearly 20 percent.

### III. ECONOMETRIC ANALYSIS

In order to explore the existence of crowding out, we estimate equations for the unemployment rate as a function of the public sector employment rate and control variables.

$$Unemp_{it} = \beta_u Pub_{it} + \gamma_u X_{it} + v_i + \theta_t + \varepsilon_{it}$$

The subscripts $i$ and $t$ identify the country and the period, respectively. *Unemp* is the unemployment rate; *Pub* is the public employment rate; $X$ is the vector of control variables which we will discuss below; $v$ is the potential country fixed effect, $\theta$ is the coefficient on the period dummy, and $\varepsilon$ is the residual term.

If the coefficient, $\beta_u$, is close to -1, we can say the additional public jobs are purely accounted for by a fall in unemployment, which means there is no net flow of workers from the private sector to the public sector and, hence, no crowding out. If $\beta_u$ is more negative than -1, then public employment also generates private-sector jobs, or crowding in. If $\beta_u$ is between 0 and -1, it means some private-sector jobs are lost, but fewer than the public jobs created, so there is partial crowding out. If $\beta_u$ is close to 0, it means there is no change in unemployment because job creation in the public sector is completely cancelled by private-sector job losses, which means full crowding out. If it is larger than 0, then crowding-out effects are so strong that overall unemployment rises and there is more than full crowding out.

We have six periods of data ranging from 1988 to 2011. Since not all variables are available for each country and each period, the coverage of countries falls as we move on to regression analysis. Depending on specification and estimation method, we have up to 139 countries and 454 observations.

We have a number of control variables based on what is standard in the literature (Algan et al, 2002; Feldmann, 2009a, 2009b). We control for the potential impact of labor market rigidities with a measure drawn from the EFW database, specifically the "Hiring and firing regulations" index used as part of their labor regulations index. The index ranges from 0 to 10, with higher ratings indicating more free labor markets. We use the GDP growth rate with time dummies to control for business cycle fluctuations. Additionally, the urbanization rate of the population and openness, which is the ratio of trade to GDP, are included.

For simplicity and uniformity, the discussion in this paper focuses on the fixed effect (FE) within-groups estimation method. The right-hand side of our regressions has public employment rates that are likely to be correlated with country-specific but time-invariant unobservable characteristics. If those characteristics affect the unemployment rate or private-sector employment rate, it is important to eliminate those sources of bias.

One potential concern is that public hiring may respond to labor market conditions over time, for example increasing during periods of slack private-sector labor demand. Therefore, any negative relationship between public and private hiring may reflect a rise in the former taking

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place in response to a fall in the latter. In a statistical sense, this can lead to biased estimates of the causal effect of public employment on private employment (and, analogously, unemployment). To the extent that private employment is low because of long-term structural factors, this source of endogeneity is expunged by the use of fixed effects. To the extent that private-sector labor demand is lower during periods of weak economic activity, this is controlled for by the GDP growth rate. To the extent that changes in labor legislation over time may affect private-sector hiring for a given level of economic activity, this is controlled for by the hiring and firing regulations index.

In addition to standard fixed effects regressions, we also use Generalized Method of Moments (GMM) estimations, also known as Generalized Instrumental Variables (GIV), in a static framework (Cameron and Trivedi, 2005). An advantage of this approach over traditional 2SLS is that the additional instruments can yield potentially large efficiency gains.

Table 2 reports estimated coefficients for the unemployment equations. As shown in columns (1) to (3), the impact of the public-sector employment rate on the unemployment rate is close to zero. The *p*-values decisively reject the hypothesis that there is no crowding out. In other words, there is at least partial crowding out. Furthermore, the coefficients are insignificantly different from 0, which is consistent with a full crowding-out effect.

In column 4, we add interaction terms with MENAP and CCA region dummies to the original equations. However, the lower coverage of countries for each region may induce identification problems, which would be worsened if we use control variables. Given that there are only eight countries in the CCA region, the reduction of observations is quite critical. Therefore, our preferred specification excludes control variables.

The MENAP and CCA interaction terms increase the effect of public-sector employment, which suggests that there is more crowding in these two regions than the rest of the world. The coefficients also suggest a rise in public hiring would raise unemployment – for example – the sum of the public sector and MENAP interaction terms is 0.06 – but we fail to reject the hypothesis that the sum of the coefficients is zero. However, as before, we reject the hypothesis of no crowding out and find overall coefficients consistent with full crowding out.

Table 2 is representative of a broad range of results that use alternative estimation methods, specifications, and the narrow definition of public employment. Moreover, our finding that there is no change in unemployment is consistent with regressions showing that any job creation in the public sector is offset by the destruction of the same number of jobs in the private sector, holding the labor force constant. For further details, see Behar and Mok (2013).

Table 2: Regression of Unemployment Rate on Public Employment Rate

| VARIABLES | (1) UnempRt | (2) UnempRt | (3) UnempRt | (4) UnempRt |
|---|---|---|---|---|
| Public Sector Employment Rate | -0.050 | -0.027 | 0.066 | -0.096** |
|  | (0.052) | (0.062) | (0.09) | (0.047) |
| Pub.Employment X MENAP |  |  |  | 0.156** |
|  |  |  |  | (0.067) |
| Pub.Employment X CCA |  |  |  | 0.355*** |
|  |  |  |  | (0.064) |
| GDP Growth Rate |  | -0.062 | -0.079 |  |
|  |  | (0.086) | (0.12) |  |
| Urbanization Rate |  | 0.016 | 0.098 |  |
|  |  | (0.083) | (0.11) |  |
| Hiring and Firing Regulations |  | -0.402 | -0.022 |  |
|  |  | (0.280) | (0.28) |  |
| Openness |  | -0.000*** | 0 |  |
|  |  | (0.000) | 0.00 |  |
|  |  |  |  |  |
| Observations | 419 | 292 | 292 | 419 |
| R-squared | 0.070 | 0.126 |  | 0.107 |
| Number of countries | 116 | 82 | 82 | 116 |
| p-value (H0: b=-1) | 0.000 | 0.000 | 0.000 |  |
| p-value(H0: b+bM=0) |  |  | 20 | 0.206 |
| p-value(H0: b+bM=-1) |  |  | >= 3 lags | 0.000 |
| p-value(H0: b+bC=0) |  |  | No | 0.000 |
| p-value(H0: b+bC=-1) |  |  | 0.185 | 0.000 |

Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1
All regressions contain a constant term and are estimated with period-specific effects.
Columns 1,2 and 4 use the within-groups estimator except. In column 3, systems
GMM is used with instruments for the difference and levels equations, where public
employment and GDP growth are treated as endogenous.

## IV. CONCLUSION

Regressions of unemployment on public employment find robust evidence that public employment crowds out private employment. The magnitude is statistically indistinguishable from full crowding out. Therefore, for our complete sample of developing and advanced countries, an additional public job typically comes at the cost of a private job and therefore does not reduce overall unemployment. For the Middle East, North Africa, Caucasus and Central Asian (MCD) countries, crowding-out effects could be stronger than elsewhere.

At a time when many countries find themselves having to improve their fiscal positions, identifying and curtailing inefficient expenditures that have unintended consequences is paramount. Public-sector hiring: (i) does not reduce unemployment, (ii) increases the fiscal burden, and (iii) inhibits long-term growth through reductions in private-sector employment. Together, this would imply that public hiring is detrimental to long term fiscal sustainability with limited benefit, so that scarce resources could be better spent on other social needs, including protecting the most vulnerable.

We have shown that the public sector is an important employer in MCD countries. Our results show that public hiring will, at best, not reduce overall unemployment. The data hint that public employment has fallen over time in MCD countries. The econometric results imply that this did not worsen unemployment. However, there are signs that the MCD trend may change in the medium term. The youth of the region continue to prefer public employment, and a number of public hiring initiatives were announced in response to the Arab Spring. At a time when private-sector employment growth in all countries may be under strain because of slower post-Lehman growth and political uncertainty, our results suggest that public hiring could worsen the problem.

Our results are based on employment data. There are many plausible mechanisms, so further work would be needed to identify which of these may operate. For example, complementary analysis of the relationship between wages in the private and public sectors, which many MENA governments have increased, would shed light on whether crowding out occurs through the labor market by increasing reservation wages.

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