The Relation Between Public and Private Employment in Egypt: Evidence and Implications

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Abstract

Job creation is the most important challenge facing Egypt today. Economic performance has been uneven over the last three decades, but even in periods of high growth, the job content of growth has not been strong enough to absorb new entrants. The 1990s and early 2000s saw the acceleration of structural adjustments. The fast growing role of the private sector and the contraction of the public sector are considered the most important characteristics of this period, generating notable sectoral shifts. The findings of the paper support the view that sectoral shifts have been an important source of private employment fluctuations in Egypt. They also provide strong evidence of the stage of business-cycle effects. Moreover, one of the important findings of the paper shows that public sectoral shifts exhibit stronger effect on private employment growth than private sectoral shifts do. However, failure to align public sectoral shifts with growth in the private sector has had a negative effect on private employment growth, increasing unemployment. The findings also confirm the crowding-out effect of higher government expenditure on private employment, particularly during a boom. Finally, the findings show that changes in domestic credit going to the private sector as a ratio of private GDP, and higher exports ratio to GDP have statistically significant positive effects on private employment growth. Overall, the findings signify the importance of policies that aim at increasing the job content of private-led growth in Egypt.

ملخص

يمثل توفير فرص العمل أحد أهم التحديات التي تواجه مصر في الوقت الراهن. فقد اتسم الأداء الاقتصادي بالتفاوت خلال العقود الثلاثة الأخيرة؛ وحتى خلال الفترات التي شهدت معدلات مرتفعة من النمو، لم يكن محتوى الوظائف في النمو قويا بما يكفي لاستيعاب الوافدين الجدد إلى سوق العمل. وقد شهدت التسعينيات من القرن العشرين وبداية العقد الأول من الألفية الثالثة زيادة في وتيرة التعديلات الهيكلية. ويعد التنامي السريع في دور القطاع الخاص وتقلص القطاع العام من أهم الخصائص التي اتسمت بها هذه الفترة، الأمر الذي أدى إلى حدوث تحولات قطاعية ملحوظة. وتدعم نتائج هذه الدراسة وجهة النظر القائلة بأن التحولات القطاعية كانت إحدى المصادر الهامة لتقلبات التشغيل الخاص في مصر؛ كما تقدم هذه النتائج شواهد قوية على الآثار الناجمة عن المرحلة التي يمر بها الاقتصاد من حيث الدورة الاقتصادية. كما تشير إحدى النتائج الهامة للدراسة إلى أن التحولات في القطاع العام تعود بتأثير أكبر على نمو التشغيل الخاص مقارنة بتحولات القطاع الخاص. إلا أن عدم اقتران التحولات القطاعية في القطاع العام بفترات النمو في القطاع الخاص كان له تأثير سلبي على نمو التشغيل الخاص، الأمر الذي أدى إلى زيادة البطالة. كذلك تؤكد نتائج الدراسة فرضية أن زيادة الإنفاق الحكومي تؤدي إلى مزاحمة التشغيل في القطاع الخاص، لاسيما خلال فترات الرواج الاقتصادي. وأخيرا، تشير النتائج إلى أنه ثمة آثار موجبة معنوية إحصائيا للتغيرات في الائتمان المحلي الموجه للقطاع الخاص كنسبة من الناتج المحلي الإجمالي الخاص، وللزيادة في الصادرات كنسبة من الناتج المحلي الإجمالي، على نمو التشغيل الخاص. وبصفة عامة، تشير النتائج إلى أهمية السياسات التي تستهدف زيادة محتوى الوظائف في النمو الذي يقوده القطاع الخاص في مصر.

JEL classifications: C22, E24, E32, J21

Keywords: sectoral shifts, crowding out, job content, credit ratio, exports ratio, private sector, Egypt

I. INTRODUCTION

The sectoral shifts hypothesis (SSH hereafter) has been exercising a notable influence on business cycle analysis since Lilien's (1982a,b) seminal work.[1] The SSH emphasizes that intersectoral shocks, reallocation shocks affecting the composition of demand, are the driving force behind fluctuations in aggregate employment and unemployment. Using the weighted variance of cross-sectoral employment growth rates as a proxy for the magnitude of sectoral shifts, Lilien (1982a) interpreted the finding that there is a strong positive correlation between his proxy and the US unemployment rate as an evidence supporting the SSH.

The relevance of the SSH as an important source of unemployment fluctuations has generated a controversy that still persists because of the empirical difficulty in separating reallocation shocks from aggregate shocks. Abraham and Katz (1986) criticized Lilien's (1982a) finding on the grounds that sectoral employment growth rates could be poor proxies for sectoral shifts when sectors vary in terms of their cyclical response to aggregate shocks.[2]

Empirical studies have tried to avoid Abraham and Katz criticism.[3] Purging Lilien's dispersion index of aggregate effects has often been used as an effective way to overcome the observational equivalence problem. The purging practice suggests the decomposition of the index into an idiosyncratic component and a component representing the response to aggregate shocks. This practice filters out aggregate shocks either directly from the dispersion indices or indirectly from the employment growth rates used to construct the indices.

Some empirical studies use various purged measures, and they still find that intersectoral shocks are an important source of fluctuations of the unemployment rate (Mills,

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[1] Lilien (1982b) explicitly models the formal relationship between intersectoral shocks and their macroeconomic effects. Before early 1980s, most models of unemployment fluctuations had regarded aggregate shocks as the only driving force; Keynesian and new-classical models can be bunched together to the extent that they rely on aggregate shocks rather than reallocation shocks (see Davis 1987).

[2] To avoid the observational equivalence problem, Abraham and Katz considered the correlation between vacancies and Lilien's dispersion index and found evidence against the SSH. Davis (1987) emphasized that while Abraham and Katz uses the stock of vacancies in the correlation relation, the sectoral shock theory requires a positive correlation between the flow of vacancies and the unemployment rate. Nonetheless, Hosios (1994) showed the limitations of the discriminating methods related to the unemployment-vacancy relationship, such methods faded away.

[3] This prompted various attempts to build alternative measures that capture intersectoral shocks using stock market data (Loungani, Rush, and Tave (1991); Brainard and Culter (1993); Shin (1997)). These studies find that their stock-market based measures are significant explanatory variables for the unemployment fluctuations. Nonetheless, they were criticized because they did not provide compelling argument supporting their claim that their measures of intersectoral shocks are immune from aggregate influences.

Pelloni, and Zervoyanni (1995,1996)). Mills, Pelloni, and Zervoyanni (1995) employ an updated time series methodology using US quarterly data, and find a positive and statistically significant relationship between the unemployment rate and both purged and unpurged dispersion indices.

Some other empirical studies, using purged indexes, tend to reject the SSH (Abraham and Katz (1987); Neellin (1987)). In general, empirical results would vary widely according to the choices made by the researcher concerning the filtering steps and the variables used as proxy for aggregate shocks see (Gallipoli and Pelloni 2008).

Davis (1987) extended the investigation of the sectoral shifts hypothesis to include the effects of the stage-of-business-cycle on the relationship between the unemployment rate and the chosen dispersion measure of sectoral shifts, in addition to exploring the influence of past patterns of labor reallocation on current employment. The rationale behind the stage-of-business-cycle effect is that agents would prefer to shorten unemployment spells during expansions and lengthen them during recessions if the opportunity cost of unemployment is pro-cyclical. Hence, a given amount of labor reallocation will be associated with less measured unemployment during expansion and more unemployment during recessions. Contrary to Davis (1987), Mills, Pelloni, and Zervoyanni (1995) provide supporting evidence of stage-of-business-cycle effect.

Job creation is the most important challenge facing Egypt today. Economic performance has been uneven over the last three decades, but even in periods of high growth, the job content of growth has not been strong enough to absorb new entrants. The problem became more critical once the government began to restrict its guaranteed employment policy and to practically end it in late 1980s. Consequently, the unemployment rate was fairly low during 1980s, 5-7 percent. Since 1990 till 2010, Egypt's unemployment rate has remained stubbornly high, in the range of 8-11 percent, through economic cycles, major structural changes in the Egyptian economy, and a number of external shocks see (Hassan and Sassanpour 2008).

The 1990s and early 2000s saw the acceleration in the structural adjustments. The fast growing role of the private sector and the contraction of the public sector are considered the most important characteristics of this period. This process generated notable sectoral shifts. To set the stage for the analysis, we note that the latest data for the Egyptian labor market estimate labor force at 27.9 millions, of which nearly 2.5 millions are unemployed, 6.6

millions are in the public sector, 18.7 millions are in the private sector, of which 12.2 million are out of establishments, including 7.5 million in the agriculture sector, and the remainder 6.5 million are in established entities.[4] Clearly, the public and agriculture sectors remain the main sources for employment. However, the scope for employment growth is rather limited. Further, the informal sector has grown in size over time, while there is further scope for the private formal sector to grow. Yet, employment growth in the latter has been rather limited despite significant economic growth rates that the Egyptian economy has achieved in the last decade. Indeed, unemployment has remained persistently high despite high growth rates while informal employment has grown in size. Failure to increase formal private employment, coupled with deliberate attempt to reduce excessive employment in the public sector, has contributed to the rise of higher unemployment and informal employment over time.

The aim of this paper is three fold. First, we qualitatively document the sectoral shifts phenomenon and its implications. Second, we construct a proxy for intersectoral shocks using sectoral employment data and empirically test the SSH and its implications. Third, we study the effect of government expenditure on private and public employment over the business cycle.

This paper contributes to the literature on sectoral shifts on three grounds. First, to the best of our knowledge, this is the first study that tests the SSH and its implications in the MENA region. Second, it explores one of the previously unexploited implications of the SSH, which is the influence of the public sector's sectoral shifts on private sector employment.[5] Third, it shows that when the dynamics of public sector macro-data is quite different from that of private sector, the results of the studies that use the overall macro-data could be largely unreliable.

The findings of this paper support the view that sectoral shifts have been an important source of private employment fluctuations in Egypt. They also provide strong evidence of the stage of business-cycle effects. Moreover, one important finding of this paper is that public sectoral shifts practice stronger effect on private employment growth than private sectoral shifts do. The findings also confirm the government expenditure crowding out hypothesis of

[4] CAPMAS, Quarterly Bulletin of Labor Force Survey, the third quarter, 2010. It is estimated that formal employment accounts for more than one-third of total employment (25.3 million), most of them are in non-agriculture private employment.

[5] Of course, the SSH is interpreted in this special case differently as it will be explained later.

private employment. Finally, the findings show that changes in domestic credit to the private sector, as a ratio of private GDP, and exports ratio have statistically significant effects on private employment growth.

The rest of this paper is organized as follows. Section II provides the qualitative analysis. Section III reviews public-private sectoral shifts and their implications. Section IV comprises the econometric base model and its extension. In Section V, regression results and interpretations are introduced. Section VI concludes and provides policy implications.

II. QUALITATIVE ANALYSIS

A. Sectoral Shares in Total Employment and Output

The share of the agriculture sector in output and employment has been declining over time. The implications are sectoral shifts have attracted employment away from the agriculture sector, progressively decreasing its shares in output and employment over time. To illustrate, the sectoral share of total employment was 38.9 percent in 1981/82 and has progressively shrunk over time to reach 26.9 percent in 06/07. However, in contrast to its high share of employment, the sectoral share of output was significantly smaller in 1981/82, 18.8 percent, and declined steadily over time to reach 12.5 percent in 2006/07. Output and employment are highly concentrated in the private sector.

In contrast, the shares of the manufacturing sector of output and employment have steadily picked up over time with the exception of a few episodes.[6] Sectoral shifts have absorbed more employment in the manufacturing sector and contributed to the increase in the sector's share of output over time. To illustrate, the sectoral share of employment was estimated at 10 percent in 1981/82 and has steadily increased to reach 13 percent in 2006/07. Correspondingly, the sector's share of output has steadily increased over time from 13 percent in 1982/83 to 18.8 percent in 06/07. Employment and output have progressively declined in the public sector over time, coupled with a sharp surge in the shares of the private sector, starting in mid-nineties.

There is a sharp contrast between the shares of the petroleum sector of output and employment. Despite the sector's high share of output, reaching 14.5 percent in 1983/84, its share of employment has been negligible over time, less than one (0.5) percent in 06/07.

[6] The manufacturing sector does not include manufactured oil products.

Through 2000, employment had been concentrated in the public sector. Subsequently, private employment has picked up to become the dominant share of employment. Moreover, the sector's share of output has steadily decreased over time, reaching 7 percent in 06/07. Output is mostly in the public sector. In light of the steady decline in the sector's share of output, more investments are necessary to diversify away from the energy sector and increase the share of the non-energy sector of total output over time.

The share of the electricity sector has been steadily increasing from 0.59 percent in 1981/82 to more than one (1.15 percent) percent in 06/07. Despite this growth, which reflects increased usage of electricity across the economy, the sectoral share of employment has been flat, slightly above 0.7 (0.75 percent) percent in 06/07. The growth of employment has not been conducive to job growth over time. Output and employment are predominantly public in the electricity sector.

In contrast, the share of the construction sector to total employment has steadily increased over time, nearly doubling between 1981/82 and 06/07 to approximately 8 (7.8) percent of total employment. In contrast, the sector's share of output has been cyclical over time, reflecting cyclicality on the demand side in response to fluctuations in economic conditions and capital flows. Nonetheless, the construction sector has been a major driver of employment growth over time. Both output and employment are predominantly private.

Similarly, the share of employment in transportation and storage has increased from 2.9 percent in 1981/82 to nearly 4 percent in 06/07. In contrast, the sector's share of output has shrunk over time, from above 6 (6.3) percent in 1984/85 to 5.7 percent in 06/07. The steady increase in employment provides potential for further increase in employment in the transportation and storage sector. The contribution of the private sector to output and employment has significantly and steadily increased since early nineties to become the dominant share of the sector's output and employment.

There has been a surge in the share of the communications sector in total output, increasing from 1.5 percent in 81/82 to over 6.6 percent in 2006/07. The surge reflects the importance of the communications sector, which has been the main driver of growth in Egypt. Historically, the sector was predominantly public. However, starting in 1999/2000, on account of privatization, the shares of the private sector in output and employment have steadily increased.

The output of Suez Canal, predominantly public, has fluctuated over time with international prices and global economic conditions. Nonetheless, the share of employment in the sector has been negligible over time.

The share of employment in the trade, finance and insurance sector has been moderately increasing over time, from 8 percent in 81/82 to 9.9 percent in 06/07. The increase reflects a deliberate attempt to intensify labor representation and create new jobs, while the sector's share of output has continued to hover around 16.5 percent, reflecting cyclicality on the demand side. Both output and employment are predominantly private.

The tourism sector has been a major driver of employment and real growth. Since 1992/93, the sector's share of employment has increased steadily from 1.4 percent to 1.7 percent in 2006/07.[7] Most notably, however, is the surge in the sector's share in output from around one percent in 1981/82 to slightly above 3 percent in 06/07. Both output and employment are predominantly private.

In real estate and housing, the sector's share of employment has been declining over time, although relatively stable more recently, slightly above one percent. Similarly, the sector's share of output has been on a declining path, reaching a ratio of slightly above 4 percent, more recently. Both output and employment are predominantly private.

In government, social and personal services, the sector's share of output has been declining lately, but remains significant, accounting for 16 percent of the economy's output. The sector's share of total employment is even much higher; exceeding 30 percent, although has been declining somewhat lately. Both output and employment are predominantly public.

To summarize, the economy is decomposed into three groups: commodity-producing sectors, services-producing sectors, and social sectors.[8] The shares of commodity-producing sectors have been declining over time, both in output and employment. The decline in employment is particularly pronounced in the public sector. The increase in the shares of services-producing sectors has made up for the decline in goods-producing sectors. However, the increase, both in employment and output, is driven by private sector activity, while the

[7] The tourism sector comprises hotels and restaurants. However, it has positive spillover effect on the size of the transportation and retail trade sectors that grow in parallel with the growth in tourism.

[8] Commodity-producing sectors include agriculture, industry and mining, petroleum and products, electricity, and Construction. Services-producing sectors include transportation, communications, Suez Canal, trade, insurance & finance and hotels & restaurants. And social sectors include housing & real estate and government, social, and personal services.

shares of public services-producing activity have been declining over time. The shares of social sectors in employment and output have also been declining over time, reflecting decline in public activity, although there is a moderate increase in the share of private employment recently.

As for sectors that are driving growth and cyclicality in Egypt, four sectors are leaders. In the goods-producing segment, leading sectors are manufacturing and construction. In the services-producing segment, leading sectors are wholesale and retail trade and financial intermediaries. Combining the four leading sectors (see Figures 1a, b, c), we note that their shares of GDP and employment have been increasing over time, where the combined share of output accounts for nearly 40 percent, while the employment share accounts for nearly 25 percent. However, a decomposition of their activity into private and public indicates a surge in the private share and a decline in the public share, which is particularly pronounced for employment.

Figure 1a. Share of the Sectors Shaping the Business Cycle in Employment and GDP

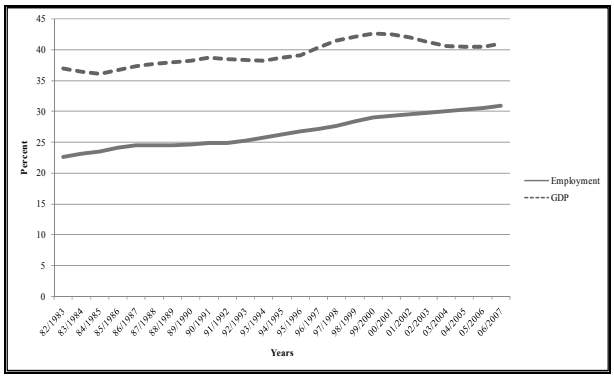


Figure 1b. Share of the Public and Private Employment by the Sectors Shaping the Business Cycle

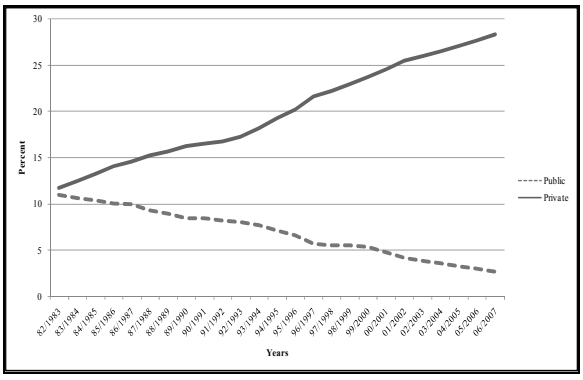
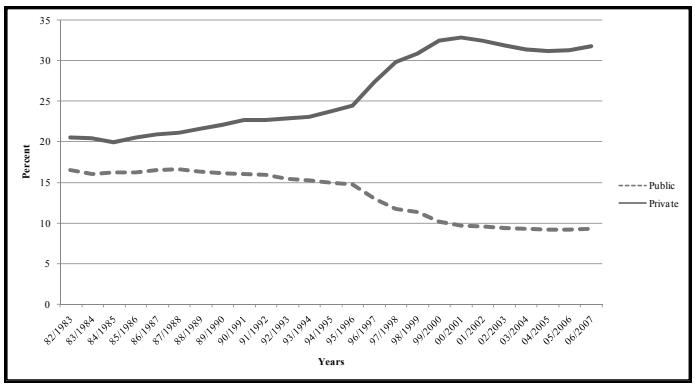


Figure 1c. Share of the Public and Private Output by the Sectors Shaping the Business Cycle



Source: Authors' calculations based on sectoral data from the Ministry of Economic Development, Egypt.

B. Developments in Sectoral Employment and Real Growth

Overtime, the growth of agriculture output has surpassed employment growth. However, both employment and real growth exhibited similar patterns of cyclicality. Specifically, growth of both output and employment decreased in the early nineties and picked up in late nineties. Cyclicality is dominant in the private sector.

With a few exceptions, real growth has surpassed employment growth in manufacturing.[9] Similarity in cyclical patterns is also notable. Specifically, output growth shrank in the early nineties. Subsequently, growth started to rebound, but never recovered to the higher rates of the eighties. Growth has been positive in the private sector while the public sector, particularly employment, has been contracting.

The association between output and employment growth has been less pronounced in the petroleum sector over time. Nonetheless, employment growth has picked up momentum in this decade, which clearly coincided with the oil price boom and the surge in real growth in 05/06. Despite significant decline in real growth in 06/07, employment growth remained robust. The surge in employment growth has been dominant in the private sector.

In the electricity sector, both output and employment growth exhibited a high degree of cyclicality over time, although somewhat varied. The main similarity relates to the highest rates of growth of employment and output in early eighties, which appear to have since tapered down. The sector is dominated by public activity.

Despite a pronounced surge in real growth in the construction sector recently, the corresponding employment growth does not seem to be as pronounced. The difference could be related to growth in the public sector. While employment growth has been contracting, output growth has picked up in the public sector recently.

In general, output growth has surpassed employment growth in the transportation and storage sector over time. Moreover, cyclicality patterns do not seem to be consistent over time. Specifically, the recent surge in output growth has not been matched by a comparable increase in employment growth. The recent mismatch appears to be attributed to growth in the public sector that is not matched by comparable employment growth.

[9] While manufacturing output is dominated by large firms that are capital intensive, employment in the sector is highly concentrated in small and medium enterprises (SME). Hence, there is a need to increase output in SME to provide more employment opportunities.

Cyclical swings in output growth in the communications sector have not been matched by comparable swings in employment growth. Nonetheless, it is worth noting that employment growth surpassed output growth for the first time in 2006/07. The difference appears to be attributed to a surge in private employment, following a dominant growth of the public sector over the past two decades.

Growth of Suez Canal output has been coupled with employment contraction. In general, the sector's employment has been shrinking while output growth has picked up.

The growth of trade, finance and insurance has been conducive to employment growth. Indeed, growth has rebounded, coupled with high employment growth. More recently, growth has been predominantly private which helped support employment growth.

Cyclical fluctuations in the tourism sector have been severe, reflecting demand-side swings. Nonetheless, the growth of employment has been less cyclical more recently. Growth is predominantly private.

Growth of housing and real estate has shrunk over time. More recently, employment growth has been comparable to real growth. Despite a surge in private employment, contraction in public employment has moderated the sector's employment growth.

Output growth in the government, social and personal services has been on a rising trend over time. Nonetheless, employment growth has been relatively stable lately, reflecting contraction of public employment despite a surge in private employment.

C. Sectoral Contributions to Aggregate Employment and Output Growth

The contribution of the agriculture sector to employment and output growth has been cyclical over time. Contribution to employment growth peaked in the eighties, but declined significantly in most of the nineties. It started to rebound in late nineties and reached its largest value over time in 2000/01, nearly 18 percent. While contribution to output growth has been also cyclical overtime, it declined significantly more recently, reflecting the surge in output in other sectors of the economy. Most of the sector's contributions to output and employment growth is attributed to private activity. In contrast, the contributions of public activity have turned negative in several years.

The contributions of manufacturing to aggregate employment and output growth have varied over the years. After peaking in late eighties, the contributions shrank considerably in

early nineties and rebounded in late nineties. The largest contributions were in 1998/99, mainly attributed to the private sector. In contrast, the contributions of public companies have been negative in many years.

The contribution of the petroleum sector to employment growth had been modest, less than 1 percent, in the eighties and nineties. Following a sharp decline in 2000/01, the contribution has picked up steadily, reaching nearly 3 percent in 2006/07. The recent surge has been primarily attributed to private activity. In contrast, the sector's contribution to real growth declined over the past two decades, with negative contributions in a few years that reflected fluctuations in the energy price. The sector's contribution to real growth is dominated by public sector activity.

The contributions of the electricity sector to employment and real growth have fluctuated over time. The largest contributions were in 1985/86. More recently, the sector's contributions to aggregate employment and real growth have declined throughout this decade. All of the sectoral contributions are attributed to activity in the public sector.

The contributions of construction to employment and real growth have been cyclical. They peaked in 1997-1999. Subsequently, they shrank considerably in 2002/03 and picked up subsequently to nearly 10 percent of aggregate employment and real growth. Cyclicality has been driven by private sector activity. In contrast, the contribution of the public sector to employment growth has been negative more recently.

The contribution of transportation and storage to aggregate employment and output growth has been cyclical over time. Following a pickup in momentum in the nineties, the pace moderated more recently. The cyclical contributions are attributed mostly to activity in the private sector. In contrast, the contributions of the public sector to employment and output growth turned negative in several years.

The contribution of the communications sector to employment growth had been small historically. More recently, it peaked to nearly 5 percent of total employment growth. The peak has reflected a pickup in private sector activity. In contrast, the negative contribution of public employment in 1998/99 was the result of the privatization of a large public communications company. The sector's contribution to output growth has been pronouncedly larger than its contribution to employment growth over time. Output was dominated by the public sector, although the private sector's contribution has surged recently.

Output and, to a lesser extent, employment in Suez Canal has fluctuated over time. More recently, its contribution to employment growth has been negative, which reflects activity in the public sector. In contrast, the contribution of Suez Canal to output growth has been more significant in this decade, relative to historical contributions, reflecting a pickup in the global economy and related trade.

The contributions of trade, finance and insurance to employment and output growth have fluctuated over the years. Positive fluctuations have been dominant in the private sector. In contrast, the contribution of public employment has been negative for most years.

Employment and output in tourism have had varying contributions to aggregate growth, including several episodes of negative contributions. The largest contribution to employment growth was in 1996/97 and to real growth was in 2003/04. More recently, the sectoral contributions to employment and real growth ranged around 5 percent. Fluctuations are predominantly attributed to private activity.

The contribution of housing and real estate to aggregate employment growth has been less than 2 percent over time, in general, with the exception of two extreme episodes in 1991-1998. In contrast, the sector's contribution to real output growth had largely surpassed its contribution to employment growth over time and converged more recently. Fluctuations have been dominated by private sector activity.

The contributions of government, social and personal services to employment and output growth have varied over time. Following a surge in late eighties and early nineties, the sector's contributions decreased more recently. Fluctuations have been dominated by public activity. More recently, however, there has been a surge in the contribution of private employment (nearly 15 percent). In contrast, the share of public employment has been shrinking, reaching 8 percent in 06/07, coupled with a decline in output in the public sector.

To summarize, the contributions of the goods-producing sectors have fluctuated over time, reflecting continued cyclicality. This is consistent with the nature of output in these sectors that reflects cyclicality with domestic and international prices. It is interesting to note, however, that patterns of cyclicality in private and public activity are complementing each other in several episodes, which is particularly pronounced for employment. That is, where the contributions of the private sector increase, they are matched with a reduction in the contribution of the public sector. While the contributions of the services-producing sectors to

employment and output are equally cyclical over time, there has been a noticeable surge in these contributions recently. The surge appears to be mostly driven by private sector activity, both for output and employment. In contrast, the contributions of social sectors to output and employment have been declining recently. The decline appears to be driven by the decline of private activity, while the contribution of the private sector to employment growth has been increasing recently.

Next, we consider the contributions of leading sectors in the economy as categorized above: manufacturing and construction in the goods-producing segment and wholesale and retail trade and financial intermediaries in the services-producing segment (see Figures 2a, b, c). The contributions to growth and employment surged in late nineties, and picked up more recently, following a downward trend in the early part of this decade. It is interesting to observe the patterns of cyclicality in the private and public components, where the surge in contributions to employment in the former has reflected a decline in the contribution of the latter for the most part. More recently, however, the contributions of both the public and private components to real growth have been on the rise.

Figure 2a. Sectoral Contribution to overall Growth of the Sectors Shaping the Business Cycle in Employment and GDP

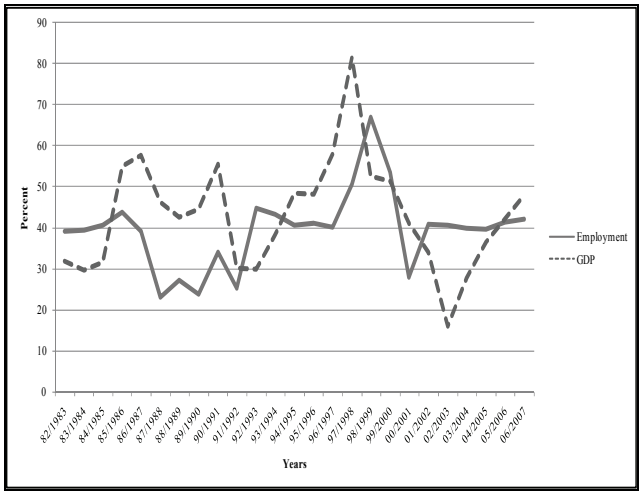


Figure 2b. Sectoral Contribution to Overall Growth of the Public and Private Employment by Sectors Shaping the Business Cycle

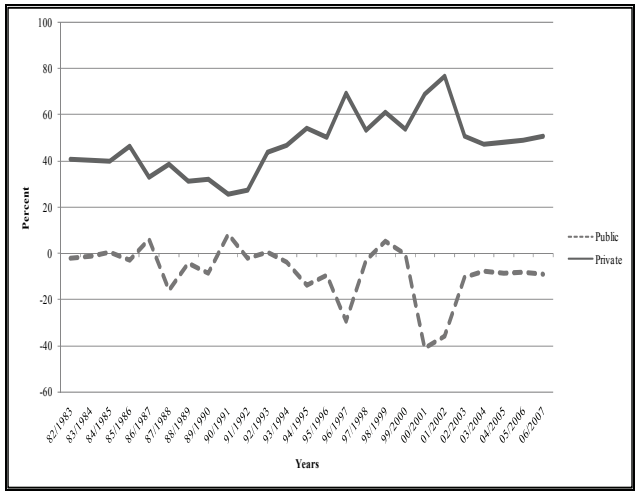
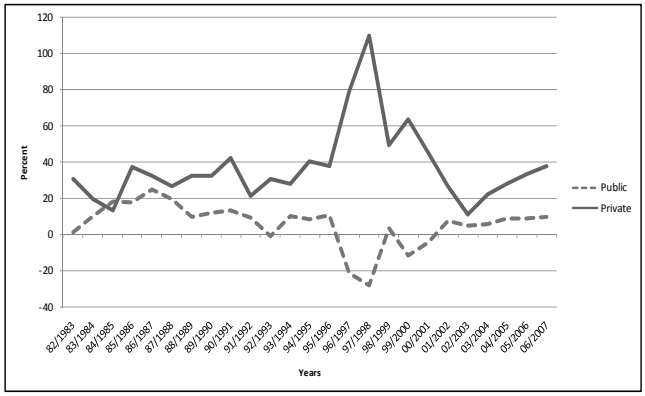


Figure 2c. Sectoral Contribution to Overall Growth of the Public and Private Output by the Sectors Shaping the Business Cycle



Source: Authors' calculations based on sectoral data from the Ministry of Economic Development, Egypt.

D. Analysis of Employment and Output Growth

We consider basic statistics in three episodes that mark structural shifts in the Egyptian labor market: 1982/83-1990/91, 1991/92-2002/03, and 2003/04-2006/07 (see Table 1).[10] There is a sharp contrast in the pattern of shifts within the public and private sectors. Employment growth is markedly decreased in the public sector over time. In contrast, employment growth is markedly increased in the private sector over time. Moreover, the surge in private sector employment in the latter episode dominates, resulting in an increase in average employment at the aggregate level.

Detailed statistics, by sector, confirm employment contraction in the public sector across various sectors of the economy: agriculture, manufacturing and mining, construction, Suez Canal, trade, finance and insurance, and tourism in the most recent episodes (1991/92-2002/03) and (2003/04-2006/07). Contraction in public sector employment is also evident for

[10] For detailed sectoral employment and real growth over the three episodes, see Tables A1, A2, and A3 of the appendix. It is worth noting that employment growth and output growth has not always been consistent in public and private sectors. For example, in housing and property, with only 4.18 percent GDP growth in the first period under investigation in the public sector, employment growth in the public sector was 15.16 percent (reflecting employment strategy), whereas 8.19 percent of GDP growth in the private sector only led to 1.90 percent of employment growth (reflecting value added and productivity of labor). For petroleum products, the nature of output and employment growth may not be compatible within a short span, reflecting privatization execution and fluctuations in the international price. For example, in period 2 private sector GDP growth decreased but private sector employment increased by 13.2 percent, and further increased by 18.8 percent in period 3, with only 8.1 percent in private sector GDP growth. Similarly, due to privatization private GDP growth in communications grew in all three periods, with no employment growth. Tourism has changed entirely in its employment performance from being extremely employment un-intensive (0.52 percent employment growth versus 7.86 percent GDP growth in period 1) to very employment intensive in period 2 and relatively employment intensive in period 3. In Suez Canal, there is no private share, so both growth and employment creating all goes to the public sector.

a few sectors, such as petroleum, transportation and warehouse and communications, in the second episode only (1991/92-2002/03). In contrast, private sector employment growth has remained solid across various sectors of the economy, signifying its contribution to aggregate employment growth.

The reduction in average employment growth over time has reduced variability across the three episodes within the public sector. In contrast, the variability of employment growth increased in the nineties, but decreased more recently, reflecting more stability in private employment. As a result, employment growth at the aggregate level is also more stable in the latter episode, compared to the nineties.

The results are robust upon separating employment in the agriculture sector. Average employment growth has steadily decreased in the public sector. This pattern dominates at the aggregate level as the share of private sector employment is significantly reduced upon separating agriculture employment. Employment variability is the largest in the nineties.

Overall, the above patterns illustrate complementarities between private and public employment over time. The surge in private employment growth mitigated the effect of the reduction in public employment at the aggregate level. Hence, the net effect of this sectoral shift proved to be beneficial at the aggregate level. As a result, employment growth has surged over time and is characterized by more stability in this decade.

To the extent that sectoral shifts have proved to be beneficial to stimulate employment growth, and given observed complementarities between private and public employment, further growth in the private sector should prove to be conducive to job creation and employment growth.

Table 2 (in the reference tables) illustrates the average and variability of real growth, with and without the agriculture sector, over the three periods. Co-movements between real growth and employment growth within the public and private sectors further illustrate the points above (see Figures 3a, b, c). Since the beginning of the economic reform agenda in early nineties public sector employment growth appears to be following a downward trend. Nonetheless, growth in the public sector has been cyclical reflecting exogenous shocks and stabilization efforts. The co-movement between private employment growth and private output growth presents a sharp contrast. Cyclicality in private employment growth varies closely with cyclicality in private real growth over time. The association appears to be

stronger since the beginning of the reform program in early nineties. However, cyclicality in employment growth overshoots or undershoots that of real growth in specific episodes.[11] In light of the a-cyclical pattern of public employment, co-movement between cyclicality in the aggregate measures of employment and real growth appears less pronounced. Hence, cyclicality of employment appears to be driven by activity in the private sector which is tied to output cyclicality, to a great extent, mitigated by employment activity in the informal market. Further, the downward trend in public employment growth reflects a deliberate strategy that increased sectoral shifts in the public sector and contributed positively to employment growth in the private sector.

Figure 3a. Co-movement between Output and Employment Growth in the Public Sector

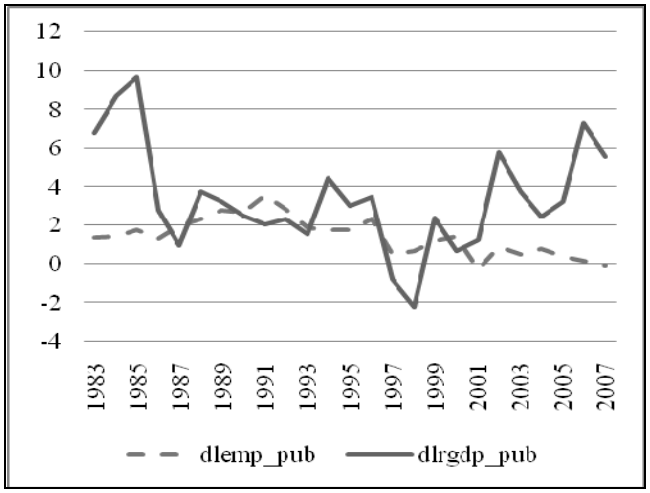
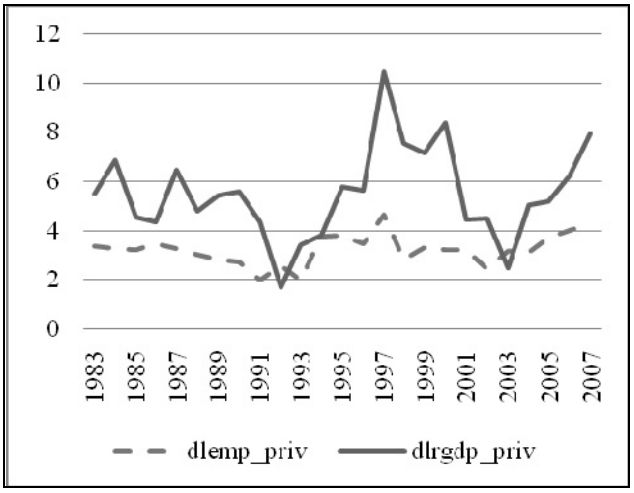
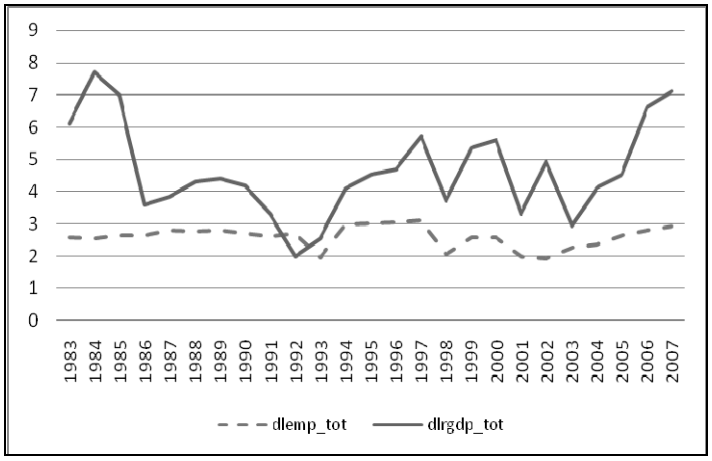


Figure 3b. Co-movement between Output and Employment Growth in the Private Sector



[11] Employment is only formal. It is estimated that around 12.2 million Egyptians hold jobs in the informal market. At least one third of the informal market acts as a buffer for cyclicality in the formal market. Accordingly, cyclicality in formal employment may be less pronounced during the boom as employers fill in some jobs from the informal market to avoid over-committing during a boom. Similarly, during a bust employers may hoard their skilled labor and reduce informal temporary jobs to avoid the cost of hiring and locating skilled workers as the economy rebounds.

Figure 3c. Co-movement between Output and Employment Growth



Source: Authors' calculations based on sectoral data from the Ministry of Economic Development, Egypt.

To formalize the relationship between employment and output growth, Table 3 verifies the relationship within each of the private and public sectors. Output growth mobilizes higher employment growth in the private sector, compared to the public sector. Moreover, the relationship between private employment and output growth is further reinforced in the non-agricultural sector. The difference attests to a better potential to mobilize employment growth with higher growth in the private sector.[12]

III. PUBLIC/PRIVATE SECTORAL SHIFTS AND THEIR IMPLICATIONS

A. Measuring Sectoral Shifts

According to Lilien (1982a), the fluctuations in employment demand across sectors will influence both aggregate employment and unemployment. The sectoral shifts hypothesis implies that shocks that require more labor to be allocated to some sectors and less to others in an economy in which labor resources are not instantaneously mobile across sectors will cause temporary decreases (increases) in employment (unemployment).

Davis and Haltiwanger (1992) showed that a great deal of reallocation of employment is made within industries which seems to reflect the lower adjustment costs associated with movement within sectors compared to movement across sectors. Hence, the sectoral shifts

[12] As public sector employment has gone through phases of increase and decline over time, the intercept is insignificant. This is in contrast to the positive and significant intercept for private sector employment growth, reflecting persistent growth over time. The coefficient that measures the response of employment growth to output growth in the public sector remains robust, in terms of value and significance, in a modification that suppresses the intercept in the estimated empirical model.

hypothesis implies that employment decreases when there are disturbances which entail higher adjustment costs.

Lilien (1982a) proxies the magnitude of sectoral shifts by a weighted variance of cross-sectoral employment growth rates:

$$ss_t^2 = \sum_{i=1}^{N} \left(\frac{e_{it}}{E_t}\right).\left(\Delta log(e_{it}) - \Delta log(E_t)\right)^2$$

Where e_{it} is employment in sector *i*, *i =1, 2, N* and $E_t = \sum_{i=1}^{N} e_{it}$ is aggregate employment.

Using annual data over the period 1981-2007, we construct the sectoral shifts measures following Lilien (1982a). We calculate two measures using twelve-sector decomposition of agricultural and nonagricultural employment for private and public sectors, in addition to two other measures using eleven-sector decomposition of nonagricultural employment for private and public sectors. While the literature on the sectoral shifts hypothesis excludes agricultural employment, the relationship between the agricultural employment and the nonagricultural employment, especially the construction sector employment, cannot be ignored in the Egyptian case.

One might think that our measure of sectoral shifts is vulnerable to the criticism made by Abraham and Katz (1986). We filter out the aggregate demand effects by regressing each relative sectoral employment growth rate $\left(\Delta e_{it} - \Delta E_t\right)$ on current and lagged real GDP growth rates, a proxy for the aggregate shock, to obtain the residual series τ_{it}. The residual term is considered a pure sectoral shock after filtering out the aggregate effects. These residuals can then be combined to obtain a purged dispersion index:

$$ss_t^2 = \sum_{i=1}^{N} \left(\frac{e_{it}}{E_t}\right).\tau_{it}^2$$

Nonetheless, the regression equations were not statistically significant in most cases. In addition, we regressed the sectoral shifts dispersion measures on current and lagged real GDP growth rates, but again the regression equations were not significant and $\overline{R}^2$ was almost zero

or negative. Hence, we consider our measure of sectoral shifts representing the pure sectoral shock.

B. Analysis of Sectoral Shifts

To set the stage for the regression analysis, we start off by analyzing correlation coefficients between our measures of sectoral shifts (see Table 4).[13] Of particular interest is to analyze sectoral shifts across the private and public sectors and across the economy, as a whole. It is worth noting at the outset that the private sector is dominant in agriculture that captures more than 60 percent of total private employment. Moreover, sectoral shifts are likely to be more pronounced in the non-agricultural sector since agriculture workers are likely to be less mobile to other sectors. Hence, we conduct the analysis with and without agriculture to demonstrate the difference.

Table 4 illustrates average sectoral shift in the public and private sectors over time. The largest sectoral shifts in the public and private sectors are evident in 1991/92-2002/03, reflecting an attempt to press ahead with the economic reform agenda, marking the beginning of the privatization program. The pattern of variability is further reinforced by the average of sectoral shifts over time. In both the public and private sectors, sectoral shifts were the highest in the nineties, reflecting movements across sectors, namely employment reduction in the public sector and expansion in the private sector.

It is worth noting, however, that total sectoral shift is pronouncedly smaller compared to either public or private sectoral shifts. Public sectoral shift is matched by a comparable shift in the private sector to absorb excess labor, cancelling out shifts at the aggregate level. To further reinforce the point, variability of total sectoral shift is significantly smaller compared to variability of sectoral shifts in either the private or public sectors. The implication is higher variability in one sector is offset by comparable variability in the other sector, reducing variability of aggregate sectoral shifts.

In light of the above observations, some formal evidence regarding the relationship between private and public shifts is in order. We expect that high sectoral shift in the private sector is induced by higher sectoral shift in the public sector, reflecting structural shifts to scale down public employment and increase the role of the private sector in economic activity

[13] The results are robust in an experiment that measures correlations among the first difference of sectoral shifts.

as part of the broad economic agenda including privatization. However, the success of this strategy appears to hinge on economic activity in the private sector. That is, the private sector absorbs higher employment during a boom only, in response to high public and private sectoral shifts, reflecting a strategy to align employment growth with cyclical demand.

The evidence in Table 5 affirms the hypothesis above; private sectoral shift increases significantly in response to higher public sectoral shift in regression (1). In regressions (2) and (3), the increase in total sectoral shift is not significant in response to the increase in public or private sectoral shifts, an evidence that the two measures of sectoral shifts cancel each other out over time, which rules out strong association with the aggregate measure. The above patterns remain robust in an extension that measures private sectoral shifts, excluding private agriculture employment. As the latter exhibits lesser variability, compared to the remainder of the private sector, the association between public sectoral shift and non-agricultural private sectoral shifts is even more pronounced. The implication is the bulk of laid off workers is absorbed in non-agricultural private jobs, in line with higher sectoral shift. Moreover, the negative and significant intercept indicates further scope to increase employment in the private sector in response to public sectoral shifts. That is, public sectoral shift is significantly larger than private sectoral shift, availing scope to create more jobs in the private sector that would iron out the variability in public employment in the form of comparable variability in the private sector.

C. Employment Growth, Sectoral Shifts and Sources of Cyclicality

Next, we evaluate the impact of sectoral shifts on employment growth. The negative impact of sectoral shift on employment growth is more pronounced within the public sector, compared to the private sector. Graphical illustration of movements in sectoral shifts and employment growth over time reinforces the pattern (see Figures 4a, b, c, d). The combined effects of sectoral shifts within the private and public sectors are captured by total sectoral shifts. The total shifts across the economy are positively correlated with aggregate employment growth and the correlation coefficient is 0.32. As sectoral shifts may be stimulating employment growth in the private sector, this channel dominates at the aggregate level, despite the negative effect of sectoral shifts on employment growth within the public sector with a correlation coefficient of -0.10. The positive effect of sectoral shift on aggregate

employment growth is reduced (the correlation coefficient is 0.19) if the agriculture sector is excluded, reflecting a smaller share of private employment in total employment.

Figure 4a. The Correlation between Employment Growth in the Private Sector and Sectoral Shift in the Public Sector

Figure 4b. The Correlation between Employment Growth in the Private Sector and Sectoral Shift in the Private Sector

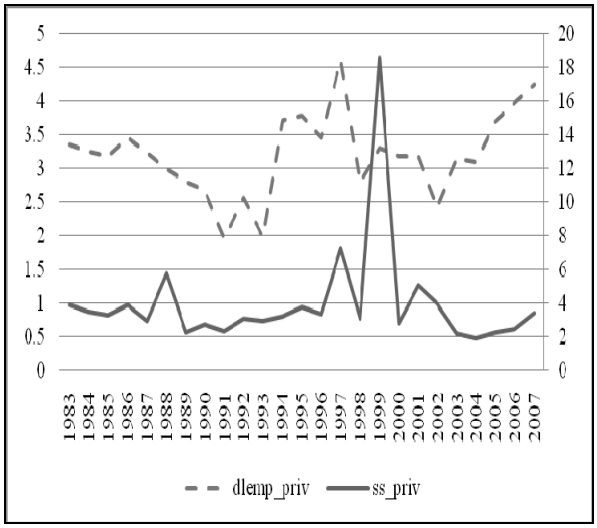
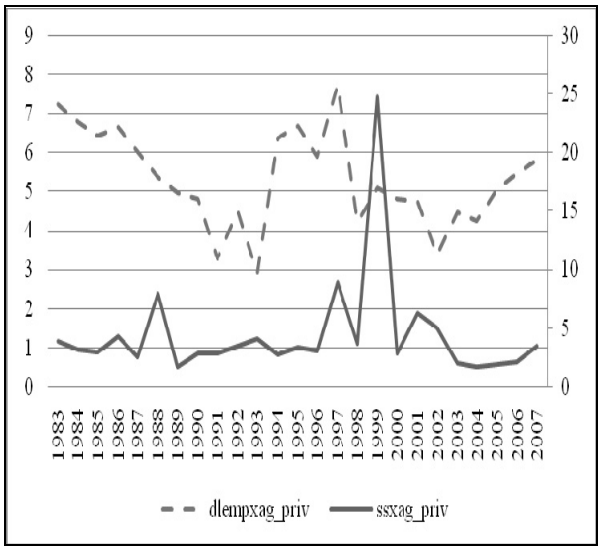


Figure 4c. The Correlation between Employment Growth in the Private Sector and Sectoral Shift in the Public Sector, Excluding Agriculture

Figure 4d. The Correlation between Employment Growth in the Private Sector and Sectoral Shift in the Private Sector, Excluding Agriculture



Source: Authors' calculations based on sectoral data from the Ministry of Economic Development, Egypt.

To reinforce the point, the analysis considers the impact of government spending on employment growth, both in the private and public sectors. Three measures of government spending are under consideration: the ratio of government expenditures to GDP, the change in

this ratio, and real growth in government expenditures. Regardless of the measure of government spending, employment growth in the public sector has not been responsive to the increase in government spending (see Figures 5a, b, c). Specifically, growth of public employment has been shrinking over time despite the government's efforts to invoke additional spending. Moreover, the growth of private employment appears to be negatively correlated with developments in government spending. The implication is the increase in government spending could be crowding out available resources for private sector activity with a negative impact on employment growth in the private sector. Hence, growth of private employment may have benefited from sectoral shifts within the public sector, but not necessarily from the increase in government spending. As interest payment constitutes a good share of government spending that is not expected to have direct bearing on employment growth.[14] The growth of government spending stimulates public output growth. In contrast, public employment growth appears to be following a downward trend, regardless of the increase in government spending. While private employment and output growth are closely associated over time, they appear to be negatively correlated with the growth in government spending. The implication is the increase in government spending crowds out private activity, with adverse effects on private employment and output growth. Hence, the stimulus effect of government spending is reflected in higher value added in the public sector, increasing wages and salaries in support of domestic consumption.[15]

[14] The evidence, available upon request, remains robust regarding deviation in public employment growth from the increase in primary expenditures. Further, negative co-movements between the increase in primary expenditures and the growth of private employment appear more pronounced, attesting to potential crowding out.

[15] It is worth noting that government spending captures both government consumption and investment. The crowding out effect of government spending may vary depending on the type of spending, which is worthy of investigation in future research.

Figure 5a. Co-movement between Employment Growth in the Public and Private Sectors and the Ratio of Government Expenditure to GDP

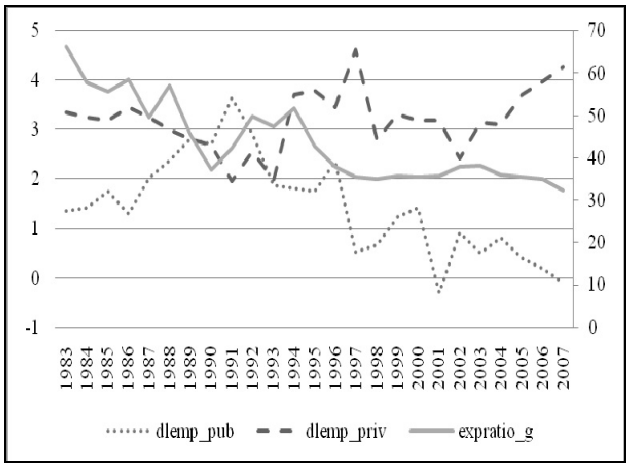


Figure 5b. Co-movement between Employment Growth in the Public and Private Sectors and the Change in the Ratio of Government Expenditure to GDP

Figure 5c. Co-movement between Employment Growth in the Public and Private Sectors and the Growth of Real Government Expenditure

Source: Authors' calculations based on sectoral data from the Ministry of Economic Development, Egypt.

IV. EFFECTS OF SECTORAL SHIFTS ON EMPLOYMENT FLUCTUATIONS

Before testing the sectoral shifts hypothesis, we first review the most important extensions that have deepened the original hypothesis, and then we will proceed to specify the models that we use for the hypothesis testing.

First, the stage of business cycle effect introduced by Davis (1987) is considered an important implication of Lilien's sectoral shifts hypothesis. The testable implication of the

stage of business cycle effect is that the relationship between employment growth and *ss* must be asymmetric such that a given rise in *ss* is expected to result in a larger decrease in employment during downturns than during upturns.

Moreover, one of the previously unexploited implications of the sectoral shifts hypothesis is the influence of the public sector's sectoral shifts on private sector employment. We think that the costs of movement across private sectors are quite lower than the costs associated with moving from public to private sectors. To interpret the hypothesis in this way, it is informative to measure the magnitude of the response of the private employment growth to private sectoral shifts compared to its response to public sectoral shifts, especially when the private sector is taking over the public sector.

A. A Base Model for Private Employment Growth

According to Barro (1977) and Mills, Pelloni, and Zervoyianni (1995), the typical unemployment equation is modeled as a function of unanticipated and anticipated money growth, as well as a variety of other variables. In the case of Egypt, the anticipated money growth is much more important than the unanticipated money growth because of the fiscal dominance that shaped the relationship between monetary policy and fiscal policy over most of the period under investigation, especially during the 1980s and the second half of 1990s. Three other variables are particularly important in the Egyptian case: the sectoral shifts measure, *ss*, the ratio of exports to GDP, *x*, and the ratio of domestic credit going to the private sector as a share of private GDP, *c*. The export ratio can be taken to reflect the effect of changes in the global economic environment on the unemployment rate. The domestic credit ratio is assumed to represent the effect of changes in working capital availability on the unemployment rate. It is important to mention that the working capital costs of firms that could be represented by short-term real interest rates have had a minor effect on unemployment given the financial repression distinguishing the1980s and the credit rationing shaping the period covering the1990s and 2000s.

The focus of this study is mainly on understanding the fluctuations in employment of private and public sectors that resulted from sectoral shifts. Hence, we are interested in modeling the employment growth equation in the private sector and in the public sector.

Unit root tests show that private employment growth, private sectoral shifts and the export ratio are *I(0)* while the domestic credit ratio is *I(1)*. Therefore, the following specification is considered as the base model of the private employment equation:

$$dlemp_{prt} = a_t + \alpha ss_{prt-3} + \beta\Delta\left(c_{prt-1} + c_{prt-2}\right) + \gamma(x_{t-1} + x_{t-2})$$

Where $dlemp_{prt}$ refers to the change in the logarithm of the private employment at time *t*. Private Sectoral shift is measured by ss_{prt}. For convenience, all variables are measured in units of percentage change.

B. An Extended Model Including Stage-of-Business Cycle Effects

It was mentioned that Davis (1987) extended the sectoral shifts hypothesis to include the effect of the stage of business cycle. Consequently, the linear relationship between employment growth and sectoral shifts was transformed into a nonlinear one.

Specifically, we construct a convenient measure of the stage of business cycle effects as follows. We create two dummy variables. The first dummy, $dumh_t$ takes the value of unity when private economic growth is larger than or equal its average plus one standard deviation,[16] and takes the value of zero otherwise. The second dummy, $duml_t$ takes the value of unity when private economic growth is less than its average minus one standard deviation,[17] and takes the value of zero otherwise. Then, two interaction variables of the form $ssdumh_{prt}$ and $ssduml_{prt}$ were added to the base model, leading to the following extended model:

$$dlemp_{prt} = a_t + \alpha ss_{prt-3} + \delta ssdumh_{prt} + \theta ssduml_{prt} + \beta\Delta\left(c_{prt-1} + c_{prt-2}\right) + \gamma(x_{t-1} + x_{t-2})$$

C. Data

We used annual data for the period 1981/82 through 2006/07. The sectoral employment and GDP data are from the ministry of economic development. The government expenditure data are from the ministry of finance. The data on domestic credit going to private and public

[16] It is equivalent to 7.4 percent and 8.45 percent for private growth including agriculture and private growth excluding agriculture respectively.

[17] It is equivalent to 3.6 percent and 4 percent for private growth including agriculture and private growth excluding agriculture respectively.

sectors, and that on exports are from the International Financial Statistics (IFS) available from the International Monetary Fund.

V. Estimation, Empirical Results and Interpretation

A. Estimation Results when Agricultural Employment is Included

The base model equation was estimated using *OLS* estimation technique. The results can be seen in Table 6. The contribution of the private sectoral shifts measure is represented by a coefficient estimate of -0.059 with *t*-ratio -1.550. The negative coefficient is in accordance with the expectation that an increase in *ss* would reduce employment growth. The domestic credit ratio has a positive effect on employment, thus providing evidence in favor of relaxing the credit rationing constraint. The exports ratio also has a positive effect on employment as expected, reflecting the importance of minimizing the effects of unfavorable external shocks. Nevertheless, $\overline{R}^2$ is not relatively high, 0.287.

A.1 Testing stage-of-business cycle effects

The estimation of the extended model shown in Table 6 provides a very statistically significant effect of the sectoral shift on employment growth. This finding is taken as evidence in favor of the sectoral shifts hypothesis. Including $ssdumh_{prt}$ and $ssduml_{prt}$ as additional regressors yields two coefficient estimates of 0.093 and -0.326 with *t*-ratios of 1.629 and -3.144 respectively. The augmentation has very little effect on the magnitude of the coefficients of the other variables included in the base model, although considerably improves the fit of the model; $\overline{R}^2$ is more than doubled and the equation standard error is dramatically less.

Sectoral shift has a nonlinear positive and significant effect on employment growth when output growth exceeds the historical average plus one standard deviation. In contrast, the sign on the interactive dummy is negative and statistically significant during a downturn, further attesting to a conservative hiring strategy to avoid the risk of over-commitment during a downturn. Hence, we conclude that there is an important stage of business cycle effect on the relationship between the magnitude of sectoral shifts and private employment growth in the direction predicted by Davis.

A.2 Testing whether the public sectoral shifts have a similar effect on employment

One of the contributions of this paper, mentioned earlier, is testing the influence of the public sector's sectoral shifts on private sector employment. Taking into account our assumption that the costs of moving across private sectors are lower than that associated with moving from public sectors to private sectors, we predict that public sectoral shifts would have stronger effect on private employment when the private sector is taking over the public sector.

We estimate the base model and the extended model replacing the private sectoral shifts by public sectoral shifts. Table 6 shows that the coefficient of the public sectoral shift is almost tripled, the coefficients of the other variables are slightly affected, the fit of the two models improves slightly, and the standard error of each equation is reduced marginally.

Moreover, the two interaction variables in the extended model, $sspudumh_t$ and $sspuduml_t$, now reflect the nonlinearity of the effect of public sectoral shifts on private employment due to the stage of private business cycle. As expected, when the magnitude of the public sectoral shifts increases while private economic growth is relatively low, the private employment growth decreases. One might expect that the large public sectoral shifts associated with relatively high private growth could have a positive effect on private employment. In fact, the coefficient of $sspudumh_t$ is positive as expected, but it is not statistically significant. We conclude that public sectoral shifts have had a strong and negative impact, attesting to failure to be absorbed in the form of private employment growth during a downturn.

B. The Robustness of the Results when Agricultural Employment is Excluded

To assess the robustness of our results when agricultural employment is excluded, we re-estimated the previous four models using nonagricultural employment growth and nonagricultural sectoral shifts measure; the results are shown in Table 7.

A comparison across the sets of models shows the following. For all comparisons, the magnitude of the sectoral shifts coefficient is larger and still significant. This means that the agriculture sector can, to some extent, serve as a buffer. While the export ratio is still significant, the domestic credit ratio is no longer significant in three out of the four models. This is expected since we do not have data on private domestic credit going to nonagricultural sectors, and the domestic credit ratio therefore was not adjusted. In addition, the models in

Table 6, except the third equations, provide better fits than those in Table 7, and they have lower standard error of estimation. This is mainly because the volatility of nonagricultural employment is quite higher, and the domestic credit ratio is not constructed properly when agriculture sector is excluded.

The stage of business cycle effect in the extended model, the second equation in Table 7, is still significant and its size is larger. Moreover, the interaction variable $ssxdumh_{prt}$, representing large private sectoral shifts that are associated with relatively high private nonagricultural growth, is now significant. This means that the effect of the overall sectoral shifts on private employment growth becomes positive when private economic growth excluding agriculture is relatively high. The contrast confirms the earlier evidence; private sectoral shift is only beneficial to employment growth during a boom. In contrast, employment growth decreases during a downturn on account of higher sectoral shifts across non-agricultural private firms.

The last two equations in Table 7 again show that the public sectoral shifts[18] have a stronger impact on private nonagricultural employment growth; it is almost four times the effect of private sectoral shifts. The last equation in Table 7 shows that while the public sectoral shifts interacting with private nonagricultural economic growth $sspudumh_t$ is significant at 11.5 percent significance level, the interaction variable $sspuduml_t$ is statistically insignificant. In fact, these estimates are quite different from the estimates of interaction variables of the fourth equation depicted in Table 6. Consequently, when private sector is taking over nonagricultural sectors, the timing of such process does matter. If it is taking place while the nonagricultural private growth is relatively high, the prospect of a positive effect of public sectoral shifts on private nonagricultural employment growth would be higher.

In general, the positive spillover effect of a reduction in public sector employment on private employment growth is dependent on economic conditions. During periods of high growth, higher employment corresponds to higher demand and potentially higher productivity of workers. In contrast, during a downturn, the private sector is reluctant to absorb laid off workers in the public sector, in light of slow demand and potentially low productivity. Further, privatized firms could proceed with employment reduction to get rid of excess labor,

[18] Since the contribution of the public sector in agriculture is negligible, we did not adjust the variable representing public sectoral shifts.

align wages with productivity, and reduce the wage bill during a downturn. Indeed, public sectoral shift is matched with a significant reduction in private employment growth during a downturn, where growth falls below a benchmark based on the historical average adjusted downward by one standard deviation.

We conclude that private sectoral shifts have similar effects on private employment growth whether agricultural employment is included or excluded. Nevertheless, testing public sectoral shifts hypothesis requires the exclusion of agricultural employment as mobility is higher from the public sector to the non-agricultural private sector.

C. The Effect of the Government Expenditure on Private Employment Growth

It was mentioned in Section **IV** that anticipated monetary shocks are more important than unanticipated shocks in the employment growth equation in the case of Egypt. This is because of the fiscal dominance that has prevailed during the 1980s and the second half of the 1990s. Hence, government expenditure can be used as a proxy for anticipated monetary shock. Even in the absence of fiscal dominance, government expenditure is still considered one of the important variables that should enter into unemployment or employment equations.

To test the significance of the government expenditure on private employment growth, we re-estimate the base model after replacing the variable representing the sectoral shifts by the change in the government expenditure as a ratio of GDP, Δg_t. Unit root tests show that the government expenditure ratio is *I(1)*. Moreover, to test the crowding out and crowding in hypothesis, and to determine the phase of business cycle at which this phenomenon occurs, two interaction variables were created. The first interaction variable Δgh_t or Δghx_t refers to the interaction between the change in the government expenditure ratio and a dummy variable that takes the value unity when private economic growth is greater than or equal its average value plus one standard deviation, 7.4 percent and 8.45 percent when the agriculture sector is included and excluded respectively, and takes the value zero otherwise. The second interaction variable Δga_t or Δgax_t represents the interaction of the change in government expenditure ratio with a dummy variable that takes the value unity when private economic growth is greater than or equal its average, 5.5 percent and 6.2 percent when agriculture sector is included and excluded respectively, and takes zeros otherwise.

We first estimate two private employment growth equations when agricultural employment is included, in each of which private employment growth is regressed on the domestic credit ratio, the exports ratio, the change in the government expenditure ratio and an interaction variable, Δgh_t or Δga_t. Second, we estimate two other equations, in each of which nonagricultural employment growth is regressed on the same set of regressors included in the first two equations except for the interaction variable Δgh_t and Δga_t that are replaced by Δghx_t and Δgax_t respectively. The estimation results are displayed in Table 8.

The first two equations in Table 8 show that the change in government expenditure ratio is statistically insignificant. In addition, while the interaction variable Δga_t is statistically insignificant, the interaction variable Δgh_t is hilly significant and has a negative sign. We conclude that government expenditure is crowding out private employment only when private economic growth is relatively high, greater than or equal 7.4 percent. While additional government spending could crowd out private activity with adverse effects on employment growth during normal times, it could stimulate employment growth only when there is slack of resources during a downturn.

The last equation in Table 8 shows that while government expenditure crowds in nonagricultural employment, it practices a strong crowding out effect once private economic growth excluding agriculture becomes higher than its average. Hence, the overall, nonlinear, effect on nonagricultural employment becomes negative.

We conclude that the overall nonlinear effect of government expenditure on private employment is either statistically insignificant or significant and negative. The evidence indicates that the stimulating effect of government spending is limited to periods of low growth in the private sector where the increase in government spending does not crowd out available resources for private activity. However, during normal times the increase in government spending carries the risk of crowding out as evident by the negative and significant effect on private employment growth.

D. The Determinants of Employment Fluctuations in the Public Sector

Turning our attention into public employment fluctuations, we estimate two base models. In the first one, we regress the change in public employment growth on public sectoral shifts measure, ss_{put-2}, the change in domestic credit going to the public sector as a ratio of public

GDP, and the exports ratio. Unit roots tests show that public employment growth and public domestic credit ratio are *I(1)*. The results of estimation are displayed in Table 9, first regression. Public sectoral shift has a negative significant effect on public employment growth, although with a lag. The evidence confirms that sectoral shift in the public sector reflects policy directions that have targeted a reduction in public sector employment over time. Credit to the public sector has a positive effect on employment growth.

The second base model is a simple regression model that only includes the regressor representing the public sectoral shifts as the D-W statistic in the first base model indicates the possibility of autocorrelation. However, the negative effect of sectoral shift on employment growth is robust in the second model.

To test the stage of business cycle effect, we extend the two base models by adding two interaction variables $sspudumh_t$ and $sspuduml_t$ to each of them. It is worth mentioning that the two interaction variables are the same variables used in the sub-section studying the effect of public sectoral shifts on private employment growth. We incorporated these two interaction variables into the two base models to highlight how the stage of private business cycle affects public employment fluctuations when private sector is taking over the public sector. The evidence remains robust, public sectoral shift has a negative and significant effect on public employment growth. Moreover, the evidence remains robust over the business cycle. During a downturn, public sectoral shift decreases public employment growth. This evidence may signal commitment to reduce public sector employment, regardless of business conditions in the private sector. Aligning the employment reduction strategy in the public sector with business cycles in the private sector may have provided a better scenario to absorb excess employment. Namely, an increase in the public sector shift during a boom reduces public employment at a time when jobs could be available in the private sector, mitigating adverse effects on aggregate unemployment. In contrast, during a downturn, persistent reduction in public employment carries a higher risk of increasing unemployment due to limited opportunities for job growth in the private sector.

Finally, once the two extended models were estimated, we added the change in government expenditure ratio to the model that marginally outperformed the other one to investigate the effect of government expenditure on acceleration and deceleration of public employment growth. The evidence remains robust. Further, public employment growth does

not increase with the increase in government spending, reflecting failure to align spending priorities with providing job opportunities to increase the fiscal multiplier and maximize the return on stimulus spending.

VI. Summary and Policy Implications

The paper has aimed at studying cyclicality in the labor market in Egypt and its determinants. Over time, sectoral shift in the public sector reflects a deliberate policy to reduce the size of employment in the public sector. However, the end result on employment has varied with the business cycles.

Private sector employment growth has increased during a boom on account of higher private output growth, reflecting a deliberate strategy to align jobs with productivity. Moreover, private employment has increased with sectoral shifts in both the public and private sectors during a boom, reflecting success to absorb laid off workers in the public sector in more productive activity in the private sector. However, persistent reduction in public sector employment was not aligned with business cycles in the private sector. As a result, sectoral shift has had a negative impact on private sector employment during a downturn. While the evidence reflects a rational strategy of employment growth in the private sector, it signals the failure of employment strategy in the public sector that has not varied flexibly with cyclicality in economic conditions to mitigate the adverse effects on the economy.

As for the determinants of private sector employment growth, an increase in credit and the growth of exports are key pillars to mobilizing jobs. However, the evidence indicates the adverse effects of higher government spending on private activity. In general, higher government spending crowds out employment growth in the private sector, which is more pronounced during periods of economic boom. However, government spending carries the potential of stimulating private employment during a downturn, attesting to the need to align government spending with stabilization priorities while refraining from pro-cyclical spending. It is also noteworthy that the increase in government spending has had a negative impact on employment growth in the public sector, further signifying the need to align spending priorities with employment objectives to increase the fiscal multiplier and the return on stimulus spending by the government.

For policy implications, the evidence signifies the importance of policies that aim at providing more credit for private sector activity and promoting exports towards growing more jobs in the private sector. Also, it is noteworthy that output growth is highly concentrated in capital intensive industries. Hence, it is necessary to provide incentives to increase the job content of output growth by providing tax incentives that are tied to the employment agenda and availing affordable credit for small and medium enterprises that have the capacity to mobilize high employment. Fiscal consolidation should help these objectives by reducing evidence of crowding out, namely in the form of higher cost of borrowing and inflation, and providing higher incentives for financial institutions to make more credit available to the private sector. Continued drive to reform public institutions with an aim to reduce unproductive employment should be better managed in the context of a comprehensive economic strategy that aims at absorbing excess labor in a growing private sector and providing training to increase the adaptability of laid off workers in the public sector to jobs in the private sector. Reducing unemployment and increasing income in line with productivity are key pillars towards sustaining high growth and achieving social equity.

Reference Tables

Table 1. Average and Volatility of Employment Growth

W/ Agriculture	Average employment growth %			STDEV of employment growth		
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	2.145	3.005	2.667	0.798	0.464	0.099
1991/92-2002/03	1.294	3.188	2.511	0.902	0.700	0.472
2003/04-2006/07	0.315	3.768	2.674	0.385	0.498	0.248
Whole period	1.444	3.215	2.593	1.005	0.628	0.346
W/O Agriculture						
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	2.172	5.725	3.58	0.791	1.252	0.109
1991/92-2002/03	1.394	5.062	3.189	0.979	1.393	0.724
2003/04-2006/07	0.348	5.142	3.07	0.383	0.672	0.283
Whole period	1.507	5.314	3.311	1.03	1.253	0.546

Table 2. Average and Volatility of Economic Growth

W/ Agriculture	Average economic growth %			STDEV of economic growth		
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	4.518	5.311	4.949	3.102	0.904	1.590
1991/92-2002/03	2.161	5.439	4.130	2.244	2.585	1.237
20033/04-2006/07	4.664	6.103	5.605	2.212	1.328	1.483
Whole period	3.410	5.499	4.661	2.762	1.906	1.463
W/O Agriculture						
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	4.500	6.422	5.408	3.130	1.341	1.957
1991/92-2002/03	1.894	5.833	4.381	2.673	2.938	1.421
2003/04-2006/07	4.730	6.902	5.961	2.359	1.536	1.666
Whole period	3.286	6.216	5.004	3.017	2.240	1.720

Table 3. Mapping Economic and Employment Growth

Private Sector:

$$\Delta lemp_{prt} = 2.201 + 0.184\ \Delta lrgdp_{prt}$$
(6.649) (3.233)

$\bar{R}^2$ = 0.283; SE of estimate = 0.532; DW = 1.728; Degrees of Freedom = 23

Private Sector Excluding Agriculture:

$$\Delta lemp_{prt} = 3.634 + 0.270\ \Delta lrgdp_{prt}$$
(5.400) (2.648)

$\bar{R}^2$ = 0.200; SE of estimate = 1.120; DW = 1.545; Degrees of Freedom = 23

Public Sector:

$$\Delta dlemp_{put} = 0.105\ \Delta dlrgdp_{put}$$
(1.978)

$\bar{R}^2$ = 0.139; SE of estimate = 0.691; DW = 2.458; Degrees of Freedom = 23

(OLS estimation: T-Statistics shown in parentheses)

Table 4. Average and Volatility of Sectoral Shift

W/ Agriculture	**Average of sectoral shift**			**STDEV of sectoral shift**		
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	0.025	0.034	0.019	0.009	0.011	0.009
1991/92-2002/03	0.042	0.049	0.018	0.020	0.045	0.008
2003/04-2006/07	0.026	0.025	0.016	0.002	0.006	0.005
Whole period	0.033	0.040	0.018	0.017	0.033	0.008
W/O Agriculture						
Period	**Public**	**Private**	**Total**	**Public**	**Private**	**Total**
1982/83-1990/91	0.025	0.036	0.017	0.009	0.018	0.013
1991/92-2002/03	0.039	0.058	0.017	0.022	0.063	0.011
2003/04-2006/07	0.026	0.023	0.018	0.002	0.008	0.006
Whole period	0.032	0.045	0.017	0.017	0.046	0.011

Table 5. The Relationships among Sectoral Shift Measures

First: Agriculture Sector is included

Private and Public Sectoral Shifts:

$ss_{prt} = 1.269\ ss_{put}$

(11.097)

$\bar{R}^2$ = 0.585; SE of estimate = 2.114; DW = 1.426; Degrees of Freedom = 24

Overall and Public Sectoral Shifts:

$ss_{ot} = 1.377 + 0.139\ ss_{put}$

(4.063) (1.519)

$\bar{R}^2$ = 0.052; SE of estimate = 0.755; DW = 1.674; Degrees of Freedom = 23

Overall and Private Sectoral Shifts:

$ss_{ot} = 1.589 + 0.062\ ss_{prt}$

(6.525) (1.313)

$\bar{R}^2$ = 0.029; SE of estimate = 0.763; DW = 1.782; Degrees of Freedom = 23

Second: Agriculture Sector is excluded

Private and Public Sectoral Shifts:

$ss_{prt} = -2.387 + 2.135\ ss_{put}$

(-1.964) (6.360)

$\bar{R}^2$ = 0.622; SE of estimate = 2.824; DW = 1.384; Degrees of Freedom = 23

Overall and Public Sectoral Shifts:

$ss_{ot} = 1.123 + 0.192\ ss_{put}$

(2.550) (1.582)

$\bar{R}^2$ = 0.059; SE of estimate = 1.023; DW = 1.887; Degrees of Freedom = 23

Overall and Private Sectoral Shifts:

$ss_{ot} = 1.421 + 0.072\ ss_{prt}$

(4.929) (1.573)

$\bar{R}^2$ = 0.058; SE of estimate = 1.024; DW = 1.931; Degrees of Freedom = 23

(OLS estimation: T-Statistics shown in parentheses)

Table 6. The Determinants of Employment Fluctuations in Private Sector

(Base Model)

$$dlemp_{prt} = 2.247 - 0.059ss_{prt-3} + 0.040\Delta(c_{prt-1} + c_{prt-2}) + 0.024(x_{t-1} + x_{t-2})$$

(3.499) (-1.550) (2.316) (1.907)

$\bar{R}^2$ = 0.287; SE of estimate = 0.567; DW = 1.522; Degrees of Freedom = 18

Extending the Base Model to Include Stage Of Business Cycle Effects

$$dlemp_{prt} = 2.306 - 0.066ss_{prt-3} + 0.093ssdumh_{prt} - 0.326ssduml_{prt}$$

(4.657) (-2.234) (1.629) (-3.144)

$$+0.025\Delta(c_{prt-1} + c_{prt-2}) + 0.026(x_{t-1} + x_{t-2})$$

(1.753) (2.573)

$\bar{R}^2$ = 0.581; SE of estimate = 0.434; DW = 2.068; Degrees of Freedom = 16

Testing Whether the Public Sectoral Shift Has Similar Effect On Private Employment

(Base Model)

$$dlemp_{prt} = 2.139 - 0.134ss_{put-3} + 0.046\Delta(c_{prt-1} + c_{prt-2}) + 0.031(x_{t-1} + x_{t-2})$$

(3.691) (-1.892) (2.656) (2.622)

$\bar{R}^2$ = 0.326; SE of estimate = 0.551; DW = 1.447; Degrees of Freedom = 18

Extending the Base Model to Include Stage Of Business Cycle Effects

$$dlemp_{prt} = 2.168 - 0.150ss_{put-3} + 0.092sspudumh_t - 0.292sspuduml_t$$

(5.104) (-2.834) (1.482) (-3.622)

$$+0.034\Delta(c_{prt-1} + c_{prt-2}) + 0.034(x_{t-1} + x_{t-2})$$

(2.550) (3.759)

$\bar{R}^2$ = 0.643; SE of estimate = 0.401; DW = 1.947; Degrees of Freedom = 16

(OLS estimation: T-Statistics shown in parentheses)

Table 7. Testing the Robustness of the Results When Agriculture Sector is Excluded

(Base Model)

$$dlempx_{prt} = 3.292 - 0.086ssx_{prt-3} + 0.044\Delta(c_{prt-2} + c_{prt-3}) + 0.048(x_{t-2} + x_{t-3})$$

(2.744) (-1.731) (1.385) (1.900)

$\bar{R}^2$ = 0.258; SE of estimate = 1.023; DW = 1.770; Degrees of Freedom = 18

Extending the Base Model to Include Stage-Of-Business Cycle Effects

$$dlempx_{prt} = 3.795 - 0.089ssx_{prt-3} + 0.185ssxdumh_{prt} - 0.346ssxduml_{prt}$$

(3.547) (-2.039) (1.772) (-1.938)

$$+0.001\Delta(c_{prt-2} + c_{prt-3}) + 0.042(x_{t-2} + x_{t-3})$$

(0.036) (1.826)

$\bar{R}^2$ = 0.432; SE of estimate = 0.894; DW = 1.691; Degrees of Freedom = 16

Testing Whether the Public Sectoral Shift Has Similar Effect On Private Employment

(Base Model)

$$dlempx_{prt} = 3.738 - 0.324ssx_{put-3} + 0.055\Delta(c_{prt-2} + c_{prt-3}) + 0.051(x_{t-2} + x_{t-3})$$

(3.445) (-2.788) (1.890) (2.364)

$\bar{R}^2$ = 0.396; SE of estimate = 0.923; DW = 2.195; Degrees of Freedom = 18

Extending the Base Model to Include Stage-Of-Business Cycle Effects

$$dlempx_{prt} = 4.276 - 0.323ss_{put-3} + 0.227sspudumh_t - 0.270sspuduml_t$$

(4.151) (-2.929) (1.663) (-1.347)

$$+0.028\Delta(c_{prt-2} + c_{prt-3}) + 0.042(x_{t-2} + x_{t-3})$$

(0.944) (1.982)

$\bar{R}^2$ = 0.485; SE of estimate = 0.852; DW = 2.130; Degrees of Freedom = 16

(OLS estimation: T-Statistics shown in parentheses)

Table 8. Testing Crowding Out and Crowding in Hypothesis with an Interaction Effect
A: Agriculture Sector is included

First: when growth is greater than or equal the average plus one standard deviation (≥ 7.4)

$$dlemp_{prt} = 2.116 + 0.031\Delta(c_{prt-1} + c_{prt-2}) + 0.020(x_{t-1} + x_{t-2}) - 0.014\Delta g_t - 0.386\Delta gh_t$$
(3.972) (1.953) (1.668) (-0.655) (-2.408)

$\bar{R}^2$ = 0.379; SE of estimate = 0.516; DW = 1.841; Degrees of Freedom = 18

Second: when economic growth is greater than or equal the average (≥5.5)

$$dlemp_{prt} = 1.710 + 0.035\Delta(c_{prt-1} + c_{prt-2}) + 0.030(x_{t-1} + x_{t-2}) - 0.006\Delta g_t - 0.032\Delta ga_t$$
(2.940) (1.986) (2.383) (-0.180) (-0.592)

$\bar{R}^2$ = 0.195; SE of estimate = 0.588; DW = 1.783; Degrees of Freedom = 18

B: Agriculture Sector is excluded

First: when growth is greater than or equal the average plus one standard deviation (≥8.45)

$$dlempx_{prt} = 2.822 + 0.03\Delta(c_{prt-2} + c_{prt-3}) + 0.047(x_{t-2} + x_{t-3}) - 0.042\Delta g_t - 0.389\Delta ghx_t$$
(2.355) (0.931) (1.711) (-0.928) (-1.130)

$\bar{R}^2$ = 0.195; SE of estimate 1.065; DW = 1.782; Degrees of Freedom = 17

Second: when economic growth is greater than or equal the average (≥ 6.2)

$$dlempx_{prt} = 0.587 + 0.091\Delta(c_{prt-2} + c_{prt-3}) + 0.081(x_{t-2} + x_{t-3}) + 0.213\Delta g_t - 0.415\Delta gax_t$$
(0.594) (3.052) (4.021) (2.655) (-3.613)

$\bar{R}^2$ = 0.512; SE of estimate 0.831; DW = 2.204; Degrees of Freedom = 17

(OLS estimation: T-Statistics shown in parentheses)

Table 9. The Determinants of Employment Fluctuations in Public Sector

(Base Model 1)

$$\Delta dlemp_{put} = 0.571 - 0.183ss_{put-2} + 0.014\Delta(c_{put-1} + c_{put-2}) + 0.001(x_{t-1} + x_{t-2})$$
(0.594) (-2.285) (1.806) (0.029)

$\bar{R}^2$ = 0.279; SE of estimate = 0.647; **DW = 2.729**; Degrees of Freedom = 19

(Base Model 2)

$$\Delta dlemp_{put} = 0.492 - 0.166ss_{put-2}$$
(1.481) (-1.885)

$\bar{R}^2$ = 0.10; SE of estimate = 0.721; DW = 2.372; Degrees of Freedom = 21

Extending the Base Model 1 to Include Stage-Of-private Business Cycle Effects

$$\Delta dlemp_{put} = 1.006 - 0.177ss_{put-2} - 0.219sspudumh_t - 0.197sspuduml_t$$
(1.109) (-2.494) (-2.584) (-1.406)
$$+0.006\Delta(c_{prt-1} + c_{prt-2}) - 0.006(x_{t-1} + x_{t-2})$$
(0.658) (-0.294)

$\bar{R}^2$ = 0.434; SE of estimate = 0.573; DW = 2.299; Degrees of Freedom = 17

Extending the Base Model 2 to Include Stage-Of-private Business Cycle Effects

$$\Delta dlemp_{put} = 0.754 - 0.165ss_{put-2} - 0.251sspudumh_t - 0.286sspuduml_t$$
(2.773) (-2.358) (-3.114) (-2.633)

$\bar{R}^2$ = 0.438; SE of estimate = 0.571; DW = 2.103; Degrees of Freedom = 19

Testing the significance of the government expenditure effect

$$\Delta dlemp_{put} = 0.754 - 0.165ss_{put-2} - 0.251sspudumh_t - 0.286sspuduml_t + 0.0005\Delta g_t$$
(2.667) (-2.294) (-3.029) (-2.507) (0.021)

$\bar{R}^2$ = 0.407; SE of estimate = 0.587; DW = 2.104; Degrees of Freedom = 18

(OLS estimation: T-Statistics shown in parentheses)

Appendix 2 (Tables)

Table A1. Employment Growth

Sr.	Sector	1982/83-1990/91 Average Employment Growth			1982/83-1990/91 STD of Employment Growth			1991/92 -2002/03 Average Employment Growth			1991/92 -2002/03 STD of Employment Growth			2003/04 - 2006/07 Average Employment Growth			2003/04 - 2006/07 STD of Employment Growth		
		Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
1	Agriculture	1.11	1.07	1.07	1.12	0.11	0.09	-4.10	1.10	0.99	7.36	0.14	0.21	-2.38	1.69	1.63	0.62	0.13	0.12
2	Manufacturing and mining	-0.09	9.72	3.51	2.97	5.09	1.20	-5.55	8.19	3.55	6.62	3.39	0.90	-9.55	6.17	4.01	1.69	0.37	0.30
3	Petroleum products	5.68	2.79	4.84	3.91	7.83	2.00	-1.49	13.24	5.40	14.61	27.82	2.70	1.28	18.79	14.37	0.19	2.16	2.22
4	Electricity	4.91		4.91	1.32		1.32	2.93		2.94	1.06		1.15	2.13	10.14	2.15	0.66	17.56	0.65
5	Construction	3.16	6.82	5.83	2.76	1.75	1.18	-1.97	7.09	5.65	3.41	2.20	1.72	-2.94	3.49	2.93	1.03	0.56	0.52
6	Transport and storage	2.93	6.71	4.66	1.68	1.49	1.27	-0.31	6.02	3.44	6.28	5.17	0.97	0.63	4.43	3.28	0.98	1.10	0.82
7	Communications	1.95		1.95	2.05		2.05	-5.15		3.32	27.00		3.01	0.22	8.98	6.15	0.27	12.61	8.53
8	Suez Canal	0.70		0.70	1.98		1.98	-0.57		-0.57	4.02		4.02	-0.91		-0.91	2.66		2.66
9	Trade, finance & insurance	-4.59	5.89	3.43	0.39	1.43	0.68	-1.15	4.07	3.44	6.60	1.35	1.01	-2.29	4.20	3.68	3.51	0.46	0.20
10	Tourism	-6.69	-0.14	-0.52	16.50	12.30	12.11	-3.79	4.27	4.05	7.84	12.37	11.81	-11.75	9.42	9.18	12.33	0.51	0.56
11	Housing and property	15.16	1.90	1.94	73.51	1.22	1.09	3.26	1.58	1.79	3.30	0.87	0.52	-3.13	3.79	2.94	0.11	0.34	0.33
12	Public utilities, educational, health services & other services	3.13	4.55	3.46	1.25	1.64	1.04	2.80	1.59	2.52	1.11	2.31	0.96	1.16	5.10	2.07	0.25	1.05	0.10

Table A2. GDP Growth

Sr.	Sector	1982/83-1990/91			1982/83-1990/91			1991/92 -2002/03			1991/92 -2002/03			2003/04 - 2006/07			2003/04 - 2006/07		
		Average GDP Growth			STD of GDP Growth			Average GDP Growth			STD of GDP Growth			Average GDP Growth			STD of GDP Growth		
		Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total	Public	Private	Total
1	Agriculture	6.98	2.85	2.93	3.86	0.85	0.86	-4.02	3.25	3.14	11.29	0.51	0.53	-37.40	3.20	3.01	68.36	0.32	0.43
2	Manufacturing and mining	5.26	11.13	7.60	2.34	3.14	1.65	-2.32	10.09	5.60	6.86	8.42	3.02	5.03	5.04	5.04	1.59	1.72	1.69
3	Petroleum products	4.47	2.88	4.11	10.02	11.65	7.60	0.45	-2.26	-0.06	3.61	11.59	4.31	5.48	8.05	5.92	7.04	7.04	6.97
4	Electricity	10.25		10.25	5.20		5.20	5.86		5.86	1.58		1.58	5.03		5.03	4.19		4.19
5	Construction	-0.25	7.95	4.69	9.39	5.43	0.90	2.60	3.87	3.50	2.14	4.49	3.71	7.27	9.48	8.88	4.37	4.79	4.65
6	Transport and storage	1.79	7.52	5.41	11.81	5.95	5.47	-3.76	5.73	3.76	6.88	4.37	4.12	5.42	6.67	6.52	1.88	1.00	1.07
7	Communications	8.24	11.64	8.27	3.83	13.84	3.82	9.44	41.73	12.21	5.47	42.24	4.97	2.21	24.61	10.95	3.15	5.71	1.55
8	Suez Canal	1.98		1.98	2.92		2.92	1.35		1.35	8.07		8.07	12.11		12.11	2.35		2.35
9	Trade, finance & insurance	3.79	3.97	3.91	1.25	0.56	0.23	1.24	5.14	4.05	2.27	2.20	1.78	4.48	4.92	4.82	1.68	2.26	2.12
10	Tourism	6.66	11.00	10.24	13.92	16.37	15.58	-16.13	5.94	4.71	56.10	13.02	14.10	18.54	18.44	18.44	12.22	12.45	12.45
11	Housing and property	4.18	8.19	7.86	1.76	1.26	1.08	2.90	4.96	4.83	2.12	2.24	2.10	2.80	2.86	2.86	1.12	1.02	1.02
12	Public utilities, educational, health services & other services	5.28	5.01	5.20	1.13	0.84	0.98	4.63	4.06	4.46	2.75	1.38	1.99	3.59	4.83	3.97	0.66	0.84	0.58

Table A3

Sr.	Sector	1982/83-1990/91			1991/92 -2002/03			2003/04 - 2006/07		
		Public	Private	Total	Public	Private	Total	Public	Private	Total
1	Agriculture	0.16	0.38	0.37	1.02	0.34	0.32	0.06	0.53	0.54
2	Manufacturing and mining	-0.02	0.87	0.46	2.39	0.81	0.63	-1.90	1.22	0.80
3	Petroleum products	1.27	0.97	1.18	-3.31	-5.86	-90.00	0.23	2.33	2.43
4	Electricity	0.48		0.48	0.50		0.50	0.42		0.43
5	Construction	-12.64	0.86	1.24	-0.76	1.83	1.61	-0.40	0.37	0.33
6	Transport and storage	1.64	0.89	0.86	0.08	1.05	0.91	0.12	0.66	0.50
7	Communications	0.24	0.00	0.24	-0.55	0.00	0.27	0.10	0.36	0.56
8	Suez Canal	0.35		0.35	-0.42		-0.42	-0.08		-0.08
9	Trade, finance & insurance	-1.21	1.48	0.88	-0.93	0.79	0.85	-0.51	0.85	0.76
10	Tourism	-1.00	-0.01	-0.05	0.23	0.72	0.86	-0.63	0.51	0.50
11	Housing and property	3.63	0.23	0.25	1.12	0.32	0.37	-1.12	1.33	1.03
12	Public utilities, educational, health services & other services	0.59	0.91	0.67	0.60	0.39	0.57	0.32	1.06	0.52

Note: The second half of 1990's witnessed a notable decrease in output of oil sector due to the fall in oil prices. Over the same period, employment increased. In addition, it seems that the private sector has taken over some state-owned enterprises in the oil sector—between 1999/2000 and 2000/2001.

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