Estimating the Beveridge Curve of Egypt:
An Econometric Study for the Period 2004 to 2010

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Abstract
This paper estimates the Beveridge curve of Egypt for the period 2004 to 2010, using quarterly data for the both the private sector and the public sector. Our results confirm the negative relationship between unemployment and private job offers for the Egyptian labor market. The Beveridge curve has shifted inwards during the observation period, indicating an improved matching process between labor supply and private labor demand. However, the results for the public sector are poor, showing the Beveridge curve relation cannot be used to explain the relationship between government sector vacancy rates and the unemployment rate.

JEL classification
J63; E24

Keywords
Beveridge Curve; Unemployment; Vacancies; Matching

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1 Introduction

It is widely accepted that the unemployed are matched with firms through a matching function that brings together an unemployed person with an advertised vacancy (see Blachard et. al., 1989; Pissarides et. al., 1986). According to Petrongolo & Pissarides (2001: 390), the matching function allows to explain frictions in the labor market resulting from imperfect information about job vacancies, heterogeneities, slow mobility of labor and other similar factors. In turn, studying the efficiency of such a matching function, and the factors that affect it could give valuable information about the success of the labor market in bringing together workers with jobs. Such a study could also reveal the reasons behind why some economies have high unemployment rates coexisting with high vacancies rates, an indicator of poor labor market performance. The Beveridge curve which shows a negative empirical relationship between the unemployment rate and the vacancy rate is a macroeconomic relationship that helps achieve this purpose.

The Beveridge curve is named after William Beveridge, who analyzed the relationship between the excess demand for labor and the unemployment rate, and showed that there is a negative relationship between them. Beveridge was interested in examining factors that affected the mismatch between vacant positions and the unemployed, and factors affecting workers’ reallocation (Yashiv, 2006: 2; Cahuc & Zylberberg, 2004: 512). The Beveridge curve allows analyzing the fit between the unemployed and vacancies that is independent of normal business cycle activities. In turn, examining frictional and structural unemployment and how it changes over time is of direct significance as it defines the location of the Beveridge curve in the $u$-$v$ sphere. Such unemployment types are most affected by the matching process, as imperfect information on job vacancies increases frictional unemployment, and the lack of appropriate training programs and/or high mobility barriers increases structural unemployment (Borsch-Supan, 1991: 279-280; Abraham & Wachter, 1987: 207-208; Bleakley & Fuhrer, 1997: 3, Abraham, 1983: 708-709). Furthermore, movements along the Beveridge curve indicate where the economy is on the business cycle. At times of a recession, there is low labor demand and hence low vacancies leading to high unemployment, and in a boom there is high labor demand leading to high vacancies, and hence low unemployment rates.
Consequently where the economy is on the Beveridge curve is a measure of the cyclical unemployment in the economy (Bleakley & Fuhrer, 1997: 3; Rodenburg, 2007:6).

This paper provides an empirical framework in which the Beveridge curve of the Egyptian economy is estimated over a time interval of seven years. It distinguishes between the private and the public sector and – more important – allows for a structural break due to the liberalization process in 2007. Though there is a plentitude of empirical research for advanced economies (see, e.g., Abraham & Wachter 1987, Valletta 2005 and Shimer 2005 for the U.S., Borsch-Supan 1991 for Germany, Pissarides et al. 1986 for the U.K., Kamada & Shinki 2003 for Japan, Archambault & Fortin 2001 for Canada, Webster 1999 for Australia), empirical evidence for developing countries is weak. Regarding the Arab world, two exceptions are the papers of Ibourk & Perelman (2001) for Morocco and of Bou Abid & Drine (2010) for Tunisia. As for Egypt, Shaheen & Mohamed (2009) plotted the actual values of vacancies and unemployment rates, but without estimating the Beveridge curve.

The remainder of the paper proceeds as follows: Section 2 titled “Theoretical Background” discusses the theoretical foundations behind the Beveridge curve, section 3 titled “Employment and Unemployment in Egypt in the period 2004-2010” gives background information about the employment situation in Egypt and the factors that have affected it during this period, section 4 titled “Data Description” explains and summarizes the data used for the estimations, namely the vacancy and unemployment rates, section 5 titled “Empirical Results” presents the results from the estimations and section 6 concludes.


2 Theoretical Background

Hansen (1970) and Holt and David (1966), in addition to other authors, derived the Beveridge Curve from the relationship between employment and wages, and hence used the labor supply and demand curve.

Figure 1: Employment and the Short Side Principle

The labor supply and demand curves, in addition to the level of wages, allow a determination of the employment level for any wage rate. When the wage rate is below the equilibrium level (\(w_1\)), employment equals the labor supply at that rate. In turn the distance between \(Q\) and \(R\) measures the number of vacancies \(v\). When the wage rate is above the equilibrium level, say (\(w_2\)), employment equals the labor demand at that rate, and the distance between \(T\) and \(M\) measures unemployment \(u\). At \(w^*\) labor demand equals labor supply and the market clears, that is there are neither vacancies nor unemployed persons (Hansen, 1970:6-9; Rodenburg, 2007:13).

In real world labor markets, however, there are factors that lead to having both unemployment and vacancies coexisting in the equilibrium. In the simplest case, there will always be some frictional unemployment arising from workers needing some time to change from one job to the next, and some firms needing some time until new vacancies are filled by suitable workers (Hansen, 1970:6). In terms of the above graph,

- 3 -
that means that employment will never be on the labor supply curve when wages are below equilibrium as some workers will not be able to find a job even though there are excess vacancies. This leads to higher $u$ and $v$ measured by the distance between $P$ and $Q$. Following the same logic, employment will never be on the labor demand curve when wages are above equilibrium, as some firms will not be able to find workers although there is excess supply of workers, leading to higher $u$ and $v$ measured by the distance between $K$ and $T$. At labor market equilibrium, represented by point $O$, $v$ and $u$ are equal. These facts can be shown by drawing a curve labeled $EE$ to the left of both the labor demand and the labor supply curve that represents that actual level of employment. It is clear that matching improves when there is high levels of excess demand or supply as that increases the chances that an unemployed person or the vacant position find a match. The total number of the unemployed is measured by the distance between the $EE$ curve and the labor supply curve, and the total number of vacancies is measured by the distance between the $EE$ curve and the labor demand curve (Borsch-Supan, 1991:280-281; Hansen, 1970:7-8; Rodenburg, 2007:13; Webster, 1999: 407).

We can also represent $u$ and $v$ in terms of rates by dividing both variables by the labor force $L$, resulting in the vacancy rate, hereinafter $V$ and the unemployment rate, hereinafter $U$. If the $V$ is plotted against $U$ for figure 1, we get a negative relation called the “Beveridge Curve”, see figure 2, where the 45 degree line represents equilibrium in the labor market, which is point $O$ in figure 1. This point represents the amount of structural (and frictional) unemployment or mismatch in an economy and determines the location of the Beveridge curve (Hansen, 1970:6-9; Borsch-Supan, 1991:280-281). Movements along the Beveridge curve indicate where the economy is in the business cycle. At times of a recession, there is low $V$ and high $U$, and in a boom the economy experiences high $V$ and low $U$. Consequently where the economy is on the Beveridge curve is a measure of the cyclical unemployment in the economy (Bleakley & Fuhrer, 1997: 3).
However, Hansen (1970:9) emphasized that the Beveridge curve is derived from static assumptions about the supply, demand and employment curves. This shortcoming was criticized by economists such as Phelps and Holt who argued that the flows of the unemployed and vacancies must be used in analyzing the labor market rather than the stock of the unemployed and vacancies in order to get a better understanding of what factors affect structural unemployment and hence the location of the Beveridge curve. This new macroeconomic analysis of unemployment was labeled ‘search theory’ or ‘flow approach’.

The main component of search theory was explained by the use of matching models put forward by economists such as Blanchard et. al. (1989), Blanchard & Diamond (1994) and Pissarides (1985). According to the search theory, the matching process is not instantaneous as it depends on various factors such as the availability of skills needed to fill a certain vacancy, geographical discrepancies between high $V$ existing in one area and high $U$ existing in another, or differences in search intensity on the part of firms and the unemployed (Blanchard & Diamond, 1989: 8; Rodenburg, 2007: 21; Webster, 1999: 405; Pissarides et al., 1986: 513; Cahuc & Zylberberg, 2004: 512).

Such analysis shows that any factor that improves the matching process reduces $U$ and $V$ and hence shifts the Beveridge Curve inwards. This is demonstrated in figure 3 as an inward shift in the Beveridge Curve from $AC$ to $AC'$ represents an improvement of the
labor market allocation process. This shift could be due to factors speeding up the market-clearing process, such as better information flow about job openings, or an enhanced mobility of workers which enlarges the menu of available jobs for the workers. An inward shift also indicates that unemployment is lower for any given number of vacancies.

Figure 3: Shifts in the Beveridge Curve

On the other hand, higher inefficiencies in the labor market such as higher mobility costs or a growing mismatch between the qualities supplied and demanded lead to an outward shift of the Beveridge Curve. In figure 3, this effect is shown as a shift from $AC$ to $AC''$. Structural and or frictional unemployment increases, as we will observe higher unemployment rates for a given level of vacancies (Cahuc & Zylberberg, 2004: 512-513; Bowden, 1980: 45; Blanchard et. al., 1989: 8; Bleakley & Fuhrer, 1997:8; Webster, 1999: 405).

(Based on: Cahuc & Zylberberg, 2004: 512)
3 Employment and Unemployment in Egypt in the Period 2004-2010

In the following, some facts about the growth of Egypt’s economy as well as the most important developments on the labor market are presented. To start with, figure 4 shows the GDP growth rate as well as the unemployment rate for the observation period. Based on annual reports published from the CBE, it is clear that the Egypt’s GDP grew steadily from 2004 to 2008. This was due to high growth rates in most of the economy’s sectors, especially the manufacturing sector, the agriculture sector, wholesale and retail trade, financial intermediation and support activities, and the Suez Canal.

As the annual CBE reports also show, this growth was mainly driven by higher investment spending which grew steadily during the period. More than half of these investments came from the private sector, whose share as a percentage of total investment increased steadily over time, reaching about 86% in 2008 (figure 5). Though Egypt was only slightly affected by the global financial crisis 2008, GDP growth rates dropped somewhat in the first two quarters of 2009. The country could not completely absorb global spillover effects hurting especially tourism and trade (Suez canal).

Figure 4: Annual GDP Growth and Unemployment

(Sources: CBE Annual Reports for GDP; CAPMAS for unemployment rate data)
However, growth picked up in the last two quarters of 2009 especially in the sectors of oil and gas extractions, communication and IT and real estate. Despite the drop in the private sector investment in 2009 due to lower FDI, it remained the main driver of the economy, contributing to 57.6% of total investment (CBE, 2009). Finally, the first quarter of 2010 witnessed high economic growth of 5.8% mainly from manufacturing, tourism, and increasing revenues from the Suez Canal (Bloomberg 2010).

Summarizing, growth rates were healthy during the period 2004 to 2010. It is not surprising that such growth rates contributed to creating job opportunities and reduced unemployment in Egypt. Actually, the unemployment rate dropped from 11% in 2005 to 9.4% in 2009 (see figure 4).

Economic reforms initiated in mid 2004 could also be a factor positively affecting the labor market. Most reforms aimed at fighting recession, creating employment opportunities, and increasing economic growth rates. Some reforms were specifically designed to improve the information flow between job seekers and firms offering positions. For instance, in 2006 the Canadian International Development Agency (CIDA) and the United States Department of Labor (USDOL) have initiated a project that aims to upgrade public employment services in Egypt. The project developed 27
employment offices - one office per governorate. Furthermore, more than 60 offices were developed by the Ministry of Manpower and Migration (MoMM) with the assistance of CIDA. The MoMM focuses primarily on providing information about employment services and announcing them in a monthly bulletin. The reforms also aimed at improving the quality of the labor force through various training and educational reform programs. Many training programs were initiated to enhance the quality of the labor force and hence improve the match between labor market requirements and labor force skills (IDSC, 2005: 2, 37; Hassan & Sassanpour, 2008: 2; Assad & Barsoum, 2007: 5; El-Megharbel, 2007: 15-16).

Furthermore, income tax reforms were passed in June 2005 which served to reduce the income tax of workers. Similar exemptions were made for corporations in 2006 (Amcham, 2005). Reduction of taxes could increase the incentive to search for a better paid job, as it increases the expected wages earned. Alisa (2007:6) explains that the period between mid 2004 and mid 2006 has also witnessed extensive privatization of state owned enterprises and banks, leading to more than half of the banking sector becoming privately owned.

Another interesting aspect is the distribution of the unemployed by age classes. As figure 6 shows, the youth and the young adults (age classes 15 to 29 years) have the highest unemployment rates, with the highest unemployment rate for the age class 20-24 years old. This was also shown in Assad (2007: 14), Hassan & Sassanpour (2008: 4) and El-Megharbel (2007: 4) who explained that the unemployment problem in Egypt is mainly a problem of youth entering the labor market for the first time and finding their first job, rather than a problem related to climbing the job ladder. Consequently, this age group suffers from the highest unemployment rate relative to the rest of the age groups. As the labor force gets older, the unemployment problem is almost nonexistent, averaging about 3% for the age bracket 30-39 and almost zero for the older age groups. Consequently, the age classes 15-29 benefitted the most from declining unemployment rates between 2004 and 2010.

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1 Except for the age group 50-59, that witnessed an increase of unemployment by an average of 3.8% for the first 2 quarters of 2009.
When analyzing the unemployment rate by education level, we notice that $U$ increased for all educational levels\(^2\) but for intermediate education levels (see figure 7). However, the unemployment rate of those with an intermediate education level remains very high. Actually, unemployment for persons with an intermediate education level is, by far, the highest among all education levels. The average unemployment rate is more than 56% for this group which represents half the number of new entrants to the labor force. This is followed by university graduates with an average unemployment rate of about 30.5% for the total study period, where both groups account for almost 88% of total unemployment. Furthermore, university graduates witnessed the highest increase in unemployment, amounting to 9.2% from 2004 to 2010. This shows the GDP growth rates and labor market reforms have only slightly reduced the unemployment rates of those with an intermediate level of education, and did not help to develop a strong market for university graduates.

\(^2\) Less than intermediate level of education includes primary and secondary education; the intermediate level comprises secondary education; above intermediate comprises 2 year colleges, and university and higher includes university education and graduate education (Masters and PhD).
Examining the growth in employment by sector allows pinpointing the sector that generated the highest vacancies that were occupied by the unemployed (figure 8). The private sector witnessed the highest employment growth, with an average annual job growth rate of 1.15%. More than half of the increase in the private sector comes from the informal sector\(^3\), also called out of the establishments (figure 9). According to OECD (2009: 2), the main reason for the growth in the informal sector is the complicated procedures for starting up formal business activities. El-Megharbel (2007: 4) explains that the jobs in the Egyptian informal sector are not decent with respect to work conditions, sustainability and wages. Hassan & Sassanpour (2008: 7) explain that informal sector employment in Egypt is mainly in the fields wholesale and retail trade, low technology manufacturing, construction and transport. Assad & Barsoum (2007: 22) show that men dominate the informal sector with almost one-third of total young male employment working in this sector. The situation is different for women, as there is low social acceptability for women to work in the informal sector, making it constitute less than one-fifth of total female employment. These facts undermine the

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\(^3\) The informal sector is defined as enterprises who do not meet any of the conditions of license, registration and regular bookkeeping (OECD, 2009: 2; Alisa, 2007: 23).
effect of the initiated government policies on increasing employment, and they show that the informal sector has been the main source of job growth.

Figure 8: Distribution of the Working Population by Sectors

*Others include co-operatives and the Foreign Sector.
Source: CAPMAS.

The second largest source of employment is the government sector comprising about 25% of the total working population. El-Megharbel (2007: 5), Assad & Barsoum (2007: 22) and El Mahdi (2002: 99) explain that the government sector been a primarily source of employment, especially for women, due to the government guarantee program initiated from the sixties to the eighties. The employment guarantee program created overstaffed government and public sectors that were unable to provide new job opportunities for the growing labor force. In turn, the government and public sectors declined in importance since the mid 1990s, after the initiation of the ERSAP and the efforts by the government to reduce expenditure. That is why figure 8 shows that both sectors have actually shrank during the study period as opposed to the private sector that has been growing steadily.
Figure 9: Employment in the Private Sector by Type of Establishment

Source: CAPMAS.
4 Data Description

The number of vacancies was calculated from the monthly series of the number of advertised for position by private and public sector companies in the 3 Egyptian national newspapers; ElAhram, ElAkhbar and ElGomhoreha by IDSC⁴ (Shaheen & Mohamed, 2009: 7). This indicator represents the total advertised positions inside Egypt, for both the private, the government and the public sectors and it was first constructed in January 2000. An index known as the Help Wanted Index is commonly constructed for calculating the number of advertised positions in newspapers and is used in the United States and Canada for calculating vacancy rates. Other countries such as Germany have an official vacancy statistic constructed by the Bureau of Labor. Although Shaheen & Mohamed (2009: 7) explained that the Help Wanted Advertising Index (HWI)⁵ was constructed in Egypt since 2000 by IDSC, the authors were not able to get this information.

\[ V \] was computed by adding government, public and the private sector vacancies and dividing it by the labor force in the respective year. Due to the fact that private sector employment grew more substantially that the government and public sector employment in the period 2004 to 2010, the vacancy rates were also computed individually. The government and public sector (both referred to hereinafter as the public sector) vacancy rates, hereinafter \( V_{pub} \), were computed by summing both sectors and dividing by the labor force, and the same was done to get the private sector vacancy rates hereinafter, \( V_{priv} \). The total labor force is calculated both monthly and annually by CAPMAS. This paper used the annual labor force, as it is assumed that the labor force does not fluctuate very heavily during the year.

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⁴ IDSC stands for Information and Decisions Support Center and it lies under the Egyptian Cabinet.

⁵ The HWI is an index that is constructed based on the counts of the number of help-wanted advertisements entered in classified sections of newspapers in fifty-one large cities (Abraham & Wachter, 1987: 208).
$U$ is calculated by dividing the number of unemployed persons, defined by CAPMAS as the number of people between the ages of 15 to 63 who are able and willing to work, and actively searching for a job during a certain reference period, by the labor force in the respective year. $U$ is calculated by CAPMAS both quarterly and annually. However, CAPMAS does not provide monthly unemployment rate statistics. This means that the quarterly unemployment rates cannot be directly comparable with the monthly vacancy rates. Consequently, $V$ was also computed on a quarterly basis. It should be noted that quarterly data fit well into the concept of the Beveridge curve, as the nature of this relation is not very short-run. In fact many authors estimated the Beveridge curve using annual data, see Webster (1999), Katherine & Wachter (1987) and Borsch-Supan (1991).

Analyzing the quarterly unemployment rates in Egypt shows that we can divide the unemployment rates into two major sub-periods. As figure 10 shows, the first sub-period between 2004 and the first half of 2006 is determined by double-digit unemployment rates, whereas the unemployment rates in the second sub-period are persistently lower. Interestingly, the Egyptian labor market suffered only slightly from
the global financial crisis. Unemployment increased by less than 1% between 2008 and 2009, with the latest quarter witnessing a decline of \( U \) to 9.1%.

Table 1: Statistical Description of the Data

<table>
<thead>
<tr>
<th>Variable</th>
<th>mean</th>
<th>std.dev.</th>
<th>min</th>
<th>max</th>
</tr>
</thead>
<tbody>
<tr>
<td>( U ) (unemployment rate in %)</td>
<td>9.89</td>
<td>1.08</td>
<td>8.37</td>
<td>11.80</td>
</tr>
<tr>
<td>( V ) (vacancy rate in %)</td>
<td>0.080</td>
<td>0.044</td>
<td>0.027</td>
<td>0.209</td>
</tr>
<tr>
<td>( V_{prv} ) (vacancy rate in %: private offers)</td>
<td>0.064</td>
<td>0.032</td>
<td>0.022</td>
<td>0.130</td>
</tr>
<tr>
<td>( V_{pub} ) (vacancy rate in %: public offers)</td>
<td>0.015</td>
<td>0.017</td>
<td>0.002</td>
<td>0.079</td>
</tr>
</tbody>
</table>


The labor force of Egypt amounted 20.9 million in 2005 and increased at an increasing rate in the period 2006 and 2007, when the annual growth rate peaked at 5%. Though the labor force also increased in 2008 and 2009, the growth rate gradually declined to 2.9%. Hassan & Sassanpour (2008: 2) note that males dominate three fourths of the labor force, with only one fourth of the labor force being females due to lower female participation rates.

As for vacancies, the first period spanning from 2004 until the third quarter of 2006 witnessed low vacancy levels. \( V \) then increased substantially in the fourth quarter of 2006 reaching its maximum value of 0.21%. In the period 2007 to 2009 it altered in the interval between a minimum of 0.09% and a maximum of 0.13%. The coefficient of variation, i.e. the ratio of standard deviation to the mean, is much higher for the vacancy rate than for the unemployment rate. Most of the vacancies are from the private sector.
5 Empirical Results

To start with the econometric analysis of the data, we first plot the vacancy rate against unemployment rate as shown in figure 11. It is obvious from this plot that we should split the data into two sub-periods. The first period is 2004 to 2005 where we observe that $V$ was relatively constant, whereas $U$ increased from 10.4% in the first quarter of 2004 to 11.7% in the last quarter of 2005. The second period starts in 2006 which marks the peak of a new Beveridge curve which is closer to the origin. In the following quarters, the vacancy rate declined and the economy shifted downwards along this new Beveridge curve. An economic reason for this shift could be the extensive privatization programs which peaked in 2007 due to the economic reform programs. This has lead private sector firms to become the main employer and more aggressively seek for workers with the desired skills, in addition to providing training programs and more transparent job advertisements which enhance the matching process.

Though the inward shift of the Beveridge curve is clearly visible and signals an improvement in the matching process between $V$ and $U$, an empirically test is necessary to check for the significance of this structural break.

Figure 11: A Plot of Unemployment versus Vacancies 2004 to 2010

The dependent variable in our model is $U$ because it is the variable that responds to changes in $V$. To allow for a non-linear relation between the vacancy rate and the
unemployment rate, all estimated models not only the linear $V$ term, but also $V^2$ as regressors. The structural break hypothesis is tested by adding a dummy variable $D_{2006to2010}$. The dummy variable takes the value zero for the periods 2004 to 2006, and the value one for all other years. The choice of the year 2007 for a possible structural break follows figure 11 which hints towards a shift of the Beveridge curve at that time.

The results are presented in table 2. In model 1, both $V^2$ and $D_{2006to2010}$ are highly significant, indicating that the relationship between $V$ and $U$ is quadratic and concave. The significant and negative parameter value of the dummy confirms that the Beveridge curve has shifted inwards in the period 2007 to 2010 relative to the previous period. However, model 1 suffers from a Durbin Watson statistic which is in the inconclusive region, implying the risk of having positive autocorrelation of the residuals with the risk of underestimating the standard errors of the parameters. Consequently, model 2 estimates the Beveridge curve using $V_{prv}$ and $V_{prv}^2$ instead of $V$ and $V^2$ in model 1. All other specifications are the same as in model 1.

Compared to model 1, the Results of model 2 are better from an econometric perspective: The parameters of $V_{prv}^2$ and $D_{2006to2010}$ are again highly significant, as well as the whole model with an adjusted $R^2$ of 0.82. The linear vacancy rate is on the edge between being significant and insignificant. The Durbin Watson statistic of 1.45 does not reject the null hypothesis of zero residual autocorrelation at the 99% confidence level.

The results of the model are interesting as they show that there is a quadratic concave relationship between $V$ and $U$ meaning that the higher the level of $V$ is the higher is the reduction in $U$. Finally, the significant dummy variable $D_{2006to2010}$ confirms that the Beveridge curve has shifted inwards when comparing the periods 2004-2006 to the periods 2007-2010. Figure 12 visualizes the estimated Beveridge curve according to model 2, which provides the best and most plausible results. The figure does not only confirm the negative relation between unemployment and vacancies for a wide range of vacancy rates, but also shows that the matching process improved substantially in the second half of the observation period.
Figure 12: The estimated Beveridge Curve of Egypt

![Beveridge Curve Graph]

Figure shows result for the private sector (model 2).

Table 2: Parameter Estimates of the Beveridge Curve

<table>
<thead>
<tr>
<th></th>
<th>model 1</th>
<th>model 2</th>
<th>model 3</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>const</strong></td>
<td>10.44 (22.82)**</td>
<td>9.96 (14.52)**</td>
<td>10.95 (57.43)**</td>
</tr>
<tr>
<td><strong>V</strong></td>
<td>18.61 (1.44)</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>V^2</strong></td>
<td>-122.97 (-2.23)**</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>V_{prv}</strong></td>
<td></td>
<td>42.66 (1.66)</td>
<td></td>
</tr>
<tr>
<td><strong>V_{prv}^2</strong></td>
<td></td>
<td>-366.23 (-2.27)**</td>
<td></td>
</tr>
<tr>
<td><strong>V_{pub}</strong></td>
<td></td>
<td></td>
<td>9.47 (0.54)</td>
</tr>
<tr>
<td><strong>V_{pub}^2</strong></td>
<td></td>
<td></td>
<td>-432.00 (-1.87)*</td>
</tr>
<tr>
<td><strong>D_{2007-2010}</strong></td>
<td>-1.97 (-5.84)**</td>
<td>-1.81 (-4.62)**</td>
<td>-1.91 (-9.81)**</td>
</tr>
<tr>
<td><strong>obs</strong></td>
<td>25</td>
<td>25</td>
<td>25</td>
</tr>
<tr>
<td><strong>R^2</strong></td>
<td>0.72</td>
<td>0.82</td>
<td>0.81</td>
</tr>
<tr>
<td><strong>D-W</strong></td>
<td>1.17</td>
<td>1.45</td>
<td>0.96</td>
</tr>
</tbody>
</table>

* t-values in brackets.
** *, ** and *** represent a level of significance of 10%, 5%, and 1%, respectively
Finally, model 3 estimates the Beveridge curve using $V_{pub}$ and $V_{pub}^2$ as well as the dummy for the structural break to check whether the Beveridge curve holds if we solely consider the public sector. The results show again that $V_{pub}^2$ and the shift of the Beveridge curve are significant, but the value of the Durbin Watson statistic is very poor. Consequently, we do not rely on the results of model 3 to make any reliable conclusions. One reason for the irrelevance of public job offers for the employment situation is the subdued use of newspapers for government vacancies. Perhaps more important, however, are the economic reforms intended to strengthen the market forces and to reduce the number and size of state-owned enterprises.
6 Conclusion

This paper attempts to estimate the Beveridge Curve for Egypt. The parameters of the Beveridge Curve for both the private and the public sector as well as for the aggregated vacancies were estimated for the period 2004 to 2010 using quarterly data. Vacancy rates were defined by the number of jobs advertised for in the 3 Egyptian national newspapers; ElAhram, ElAkhbar and ElGomhoreha.

The results are mixed. Model 1, which defined the vacancies as the sum over private and public vacancies, showed no reliable results due to a low value of the Durbin Watson statistic. As a second attempt, two distinct Beveridge curves for each of both sectors were estimated. Economically, this split mirrors the fact that the bulk of vacancies as well as the main driver of growth in Egypt was the private sector, not the public one. Though historically much larger than in European economies, the public sector started to shrink as a result of market reforms.

Similar to model 1, the estimation results using public sector vacancies turned out to be not reliable. Much better, however, are the estimation results based on private vacancies. They show clear evidence that the Beveridge curve relation, that is the negative relation between unemployment and vacancies, holds for Egypt. Also, our results indicate that the relationship between vacancy rates and unemployment rates is concave, implying that the trade-off between vacancies and unemployment is stronger for high vacancy rates. Finally, the results show that the Beveridge curve has shifted inwards in the period from 2007 to 2010 relative to the period from 2004 to 2006. This important result shows that the matching process between firms offering jobs and job seekers has significantly improved during the study period.

We consider the promising results for the private sector an encouragement to continue with liberalization, privatization, and a general strengthening of the market processes. The matching process has improved, not deteriorated. As a side effect of the improved matching process, the competition for jobs will gradually change into a competition for employees, which is an excellent basis for increasing wages and productivity.
References


