

The Effects of Public Sector Hiring and Compensation Policies on the Egyptian Labor Market

Ragui Assaad

This article examines the combined impact of the employment guarantee for graduates and public sector compensation policies on the Egyptian labor market. Besides contributing to an unsustainable rate of growth in the government labor force, these policies have encouraged queuing for government jobs, contributed to high graduate unemployment rates, and reduced the employment of graduates in the private sector. Despite substantial wage erosion in the public sector in recent years, government wages, when appropriately corrected for observed heterogeneity and sample selection, are on a par with, or higher than, private sector wages, especially for graduates. When combined with the more desirable nonwage aspects of government jobs, these compensation levels explain the attractiveness of public sector employment to graduates. Government pay scales are especially advantageous to female secondary school graduates, who appear to face considerable discrimination in the private sector.

The public sector's role in shaping labor market outcomes through its hiring and compensation policies takes on special importance in Egypt because of the country's long-standing policy of guaranteeing employment in the public sector for all graduates of secondary and postsecondary institutions. When the policy was first instituted in the early 1960s, its impact was relatively limited because of the small number of eligible graduates, but, over time, it has had major consequences for the Egyptian labor market and economy.

The employment guarantee fueled the growth in demand for secondary and university education, which has, in turn, led to rapid growth in public sector employment and in the number of aspirants to such employment. When the growth of the public sector wage bill became unsustainable in the early 1980s, the government responded by eroding real public sector wages and extending the waiting period for government jobs. Despite these measures, long queues for government jobs indicate that rents received by public sector workers have not dissipated. Although the lifetime job security and many of the generous benefits

Ragui Assaad is with the Humphrey Institute of Public Affairs at the University of Minnesota. This article was originally prepared as a background paper for *World Development Report 1995: Workers in an Integrating World*. A previous version was circulated as Working Paper 9517 of the Economic Research Forum for the Arab Countries, Iran, and Turkey. The author gratefully acknowledges research assistance by Paul Stern and thanks Insan Tunali, Ishac Diwan, and three anonymous referees for their invaluable comments and suggestions.

© 1997 The International Bank for Reconstruction and Development / THE WORLD BANK

associated with these jobs are in theory guaranteed by law, they are difficult to obtain in the private sector because of widespread noncompliance with labor regulations. Anecdotal evidence also suggests that expectations of effort and performance and tolerance of moonlighting in the public sector have adjusted to counteract at least partially the erosion of public sector wages. For example, analyzing data from Côte d'Ivoire and Peru, van der Gaag, Stelcner, and Vijverberg (1989) link a greater incidence of moonlighting with lower public sector wages.

Because of the employment guarantee for graduates and the resulting dominance of the public sector in the market for educated labor, public sector compensation policies have had a major impact on the employment and wages of graduates elsewhere in the economy. In this article, I present a Harris-Todaro-type model that predicts the major features of the market for educated labor in Egypt, namely queuing for public sector jobs, which leads to unemployment rates that are three to five times higher among graduates than nongraduates, and reduced employment of graduates in the private sector. Although graduates are overremunerated in this economy, in a static sense, the resulting excess demand for secondary and higher education results in an oversupply of educated labor and comparatively low rates of return to education by international standards. Psacharopoulos (1983) and others find that rates of return to education are generally higher in the competitive sector than in the uncompetitive sector because of the presumed equalization of pay scales in the latter. In contrast, I find that rates of return to secondary education in Egypt are higher in the public sector than in the private sector.

Section I describes the history and operation of the public sector hiring and compensation policies in Egypt. Section II examines the effects of the employment guarantee on the size and composition of the public sector labor force and on open unemployment in the economy. Section III develops a model of the market for educated labor in Egypt and presents the main findings on the effects of public sector employment and compensation policies on the wage structure and returns to education in the Egyptian labor market. Section IV concludes.

I. PUBLIC SECTOR HIRING AND COMPENSATION POLICIES

This section reviews the history and mode of operation of the graduate employment guarantee scheme, highlighting changes in the size of the program and the resulting job queue that it engendered. It also describes the government's wage-setting policy.

Historical Background of the Employment Guarantee for Graduates

As part of the extensive nationalization drive of 1961–62, the Egyptian government initiated a major public employment drive that included an employment guarantee to university graduates. In 1964 the guarantee was extended to the graduates of vocational secondary schools and technical institutes, and the

policy was formalized in Law 14 of 1964. It was later made permanent in Law 85 of 1973, which extended the employment guarantee to demobilized military conscripts of all educational levels, a provision that was abrogated in 1976 (Hansen and Radwan 1982).

The employment guarantee followed a period of rapid expansion in the number of graduates from all levels of education. (See Sanyal and others 1982 and World Bank 1989 for a detailed description of the Egyptian education system.) Primary education expanded from 1 million students in 1952 to nearly 3.5 million in 1965–66, a rate just under 9 percent a year (Richards 1992). Preparatory and secondary enrollment expanded even faster, multiplying sixfold and threefold, respectively, from 1956 to 1961. The expansion underscored the commitment of the Nasser regime to making educational opportunities more accessible to the mass of the population. However, despite the rapid growth of enrollment, the education system was starved of resources because of major increases in military spending and the demands of the state-led import-substitution drive.

In an attempt to substitute for the large number of expatriate technicians who left the country after the Suez Crisis in 1956, the government also greatly expanded access to higher education. Enrollment increased from 50,000 in 1952–53 to 97,000 in 1961–62. Combined with the abolition of fees for higher education institutions in 1963, the employment guarantee for graduates boosted the demand for education. The employment guarantee greatly enhanced the private benefits of university education, and the abolition of fees significantly lowered private costs (Richards 1992).

Operation of the Employment Guarantee Scheme

With the exception of medical graduates and teachers, whose assignment was the responsibility of the relevant ministries, the law extended to graduates the right to apply to the Ministry of Manpower and Vocational Training for a public sector job. In addition to receiving the graduates' applications, the ministry solicited requests for graduates from government agencies and state-owned enterprises. There was little incentive for these agencies to limit their requests because appointees came with a budgetary allocation to cover their salaries. Nonetheless, the requests consistently fell short of the number of applicants, presumably because the budgetary allocations did not cover the full costs of employment. The ratio of applicants to requests was 1.2 in 1977 and rose to 5.1 in 1981 (Fergany 1991a). Excess supplies of applicants were usually allocated to local authorities, which were allowed to use them at their discretion (Hansen and Radwan 1982).

Until 1978, with few exceptions, public agencies and enterprises were not allowed to hire permanent workers outside this centralized system of labor force allocation. However, many agencies circumvented this restriction by hiring workers on temporary contracts. In 1978 public enterprises were allowed to opt out of the centralized labor force allocation scheme, to set their own hiring levels, and to select their own workers. Thus, the brunt of the employment guar-

Table 1. *Number of Graduates and the Queue for Government Employment, Egypt, 1995*

<i>Area of specialization and type of institute</i>	<i>Number of graduates (by year of graduation)</i>			<i>Structure (percentage of all graduates)</i>	<i>Average annual growth rate, 1983-91 (percent)</i>	<i>Percentage of graduates still seeking government appointments (by year of graduation)</i>		
	1983	1991	1983-91	1983-91		1983	1984-90	1991
<i>Area of specialization</i>								
Health sciences	9,998	7,230	74,185	2.1	-4.1	0.2	0.7	0.8
Agriculture	8,194	8,147	72,380	2.1	-1.5	1.3	36.3	48.5
Commerce	28,441	26,293	282,434	8.1	-1.8	1.0	21.5	32.5
Engineering	8,575	7,614	78,386	2.3	-2.6	1.1	8.2	14.1
Sciences	4,370	3,625	37,792	1.1	-2.2	1.5	25.9	38.5
Law	9,562	17,848	124,308	3.6	6.9	1.4	18.3	26.7
Teacher training	15,688	22,446	203,677	5.9	2.9	0.3	0.5	4.6
Other bachelor's degrees	20,444	27,276	226,886	6.5	1.5	1.1	16.7	31.1
All universities	105,272	120,479	1,100,048	31.7	0.5	0.9	15.0	24.3
<i>Type of institute</i>								
Commercial technical institute	17,709	25,993	218,902	6.3	4.7	18.4	35.2	46.3
Industrial technical institute	4,622	13,015	79,022	2.3	19.2	23.5	46.8	38.7
Other technical institute	2,115	5,241	29,202	0.8	10.3	3.9	12.1	10.8
All technical institutes	24,446	44,249	327,126	9.4	8.3	17.9	34.3	39.3
Agricultural vocational secondary	22,267	35,103	251,107	7.2	5.0	60.6	51.6	38.0
Commercial vocational secondary	107,672	112,898	1,015,129	29.2	0.9	42.0	50.0	48.0
Industrial vocational secondary	58,412	131,472	779,987	22.5	11.4	58.0	48.3	29.2
All vocational secondary	188,351	279,473	2,046,223	58.9	5.4	49.2	49.1	37.9
All graduates	318,069	444,201	3,473,397	100.0	4.1	30.8	36.5	34.4

Source: Government of Egypt, Ministry of Manpower and Vocational Training.

antee fell on the government sector, which includes the central government ministries, local government authorities, and the service and economic authorities.

During the twenty-year period from the early 1960s, when the employment guarantee scheme was opened to secondary school graduates, to the early 1980s, when severe budgetary pressures resulting from a decline in oil revenues began to manifest themselves, the burden of the employment guarantee scheme on the public sector increased significantly. The number of graduates grew at about 12 percent a year from 1963 to 1983 (CAPMAS 1965, 1985), compared with an overall rate of growth of the labor force of about 2 percent a year. The rate of growth in the number of graduates has since 1983 slowed to about 4 percent a year, but graduates now constitute the bulk of new entrants to the labor market. As shown in table 1, there were about 444,000 new graduates in 1991, which compares with a net increment to the overall labor force of 360,000, at the prevailing growth rate of about 2.5 percent a year. Although the latter figure represents the net growth of the labor force rather than the number of new entrants, it leaves no doubt that graduates now constitute the majority of new entrants.

These figures show why the public sector employment guarantee to graduates has become untenable. In its attempt to respond to the growing burden, the government has avoided the outright abolition of the program. Instead it has established two policies. The first is to curtail the supply of graduates through direct rationing of enrollment by the Ministry of Education. The second is to increase the waiting period for a government appointment in the hope that some graduates will drop out of the queue.

The first policy—to limit enrollments—has significantly reduced the rate of growth in the number of graduates and shifted their composition toward specializations that are in greater demand in the private sector. The number of university graduates peaked at about 130,000 in 1986 and has been declining or stable ever since, with the decline occurring across all specializations except for law and teacher training.¹ The share of university graduates among all graduates declined from 33 percent in 1983 to 27 percent in 1991. In contrast, the number of vocational secondary school graduates grew about 5.4 percent a year over the same period, with their share increasing from 59 to 63 percent.

The mix of specializations at the vocational level has shifted strongly away from the commercial track and toward the industrial track, which has grown nearly 20 percent a year. This shift resulted from the concerted efforts of the Ministry of Education to adjust the mix of graduates in favor of the industrial track by building more of the substantially more expensive industrial secondary schools. (World Bank 1989 provides a detailed account of the changes in policy toward technical education in Egypt.) Because postsecondary technical institutes are a relatively recent addition to the Egyptian education system, their enrollment grew rapidly, at a rate of 12 percent a year, until 1987 but then

1. The statistics in this section are based on data provided by the Ministry of Manpower and Vocational Training, some of which are summarized in table 1.

slowed to 3 percent a year from 1987 to 1991. The mix of technical institute graduates also shifted significantly in favor of industrial specializations.

The second policy response—to increase the waiting period for a government job—has resulted in waiting periods of up to thirteen years. By law, university graduates must wait at least two years and secondary school and technical institute graduates must wait three years after graduation before they can apply to the Ministry of Manpower for a government job. The waiting period was designed to allow male graduates to complete their military service. With the exception of the period from 1967 to 1973, when conscripts could serve indefinitely, the duration of military service is normally one year longer for secondary and technical institute graduates than for university graduates. By 1984 the period between graduation and appointment had been extended to three and a half years for university graduates and to four years for vocational secondary and technical institute graduates; by 1987 it had been extended to five and six years, respectively (Handoussa 1989). Hiring through the centralized labor force allocation system of the Ministry of Manpower has been suspended but has not been formally abolished. As of 1995 the last cohorts of graduates who were offered appointments were the 1983 university graduates and the 1982 vocational secondary and technical institute graduates.

The Ministry of Manpower maintains a registry of applicants to public sector jobs by year of graduation. Although graduates are removed from the registry as a matter of course if they obtain a public sector job, many do not give up their position in the queue if they get a private job, thus reserving their right to a public sector job when their turn comes up. An attempt to remove graduates from the registry when they obtain a position in a formal private sector firm resulted in a mass resignation of graduates from these firms (see Assaad 1996b and “Escapees to the Public Sector” 1992). This episode, which received a lot of attention in the Egyptian press, indicates the value that graduates continue to attach to public employment.

As shown in table 1, 36.5 percent of individuals who graduated between 1984 and 1990 were still queuing for public sector jobs as of mid-1995. The queuing rates vary substantially by level of education and area of specialization. Because appointments have already been made to virtually all of the 1983 university graduates, their queuing rate is only 0.9 percent. The queuing rate increases to 24 percent for 1991 graduates. Health sciences and teacher training graduates have the lowest queuing rates because their appointments are handled directly by the relevant ministries. Some categories of university graduates, such as holders of agriculture degrees, have queuing rates well in excess of 30 percent. Overall, however, queuing rates among university graduates are substantially lower than those of vocational secondary school graduates, which approach 50 percent in some specializations. Unlike university graduates, queuing rates among vocational secondary graduates have been falling with year of graduation. This may indicate that some recent graduates are no longer bothering to register with the Ministry of Manpower because the probability of obtaining a government ap-

pointment has dwindled. The drop in queuing rates is especially noticeable for graduates from the industrial track, who are likely to be employable in the private sector.

Although the Ministry of Manpower data on graduates are not disaggregated by gender, there is considerable indirect evidence to indicate that women are much less likely to drop out of the queue than men. This can be ascertained by the fact that unemployment rates are typically much higher for female graduates than for their male counterparts (Fergany 1991b). The lower dropout rate can also be ascertained from the increasing feminization of the civil service work force (see section II).

Wage Setting in the Government Sector

Wage setting in the Egyptian government was driven by nonmarket considerations well before the institution of the graduate employment guarantee. The Law of the Price List of Educational Certificates of 1951 stipulated a fixed initial salary for each educational certificate and a system of periodic increments according to seniority and level of education, regardless of the position occupied. Basic wages in the government are still being set in this manner. Compensation levels are tied to job grades, with lower and upper bounds for each grade set according to a unified schedule. Each year the worker is entitled to a periodic increase so long as the resulting wage does not exceed the maximum for the grade. In addition to basic wages, workers can receive allowances for hazardous work, accommodation, and various other aspects of the job. The employing agency can also pay incentives for good performance. The sum total of allowances and incentives is limited to 100 percent of the basic wage. The public compensation system is laid out in articles 40 and 41 of the Civil Servants Law (Law 47 of 1978) and amended in Law 115 of 1983.

II. EFFECTS OF THE EMPLOYMENT GUARANTEE SCHEME

The need to absorb an ever larger number of workers every year has had major implications for the public sector's finances, performance, and size relative to the rest of the economy. Despite the abandonment of the socialist development path in 1973, public sector employment growth continued unabated in the 1970s (see El-Issawy 1983). This growth was fueled by the continuation of the employment guarantee to graduates as well as its extension to demobilized military conscripts from 1973 to 1976 (Hansen and Radwan 1982). The expansion was financed in part by the substantial increase in oil receipts flowing into public coffers after 1973.

Employment and Wages in the Government

Although it is difficult to reconcile the various sources of data on the exact size of government employment, the general trend is one of very rapid growth in the 1960s and 1970s, followed by a slowdown in the mid-1980s, when the oil

windfall of the 1970s disappeared (see El-Issawy 1983 for 1952–78 and Handoussa 1989 for the trend up to 1986). Since 1981, the Central Agency for Public Mobilization and Statistics (CAPMAS) has reported the distribution of employment by institutional sector as measured by the Labor Force Sample Survey (LFSS, see table 2). The LFSS confirms that government employment grew rapidly from 1981 to 1984 (8.4 percent a year) and then slowed markedly between 1984 and 1995 (4 percent a year), when it was still growing faster than overall employment.

Real government wages rose during the boom period of the 1970s and early 1980s but then dropped precipitously thereafter, as the government attempted to bring its finances under control. According to Zaytoun (1991), real government wages rose to a peak of 19 percent above their 1974 level in 1981 but by 1986 had fallen to nearly 60 percent of their 1981 level. Although more recent data on government wages are not readily available, real wages have probably continued to decline because cost-of-living adjustments have been kept well below the inflation rate by agreement with the International Monetary Fund.

Employment in Public Enterprises

No comprehensive series of public enterprise employment is available for the period 1960 to 1975, but Handoussa (1989) estimates that public enterprise employment grew 8.7 percent a year from 1960 to 1966 and 2.9 percent from 1966 to 1976. Data from the Public Enterprise Information Center suggest that employment grew about 5 percent a year from 1974 to 1979. In 1979 the policy allowing public enterprises to opt out of the centralized labor force allocation scheme became effective. Employment in public enterprises subsequently slowed to 1.4 percent a year from 1979 to 1986–87 (Zaytoun 1991). The more recent

Table 2. *Distribution of Employment by Institutional Sector, Egypt, Selected Years*

Year	Percentage of total employment				Total employment ^b (thousands)	Trend (index, 1984 = 100)
	Government	Public enterprises	Private	Other ^a		
1981	19.9	13.4	66.4	0.2	9,946	84
1984	21.4	10.8	64.9	3.0	11,819	100
1988	18.0	8.1	72.8	1.2	16,263	138
1990	22.9	10.5	65.6	1.0	14,361	122
1991	22.9	9.8	66.1	1.2	14,489	123
1992	24.2	9.8	64.9	1.1	14,399	122
1995	25.9	9.0	63.9	1.2	15,208	129

Note: Data are for the population ages twelve to sixty-four, based on the May rounds of the CAPMAS Labor Force Sample Surveys in 1981, 1984, and 1995; the October round in 1988; the December round in 1990; and the combined annual results in 1991 and 1992.

a. Includes joint ventures and foreign-owned enterprises.

b. Total employment in 1981 and 1988 is not comparable to other years because of significant methodological differences in the way female employment was measured.

Source: CAPMAS Labor Force Sample Survey (various years).

data from the LFSS, in table 2, show a slowly declining share of public enterprise employment in total employment.

Composition of Public Sector Employment

In addition to its effect on the overall size of government employment and wages, the guaranteed employment scheme has skewed the composition of public sector employment toward more graduates, most of whom are white-collar workers. It has also contributed to an increasing feminization of the government labor force because of the high likelihood that female graduates will remain in the job queue.

As shown in table 3, nearly 57 percent of male and 95 percent of female government employees are graduates (of secondary, postsecondary, or university education). The proportion in public enterprises is lower than in government, but nonetheless considerably higher than in the private sector. Graduates constitute a tiny fraction of employment in private agriculture and less than 20 percent of employment in the private nonagricultural sector. Moreover, the government sector is the largest employer of graduates, especially for females. More than two-thirds of employed females work for the government, and nearly 80 percent work for the public sector broadly defined.

The increasing feminization of the government labor force can be readily seen from table 4, which is based on a comparison of census data from 1976 and 1986. Female employment in the government has grown at a rate of 8.7 percent a year compared with 2.4 percent for males. The government sector is increasingly becoming the dominant employer of female labor, accounting for more than half of female employment in 1986. Finally, the proportion of females in the government has increased from 15 to 25 percent, considerably more than it has in other sectors.

Open Unemployment

For a country where it is virtually impossible to get unemployment benefits, Egypt's open unemployment rate of 7 to 10 percent is relatively high. The definition of open unemployment used in Egypt is a person who did not work at all, but was able and desiring to work and was searching for it, during the reference period, which is one week in the LFSS and one day in the census. In practice, graduates waiting for government jobs are considered to be actively searching for work. Most of the open unemployment is comprised of graduates and can be attributed to queuing for government jobs. As shown in table 5, graduates, particularly secondary school graduates, have made up the vast majority of the unemployed since the mid-1980s, and their share has increased over time.

The sharp increase in graduate unemployment rates between 1976 and 1986 can be attributed to the slowdown in the government hiring of graduates that occurred in the 1980s, when the waiting period was extended from between two and three years to between five and six years. The increase in graduate unemployment rates in 1987 can be discounted because of differences in definitions

Table 3. *Employment by Sector and Educational Attainment for Males and Females, Egypt, 1988*

Sector	Males				Females			
	Below intermediate	Intermediate and above	University and above	All	Below intermediate	Intermediate and above	University and above	All
Government	883,340	649,646	541,024	2,074,010	46,150	547,987	274,606	868,743
Public enterprise	668,155	305,737	175,429	1,149,321	36,790	95,506	40,190	172,486
Private agriculture	3,640,616	193,065	37,770	3,871,451	4,051,966	49,221	598	4,101,785
Private nonagriculture	3,154,515	513,859	276,796	3,945,170	810,798	108,298	60,874	979,970
Other	54,631	62,384	43,731	160,746	5,456	7,803	16,642	29,901
All sectors	8,401,257	1,724,691	1,074,750	11,200,698	4,951,160	808,815	392,910	6,152,885

Note: Data are for individuals ages twelve to sixty-four. Below intermediate denotes individuals who did not earn a diploma from a secondary school. Intermediate and above denotes individuals who earned a diploma from a secondary school or a two-year postsecondary technical institute. University and above denotes individuals who earned a bachelor's or master's degree at a university or other higher education institution.

Source: Calculated from CAPMAS Labor Force Sample Survey, October 1988 round.

Table 4. *Distribution of Employment by Institutional Sector and Gender, Egypt, 1976 and 1986*
(percent)

Sector							Females	
	Males						As a percentage of total	
	Structure	Growth rate		Structure	Growth rate		1976	1986
	1976	1986	1976-86	1976	1986	1976-86		
Government	16.0	18.2	2.4	40.7	55.9	8.7	15.4	25.5
Public enterprise	9.4	10.3	2.0	10.9	10.2	4.9	7.6	10.0
Agriculture	50.1	41.7	-0.7	23.0	10.6	-2.2	3.2	2.7
Private nonagriculture	24.4	29.9	3.1	25.4	23.3	4.7	6.9	8.0
Total	100.0	100.0	1.1	100.0	100.0	5.5	6.7	10.0
Total (thousands)	9,430	10,568	n.a.	676	1,176	n.a.	n.a.	n.a.

n.a. Not applicable.

Source: CAPMAS Population Census for 1976 and 1986.

and data collection methodologies between the population census in 1986 and the LFSS in 1987. Still, the data from 1987 to 1995 indicate an increasing trend in the rate of unemployment, accounted for primarily by the growing proportion of secondary graduates among the unemployed. These data confirm the pattern observed in section I, which indicates that vocational secondary school graduates have the highest queuing rates for government jobs. Because eligibility for the employment guarantee starts at the secondary level, the greatest labor market distortion should occur at that threshold level.

Disaggregated by gender, unemployment data reveal that female graduates are disproportionately represented among the unemployed. In 1995 women made up 50 percent of unemployed graduates but only 25 percent of employed graduates. Among secondary school graduates, the vast majority of whom graduated from vocational schools, the female unemployment rate was 50 percent compared with 23 percent for their male counterparts. The rate for female university graduates was lower (16 percent) but still considerably higher than that for male university graduates (9 percent). These results confirm that female vocational secondary school graduates, most of whom pursue the commercial track, are the least able to find employment outside the government.

III. A MODEL OF SECTOR SELECTION AND WAGE DETERMINATION IN EGYPT

In this section, I present a simplified Harris-Todaro-type model to analyze the public sector employment guarantee and compensation policies in Egypt. I then lay out the econometric model and empirical estimates of sector-specific wage equations that take into account the simultaneous selection process into nonagricultural wage work and into the public and private sectors.

Table 5. *Distribution of Unemployed Workers and the Unemployment Rate by Educational Attainment, Egypt, Selected Years*
(percent)

Indicator and year	Illiterate	Ability to read and write	Below intermediate	Intermediate	Above intermediate	University	All	Number (thousands)
<i>Unemployed workers</i>								
1976 ^a	27.1	12.6	9.0	38.0	2.2	11.0	100.0	513
1986 ^a	14.6	6.5	4.5	52.2	5.0	17.2	100.0	1,574
1987	2.7	2.8	2.2	60.5	7.9	22.6	100.0	1,354
1990	12.9	4.1	8.4	53.3	6.8	14.6	100.0	1,345
1991	3.7	1.7	3.5	66.8	8.2	16.0	100.0	1,397
1992	1.2	1.0	1.2	70.4	9.1	17.0	100.0	1,416
1995	1.6	1.4	1.4	74.6	8.4	12.6	100.0	1,774
<i>Unemployment rate</i>								
1976 ^a	2.5	2.5	7.0	20.6	13.5	10.9	5.0	n.a.
1986 ^a	4.1	4.4	11.0	28.8	27.2	25.9	12.3	n.a.
1987	0.4	1.5	1.5	31.8	19.8	18.8	7.4	n.a.
1990	2.6	1.8	12.7	23.2	15.4	12.3	8.5	n.a.
1991	0.8	0.8	5.6	30.2	19.3	14.0	8.8	n.a.
1992	0.3	0.5	2.1	30.2	20.1	14.6	9.0	n.a.
1995	0.5	0.7	2.6	31.9	18.6	11.2	10.4	n.a.

n.a. Not applicable.

Note: Data are for individuals ages twelve to sixty-four. Data for 1987 and 1990 are from the December round of the Labor Force Sample Survey, data for 1991 and 1992 are from the combined annual results, and data for 1995 are from the May round. All are based on a one-week reference period. The ability to read and write denotes literate individuals who did not complete primary school. Below intermediate denotes individuals who earned a diploma after five years of primary school or three years of preparatory school. Intermediate denotes individuals who earned a secondary school diploma. Above intermediate denotes individuals who earned a diploma from a two-year postsecondary technical institute. University denotes individuals who earned a bachelor's or master's degree at a university or other higher education institution.

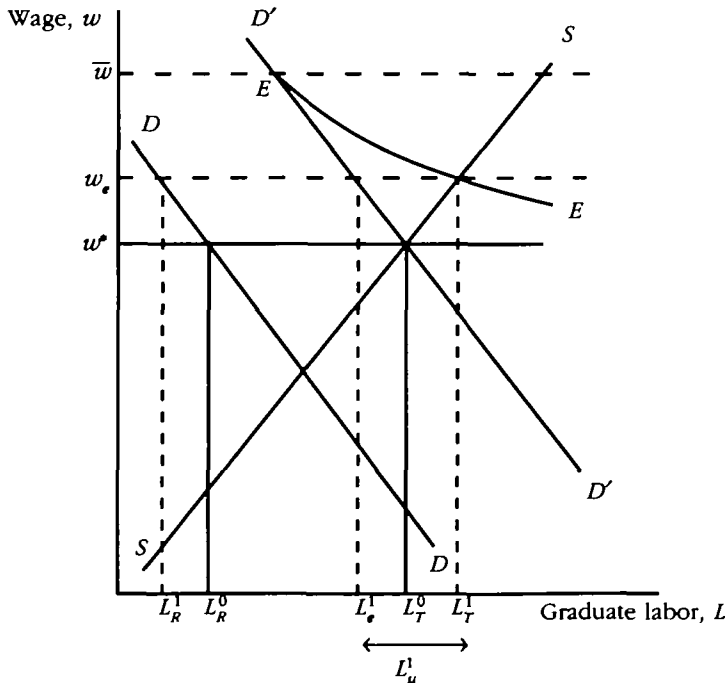
a. The data for 1976 and 1986 refer to individuals ages fifteen and above and are based on a one-day reference period.

Source: CAPMAS Population Census for 1976 and 1986. CAPMAS Labor Force Sample Survey for 1987, 1990, 1991, 1992, and 1995.

A Simple Supply and Demand Model for Educated Labor

The effect of the employment guarantee and public sector compensation policies in Egypt can be readily analyzed using a simplified Harris-Todaro-type model as follows. Consider the model shown in figure 1. Let SS be the supply curve of educated labor without the policy and DD be the private sector demand for this labor. Government employment adds a fixed amount to labor demand, shifting the demand curve to $D'D'$. If both the public and private sectors pay the market-clearing wage, the wage would be w^* , private employment would be L_R^0 , and total employment would be L_T^0 . There would be no graduate unemployment. Assume instead that government wage-setting practices are such that wages are set at \bar{w} above the market-clearing wage w^* . Assume that each graduate has a probability p of receiving the government wage \bar{w} . The prevailing wage in the private sector will be the expected wage $w_e = p\bar{w}$. The probability of p employment is assumed to depend on the number of unemployed graduates L_u (or the length of the queue for government jobs) as follows: $p = f(L_u)$, where $f(0) = 1$ and $f'(L_u) < 0$; $0 \leq p \leq 1$. w_e will fall on the intersection of a rectangular hyperbola (the curve EE) and the supply curve (see Basu 1984). At wage $w_e > w^*$, private sector employment of graduates will decline to L_R^1 and unemployment will be L_u^1 . Public sector employment is assumed to be invariant to the wage.

Figure 1. *Supply of and Demand for Graduate Labor in the Presence of a Public Sector Wage Floor*



If the increased demand for education at the secondary and university levels prompts the government to shift resources to these levels, the supply curve will shift outward. In that case the market clearing will be $w'^* < w^*$, and the new prevailing wage will be w'_e . Because it is not clear whether w'_e will be above or below the original market-clearing wage w^* , the policy might increase or reduce graduate wages in the long run.

As discussed in earlier sections, the Egyptian labor market exhibits all the features predicted by this simple model: a queue of unemployed graduates waiting for a government appointment and limited private sector employment of graduates. However, a direct comparison of public and private wages does not support the idea of a public sector wage floor. Average wages in the public sector appear to be substantially lower than those in the private sector and have lagged behind inflation in recent years. However, once wages are corrected for observed heterogeneity and for selectivity into the two sectors, and when the difference in nonpecuniary benefits across the two sectors is taken into account, the attraction of public sector jobs to graduates becomes readily apparent.

Econometric Model

The wage equations for male and female nonagricultural wage workers are based on a standard Mincerian human capital model. Variations in wages are assumed to be associated with differences in educational attainment and on-the-job experience. Regional variables are included to control for differences in cost-of-living and labor market conditions. Because public sector wages are not necessarily set to equal marginal productivity as assumed in the Mincerian approach, I distinguish between the two sectors by allowing each to have its own wage determination process. The public sector is defined to include the government (or civil service) and the public enterprise sector. Everything else is included in the private sector.

Several other studies have examined public-private wage differentials in developing countries (Lindauer and Sabot 1983; Corbo and Stelcner 1983; Psacharopoulos 1983; Al-Qudsi 1989). These studies do not take into consideration the endogeneity of the sectoral allocation process as is done in some of the more recent studies (van der Gaag and Vijverberg 1988; Stelcner, van der Gaag, and Vijverberg 1989; van der Gaag, Stelcner, and Vijverberg 1989; Terrell 1993). Because nonagricultural wage workers are themselves not a random sample of the population, I go a step further in this study by accounting for the endogeneity of participation in wage work in a context where self-employment is common. Tansel (1994) corrects for selectivity into wage work but does not disaggregate by sector. Vijverberg (1993) adjusts for selection into wage work (as well as other labor market states) and selection by region but does not address public-private differentials. I abstract from the issue of selection into the two components of the public sector. I assume that the wage determination process in public enterprises is identical to that in the government except for a shift parameter. Terrell (1993) takes into account nonrandom selection into the two components of the public sector. I do not take into account

endogenous selection into different levels of education. See Willis and Rosen (1979) for a discussion of the issues involved.

I use a double selection framework that extends the single selection procedures developed by Heckman (1976, 1979) and Lee (1976) to account for two selection rules jointly determining inclusion in a particular subsample. The double selection model used here, which is based on the bivariate probit technique, was developed by Tunali (1986) to analyze two consecutive migration decisions, each with two possible outcomes. Vijverberg (1993) has developed a model to deal with a similar double selection process, but in his model each decision is allowed to have more than two outcomes. Using the dichotomous variables D_1 and D_2 , the two selection rules for participation in nonagricultural wage work and sector selection can be expressed as:

$$D_1 = \begin{cases} 1 & \text{participate in nonagricultural wage work if } I_1^* > 0 \\ 0 & \text{otherwise (if } I_1^* \leq 0) \end{cases}$$

$$D_2 = \begin{cases} 1 & \text{become a nonagricultural wage worker in the public sector if } I_2^* > 0 \\ 0 & \text{become a nonagricultural wage worker in the private sector if } I_2^* \leq 0 \end{cases}$$

where I_1^* and I_2^* are latent variables indicating the difference in the worker's utility between nonagricultural wage work and other labor market states and between public and private nonagricultural wage work, respectively. The decisions are not necessarily sequential. The methodology used allows for the two decisions to be simultaneous. The worker's utility in each sector takes into account both pecuniary and nonpecuniary aspects of participation in each sector as well as noncompetitive barriers to entry, which can take the form of waiting queues or other costs of entry.

Omitting subscripts indicating a particular individual, the latent variables can be written as a linear function of observable characteristics and an error term as follows:

$$(1) \quad I_1^* = \gamma_1 Z + \varepsilon_1$$

$$(2) \quad I_2^* = \gamma_2 Z + \varepsilon_2$$

where Z is a vector of individual characteristics; γ_1 and γ_2 are vectors of unknown parameters; and ε_1 and ε_2 are zero-mean, constant-variance disturbance terms. Because I_1^* and I_2^* are not observed, but sector selection is, equations 1 and 2 can be estimated as a system of two dichotomous dependent-variable equations.

The wage equations in the public and private sectors are specified according to the standard Mincerian human capital model, where log wages y are assumed to depend on human capital characteristics and regional labor market and cost-of-living differences as follows:

$$(3) \quad y_P = \beta_{0P} + \beta_P X_P + v_P$$

$$(4) \quad y_R = \beta_{0R} + \beta_R X_R + v_R$$

X_P and X_R are vectors of characteristics for workers in the public and private sectors, respectively; β_{0P} and β_{0R} are the two intercepts; and β_P and β_R are vectors of unknown parameters other than the intercept. The vector of disturbances $U = (\epsilon_1, \epsilon_2, v_P, v_R)$ is assumed to have a multivariate normal distribution with zero means and covariance matrix Σ . With the usual standardization of the unidentifiable variances of the dichotomous dependent-variable models, Σ is given by:

$$\Sigma = \begin{bmatrix} 1 & \rho_{12} & \rho_{1P}\sigma_P & \rho_{1R}\sigma_R \\ \rho_{12} & 1 & \rho_{2P}\sigma_P & \rho_{2R}\sigma_R \\ \rho_{1P}\sigma_P & \rho_{2P}\sigma_P & \sigma_P^2 & \rho_{PR}\sigma_P\sigma_R \\ \rho_{1R}\sigma_R & \rho_{2R}\sigma_R & \rho_{UP}\sigma_P\sigma_R & \sigma_R^2 \end{bmatrix}.$$

The system of equations 1–4 and the covariance matrix can be estimated by Heckman-Lee-type two-stage methods, keeping in mind that σ_{PR} cannot be identified because only one regime is observed for each person.² The expected values of log wages in the public and private sectors are given by:

$$(5) \quad \begin{aligned} E(y_P) &= \beta_{0P} + \beta_P X_P + E(v_P | D_1 = 1, D_2 = 1) \\ &= \beta_{0P} + \beta_P X_P + \rho_{1P}\sigma_P\lambda_{1P} + \rho_{2P}\sigma_P\lambda_{2P} \end{aligned}$$

$$(6) \quad \begin{aligned} E(y_R) &= \beta_{0R} + \beta_R X_R + E(v_R | D_1 = 1, D_2 = 0) \\ &= \beta_{0R} + \beta_R X_R + \rho_{1R}\sigma_R\lambda_{1R} + \rho_{2R}\sigma_R\lambda_{2R} \end{aligned}$$

where

$$(7) \quad \begin{aligned} \lambda_{1P} &= \frac{f(\theta_1)F(\theta_2^*)}{G(\theta_1, \theta_2; \rho_{12})}, & \lambda_{2P} &= \frac{f(\theta_2)F(\theta_1^*)}{G(\theta_1, \theta_2; \rho_{12})} \\ \lambda_{1R} &= \frac{f(\theta_1)F(-\theta_2^*)}{G(\theta_1, -\theta_2; -\rho_{12})}, & \lambda_{2R} &= \frac{f(\theta_2)F(\theta_1^*)}{G(\theta_1, -\theta_2; -\rho_{12})} \end{aligned}$$

$f(\cdot)$ and $F(\cdot)$ denote the standard univariate normal-density and distribution functions, respectively; $G(\cdot, \cdot; \rho)$ denotes the standard bivariate normal distribution function, with correlation ρ ; and $\theta_1, \theta_2, \theta_1^*$ and θ_2^* are given by

$$\begin{aligned} \theta_1 &= \gamma_1 Z, & \theta_2 &= \gamma_2 Z \\ \theta_1^* &= \frac{\theta_1 - \rho_{12}\theta_2}{(1 - \rho_{12}^2)^{1/2}}, & \theta_2^* &= \frac{\theta_2 - \rho_{12}\theta_1}{(1 - \rho_{12}^2)^{1/2}}. \end{aligned}$$

The first stage consists of a simultaneous estimation of the two selection equations using the bivariate probit technique. The parameter estimates are used to

2. Two-stage methods provide estimates for $\lambda_{ij} = \rho_{ij}\sigma_j$ (where $i = 1, 2; j = P, R$) rather than for ρ_{ij} and σ_j separately.

compute the λ terms as in expression 7, which are then included as regressors in the second-stage wage equations. The standard errors of the second stage are adjusted to account for the presence of estimated regressors. The expression for an asymptotic covariance matrix is provided in Tunali (1986).

Empirical Analysis

The data are obtained from the October 1988 round of the Egyptian LFSS. This special round of the survey used a more detailed set of questions to inquire about earnings than is usual in the regular rounds of the survey.³ As a result, data on monetary earnings appear to be fairly reliable. Although an attempt was made to get at earnings in kind, the quality of that data appears to be poor. I therefore use monetary net earnings and divide by the number of hours worked per year to compute the hourly wage. The most important nonpecuniary benefits thus excluded are the value of retirement and death benefits for workers who are covered by social insurance and the value of job security for those who possess legal employment contracts. The vast majority of public sector workers have social insurance coverage and work under legal employment contracts, but only 26 percent of private nonagricultural workers have social insurance coverage and only 12 percent have legal contracts. (See Assaad 1996b for a description of Egypt's job security and social insurance system.)

Because participation in the labor force for working-age males is virtually universal, there is no need to model the labor force participation decision. Thus, the relevant universe for participation in the nonagricultural wage work decision for males is all males ages fifteen to sixty-four who were in the labor force some time during the reference year. In the case of females, however, the participation equation models the outcome of both the decision to participate in the labor force and the decision to participate in nonagricultural wage work, so that the relevant universe is all females ages fifteen to sixty-four.

Summary statistics for the variables used in the wage and selection equations are shown in table 6. Nearly 50 percent of males in the relevant universe are nonagricultural wage workers, and among those nearly 60 percent are in the public sector (see the last line in table 6). The information on parent background, which is used in one of the male selection equations, was only collected for half the households in the sample. The male subsample used here is therefore drawn from these households. The proportion of nonagricultural wage workers in the female sample is 10 percent, but among those a larger share works in the public sector (77 percent).

An examination of the mean wage data reveals why public sector jobs have such a strong appeal for women who choose to work for wages. While the gender gap in average wages is large in the private sector (0.37 log points), it is much narrower in the public sector (0.07 log points). The gender gap in the private sector does not appear to be related to differences in work force composition.

3. The earnings module was designed by Professor Mohaya Zaytoun and is described in detail in Zaytoun (1990).

Table 6. Mean Values for Variables by Gender and Labor Force Status, Egypt, 1988

Variable	Males ^a			Females		
	Nonagricultural wage workers			Nonagricultural wage workers		
	Public	Private	Others ^b	Public	Private	Others ^c
Log hourly wage	-0.477 (0.630)	-0.586 (0.703)	n.a. n.a.	-0.551 (0.591)	-0.955 (0.707)	n.a. n.a.
Age	39.3 (10.3)	28.2 (10.9)	35.5 (15.1)	32.6 (8.6)	27.7 (10.3)	33.1 (13.8)
Experience	19.7 (11.7)	12.8 (10.9)	n.a. n.a.	10.5 (8.7)	6.8 (9.0)	n.a. n.a.
<i>Educational attainment</i>						
Illiterate (reference)	0.146 (0.353)	0.307 (0.461)	0.482 (0.500)	0.033 (0.179)	0.304 (0.460)	0.649 (0.477)
Ability to read and write [†]	0.182 (0.386)	0.183 (0.387)	0.165 (0.371)	0.014 (0.116)	0.060 (0.237)	0.082 (0.274)
Primary [†]	0.076 (0.265)	0.106 (0.307)	0.087 (0.282)	0.018 (0.132)	0.054 (0.226)	0.057 (0.232)
Preparatory [†]	0.054 (0.226)	0.137 (0.344)	0.090 (0.286)	0.025 (0.157)	0.088 (0.283)	0.086 (0.280)
General secondary [†]	0.032 (0.176)	0.039 (0.194)	0.035 (0.183)	0.025 (0.155)	0.028 (0.166)	0.033 (0.179)
Vocational secondary [†]	0.215 (0.411)	0.144 (0.352)	0.074 (0.262)	0.449 (0.498)	0.267 (0.443)	0.055 (0.229)
Vocational secondary, blue collar [†]	0.031 (0.172)	0.097 (0.296)	n.a. n.a.	0.014 (0.116)	0.071 (0.257)	n.a. n.a.
Vocational secondary, white collar [†]	0.185 (0.388)	0.048 (0.214)	n.a. n.a.	0.436 (0.496)	0.196 (0.398)	n.a. n.a.
Technical institute [†]	0.060 (0.237)	0.020 (0.141)	0.013 (0.115)	0.143 (0.350)	0.037 (0.189)	0.007 (0.085)
All baccalaureate degrees [†]	0.201 (0.401)	0.060 (0.238)	0.049 (0.216)	0.275 (0.447)	0.159 (0.366)	0.030 (0.171)
Bachelor of medicine [†]	0.013 (0.113)	0.001 (0.028)	0.003 (0.055)	0.018 (0.132)	0.014 (0.119)	0.001 (0.030)
Bachelor of agriculture [†]	0.025 (0.157)	0.002 (0.049)	0.006 (0.079)	0.017 (0.129)	0.009 (0.092)	0.001 (0.033)
Bachelor of engineering [†]	0.025 (0.157)	0.015 (0.123)	0.006 (0.075)	0.013 (0.112)	0.003 (0.053)	0.001 (0.033)
Bachelor of sciences [†]	0.009 (0.097)	0.003 (0.057)	0.002 (0.045)	0.010 (0.100)	0.014 (0.119)	0.010 (0.031)
Bachelor of commerce [†]	0.053 (0.223)	0.024 (0.154)	0.014 (0.118)	0.069 (0.254)	0.043 (0.202)	0.006 (0.076)
Bachelor of law [†]	0.015 (0.123)	0.005 (0.070)	0.007 (0.084)	0.013 (0.112)	0.006 (0.075)	0.002 (0.044)
Other baccalaureate degree [†]	0.060 (0.238)	0.009 (0.094)	0.011 (0.104)	0.136 (0.343)	0.071 (0.257)	0.009 (0.097)
Postgraduate [†]	0.035 (0.183)	0.004 (0.064)	0.004 (0.066)	0.019 (0.135)	0.003 (0.053)	0.001 (0.028)
<i>Region of residence</i>						
Greater Cairo (reference)	0.288 (0.453)	0.368 (0.482)	0.129 (0.336)	0.353 (0.478)	0.520 (0.500)	0.211 (0.408)
Alexandria and Suez Canal [†]	0.123 (0.328)	0.123 (0.328)	0.069 (0.254)	0.157 (0.364)	0.145 (0.352)	0.088 (0.283)
Urban Lower Egypt [†]	0.141 (0.348)	0.160 (0.367)	0.122 (0.327)	0.195 (0.396)	0.105 (0.307)	0.134 (0.341)

Table 6. (continued)

Variable	Males ^a			Females		
	Nonagricultural wage workers			Nonagricultural wage workers		
	Public	Private	Others ^b	Public	Private	Others ^c
Urban Upper Egypt [†]	0.130 (0.367)	0.085 (0.279)	0.087 (0.283)	0.129 (0.335)	0.068 (0.252)	0.095 (0.293)
Rural Lower Egypt [†]	0.198 (0.398)	0.175 (0.380)	0.355 (0.479)	0.125 (0.331)	0.125 (0.331)	0.283 (0.450)
Rural Upper Egypt [†]	0.120 (0.326)	0.089 (0.285)	0.237 (0.425)	0.041 (0.197)	0.037 (0.189)	0.190 (0.392)
Public enterprise [†]	0.343 (0.475)	n.a. n.a.	n.a. n.a.	0.157 (0.364)	n.a. n.a.	n.a. n.a.
<i>Father's predominant employment status</i>						
Father self-employed [†]	0.469 (0.499)	0.369 (0.483)	0.635 (0.481)	n.a. n.a.	n.a. n.a.	n.a. n.a.
<i>Household-related variables</i>						
Currently married [†]	0.820 (0.384)	0.429 (0.495)	0.642 (0.479)	0.673 (0.469)	0.281 (0.450)	0.638 (0.481)
Household head [†]	0.749 (0.434)	0.377 (0.485)	0.525 (0.499)	0.095 (0.293)	0.094 (0.292)	0.099 (0.299)
Male household earnings (thousands of Egyptian pounds)	n.a.	n.a.	n.a.	1.63 (1.99)	1.35 (2.14)	0.961 (1.42)
Self-employed males [†]	n.a.	n.a.	n.a.	0.136 (0.343)	0.224 (0.418)	0.388 (0.487)
Male private wage workers [†]	n.a.	n.a.	n.a.	0.144 (0.351)	0.324 (0.469)	0.221 (0.415)
Male public wage workers [†]	n.a.	n.a.	n.a.	0.598 (0.490)	0.304 (0.461)	0.310 (0.462)
<i>Sample selection terms^d</i>						
Wage work selection, λ_{1j}	0.557 (0.303)	0.798 (0.358)	n.a. n.a.	0.858 (0.496)	25.7 (55.4)	n.a. n.a.
Public-private selection, λ_{2j}	0.444 (0.368)	-0.610 (0.486)	n.a. n.a.	0.254 (0.291)	-14.4 (35.8)	n.a. n.a.
Number of observations	1,694	1,232	2,991	1,180	352	14,257

n.a. Not applicable.

Note: Standard deviations are in parentheses. The ability to read and write denotes literate individuals who did not complete primary school. Primary denotes individuals who earned a diploma after five years of primary school. Preparatory denotes individuals who earned a diploma after three years of preparatory school. General secondary denotes individuals who earned a diploma from a three-year secondary school that leads to the higher education system. Vocational secondary denotes individuals who completed a three-year vocational track. Technical institute denotes individuals who earned a diploma from a two-year postsecondary technical institute.

a. The male subsample is derived from a random sample of half of the households in the overall sample.

b. Includes all other males ages fifteen to sixty-four who were in the labor force at some point during the reference year.

c. Includes all other females ages fifteen to sixty-four.

d. The subscript $j = (P, R)$ denotes the relevant sectoral wage equation.

[†] Indicates a dummy variable.

Source: Author's calculations based on data from the Labor Force Sample Survey for 1988.

Female nonagricultural wage workers in both sectors are generally better educated than their male counterparts. Nearly 50 percent of female private sector workers hold a secondary diploma or above, compared with 27 percent of their male counterparts.

Female nonagricultural wage workers also tend to be more concentrated in the large metropolitan areas of Cairo and Alexandria, where social norms are more permissive of women's work outside the home. Judging from the higher proportion of married women in the public sector, it appears that after marriage women are much more likely to stay in their public sector jobs than in private sector wage work. There is also a high correlation between a woman's labor force status and the status of other members of her household. Women with male public sector workers in the household are more likely to be in the public sector, and those with male private sector workers in the household are more likely to be observed in the private sector. The presence of a family business, which is proxied here by the father's employment status, appears to be positively correlated with self-employment for males. Finally, it is worth noting that 34 percent of male and 16 percent of female public sector workers are employed in public enterprises rather than the civil service.

First-stage estimates: the selection equations. Table 7 shows the parameter estimates from bivariate probit estimation of the two selection equations for males and females. The first selection equation describes the individual's decision about whether to participate in nonagricultural wage work. The second models the selection process into the public and private sectors for workers selected into the nonagricultural wage work subsample. For males, the participation decision amounts primarily to a choice between nonagricultural wage work and self-employment or agricultural wage work. The observable characteristics that affect that choice are essentially the same as those that determine the choice between the public and private sectors, namely age, education, and region of residence. Marital and household headship status are also likely to affect both decisions. It is not clear what the effect of headship on either decision should be a priori. The effect of marital status on the participation decision of males is also not clear a priori, but married men are more likely to prefer the public sector, other things being equal, because it provides greater income security.

In bivariate selection models such as this one, where one of the cells of the classification is censored (the outcome of the sector selection is only observed for individuals who participate in nonagricultural wage work), at least one restriction is needed for identification (Tunali 1986). The father's self-employment status, which is meant to proxy the presence of a family business, is likely to affect the choice of self-employment or wage work, but not the choice of sector. There are therefore good theoretical reasons to exclude that variable from the sector selection equation.

Because of the strong link between female labor force participation and household responsibilities, the number of children in various age groups and the pres-

ence of elderly parents or alternative caregivers in the household are sometimes included as regressors in the participation equation (see the survey in Killingsworth and Heckman 1986). Because these variables are potentially endogenous to a woman's decision to work, I do not include them in this reduced-form equation. However, I do include variables relating to the labor force status and earnings of male members of the household. In theory, other household members' decisions about whether and how to participate in the labor force may be endogenous to the woman's decision. In the Egyptian context, it is unlikely that males decide their labor force status as a function of that of their wives, sisters, or daughters. The presence in the household of males who are private or public wage workers should be positively associated with a woman's participation in wage work because of the labor market information it provides. The presence of self-employed males in the household would be positively associated with employment in a family enterprise and therefore negatively associated with a woman's participation in wage work. In addition, a woman's choice of sectors would be positively associated with that of her male relatives. In the absence of information on unearned or property income in the survey, I use male wage earnings to model the income effect on participation. Because data are only available for wage earnings, the income effect from self-employment earnings is captured by the dummy variable "male self-employed workers." This variable and the "male household earnings" variable are excluded from the female sector selection equation and thus serve to identify the model.

Because of the employment guarantee scheme for graduates, educational attainment is an important determinant of both sectoral choice and participation in wage work. Furthermore, because some educational specializations at the bachelor's level lead to a greater likelihood of being in the liberal professions and therefore of being self-employed, I use a more detailed breakdown of educational specializations than is typical in standard human capital models. The results confirm the importance of educational attainment as a determinant of both selection processes. As expected, there is a significant increase in the probability of joining the government for vocational secondary, technical institute, and university graduates, the groups covered by the employment guarantee. The increase at those levels is especially pronounced for females. The other variables discussed above seem to have the expected signs. Descriptive statistics of the λ terms calculated from the first stage are shown in table 6.

Second-stage estimates: the wage equations. Separate wage equations are estimated for males and females. Experience is calculated as the total number of years since entering the labor force, thus neglecting any time spent outside the labor force since entry. Because the number of years of schooling is not available from the survey, education is specified as the attainment of particular educational credentials. The "read and write" variable—literate individuals—is clearly an exception to this rule. (See van der Gaag and Vijverberg 1989 for a comparison of the credentials and years of schooling approaches to measuring human capital.)

Table 7. Estimation Results for the Selection Equations, Egypt, 1988

Variable	Males		Females	
	Participation in nonagricultural wage work	Public-private selection decision	Participation in nonagricultural wage work	Public-private selection decision
Constant	-1.470*** (-8.47)	-5.76*** (-13.1)	-5.24*** (-25.9)	-4.59** (-2.02)
Age	0.100*** (9.61)	0.212*** (10.4)	0.201*** (16.0)	0.192** (2.42)
Age ² /100	-0.140*** (-11.2)	-0.203*** (-7.47)	-0.254*** (-15.2)	-0.219** (-2.15)
<i>Educational attainment^a</i>				
Ability to read and write	0.476*** (9.24)	0.488*** (4.72)	0.148* (1.78)	0.479* (1.74)
Primary	0.446*** (6.68)	0.771*** (6.09)	0.610*** (7.13)	1.06*** (2.74)
Preparatory	0.514*** (7.36)	0.789*** (5.90)	0.719*** (8.94)	0.868** (2.25)
General secondary	0.371*** (3.89)	0.800*** (3.81)	0.704*** (6.77)	1.050** (2.40)
Vocational secondary	0.895*** (14.70)	1.35*** (10.1)	2.03*** (36.9)	1.66** (2.21)
Technical institute	0.878*** (7.78)	1.63*** (8.98)	2.46*** (27.4)	1.98** (2.32)
Bachelor of medicine	0.677*** (3.00)	2.61*** (4.70)	2.40*** (11.7)	1.16 (1.39)
Bachelor of agriculture	0.740*** (4.26)	2.05*** (4.69)	2.12*** (9.94)	1.28 (1.51)
Bachelor of engineering	0.769*** (4.49)	1.06*** (5.49)	1.91*** (7.82)	1.83** (2.06)
Bachelor of science	0.725*** (2.86)	1.74*** (4.15)	2.11*** (8.39)	1.08 (1.27)
Bachelor of commerce	0.713*** (6.25)	1.21*** (6.91)	1.99*** (18.2)	1.35* (1.86)
Bachelor of law	0.446** (2.55)	1.46*** (3.70)	1.58*** (7.84)	1.78** (2.23)
Other bachelor	1.02*** (8.09)	1.98*** (9.26)	2.18*** (25.6)	1.42* (1.87)
Postgraduate	0.995*** (5.89)	1.70*** (6.82)	2.39*** (9.83)	1.65* (1.83)
<i>Region of residence^b</i>				
Alexandria and Suez Canal	-0.168** (-2.47)	0.222** (2.47)	0.016 (0.29)	0.367*** (2.75)
Urban Lower Egypt	-0.327*** (-5.52)	0.227** (2.12)	-0.077 (-1.32)	0.610*** (4.35)
Urban Upper Egypt	-0.308*** (-4.72)	0.474*** (3.76)	-0.071 (-1.08)	0.726*** (4.07)
Rural Lower Egypt	-0.680*** (-12.7)	0.444*** (2.95)	-0.184*** (-3.05)	0.497*** (2.68)
Rural Upper Egypt	-0.813*** (-13.6)	0.574*** (3.18)	-0.355*** (-4.31)	0.584** (2.27)

Table 7. (continued)

Variable	Males		Females	
	Participation in nonagricultural wage work	Public-private selection decision	Participation in nonagricultural wage work	Public-private selection decision
<i>Father's predominant employment status</i>				
Father self-employed or employer	-0.384*** (-10.5)			
<i>Household-related variables</i>				
Head of household	0.250*** (4.26)	-0.002 (-0.02)	0.044 (0.64)	0.352* (1.69)
Currently married	-0.003 (-0.04)	0.266*** (2.77)	-0.481*** (-9.72)	0.379** (2.13)
Male household earnings			-0.009 (-0.66)	
Self-employed males			-0.343*** (-7.12)	
Male private wage workers			0.046 (0.93)	-0.167 (-1.50)
Male public wage workers			0.142*** (2.75)	0.305*** (2.50)
ρ_{12}^c	0.152 (0.60)			-0.170 (-0.44)
Log-likelihood	-4,726.3			-3,376.9
Number of observations	5,917			15,789

Note: Values are bivariate probit estimates. *t*-ratios are in parentheses. The ability to read and write denotes literate individuals who have not completed primary school. Primary denotes individuals who earned a diploma after five years of primary school. Preparatory denotes individuals who earned a diploma after three years of preparatory school. General secondary denotes individuals who earned a diploma from a three-year secondary school that leads to the higher education system. Vocational secondary denotes individuals who completed a three-year vocational track. Technical institute denotes individuals who earned a diploma from a two-year postsecondary technical institute.

* Indicates significance at the 10 percent level.

** Indicates significance at the 5 percent level.

*** Indicates significance at the 1 percent level.

a. Illiterate is the reference category.

b. Greater Cairo is the reference category.

c. Correlation of the disturbances of the two selection equations (ϵ_1 and ϵ_2).

Source: Author's calculations.

The wage equation estimates are shown in table 8. The coefficient for the public enterprise dummy variable indicates that public enterprise workers earn between 20 and 28 percent more than government workers on average. Public enterprises have had some autonomy in setting their compensation levels and have apparently been more successful than the government in keeping them in line with inflation. Zaytoun (1991) reports that although average wages in public enterprises were roughly equal to those in government up to the late 1970s, government wages increasingly fell behind in the 1980s.

As shown in table 8, the wage work selection term is insignificant, except for public sector males, where it is barely significant at the 10 percent level. Thus,

Table 8. *Estimation Results for the Wage Equations, Egypt, 1988*

Variable	Males		Females	
	Public	Private	Public	Private
Constant	-1.630*** (-13.85)	-0.904*** (-6.68)	-1.425*** (-7.08)	-1.701*** (-4.93)
Experience	0.042*** (9.85)	0.050*** (7.10)	0.051*** (9.21)	0.025** (2.23)
Experience ² /100	-0.045*** (-5.07)	-0.097*** (-6.56)	-0.054*** (-3.29)	-0.036 (-1.36)
<i>Educational attainment^a</i>				
Ability to read and write	0.194*** (3.93)	-0.064 (-0.93)	-0.063 (-0.53)	-0.016 (-0.10)
Primary	0.290*** (4.86)	-0.002 (-0.02)	0.097 (0.82)	0.078 (0.46)
Preparatory	0.436*** (6.58)	-0.006 (-0.07)	0.269** (2.40)	0.068 (0.46)
General secondary	0.769*** (9.61)	0.070 (0.63)	0.548*** (4.52)	0.465** (2.08)
Vocational secondary, blue collar	0.785*** (8.81)	0.187* (1.72)	0.317* (1.88)	0.256 (1.10)
Vocational secondary, white collar	0.723*** (10.8)	0.057 (0.47)	0.456*** (3.35)	0.069 (0.31)
Technical institute	0.863*** (10.7)	0.145 (0.88)	0.550*** (3.61)	-0.018 (-0.06)
University	1.06*** (14.7)	0.401*** (2.93)	0.803*** (5.72)	0.819*** (3.49)
Increment for engineering	0.182** (2.27)	0.607*** (3.66)	0.083 (0.76)	0.219 (0.35)
Postgraduate	1.39*** (15.0)	0.811*** (2.86)	1.13*** (6.62)	1.154* (1.77)
<i>Region of residence^b</i>				
Alexandria and Suez Canal	-0.143*** (-3.43)	0.031 (0.49)	-0.148*** (-3.91)	-0.173* (-1.69)
Urban Lower Egypt	-0.184*** (-4.34)	-0.083 (-1.29)	-0.099*** (-2.59)	-0.430*** (-3.56)
Urban Upper Egypt	-0.163*** (-3.52)	-0.162** (-1.99)	-0.147*** (-3.89)	-0.533*** (-3.54)
Rural Lower Egypt	-0.360*** (-7.05)	-0.048 (-0.56)	-0.191*** (-4.13)	-0.350*** (-2.87)
Rural Upper Egypt	-0.323*** (-5.27)	-0.011 (-0.11)	-0.263*** (-3.61)	-0.505*** (-2.44)
<i>Public enterprise</i>	0.245*** (9.30)		0.181*** (5.00)	
<i>Sample selection terms^c</i>				
Wage work selection, λ_{1j}	0.162* (1.90)	-0.188 (-1.57)	0.011 (0.15)	0.205 (1.51)
Public-private selection, λ_{2j}	-0.066 (-1.18)	-0.129* (-1.64)	-0.219** (-2.37)	-0.348*** (-2.68)

Table 8. (continued)

Variable	Males		Females	
	Public	Private	Public	Private
Correlation ρ_{1j}^d	0.334	-0.306	0.025	0.221
Correlation ρ_{2j}^e	-0.135	-0.210	-0.518	-0.375
R^2	0.446	0.218	0.528	0.304
Number of observations	1,694	1,232	1,180	352

Note: Values are selectivity-corrected estimates obtained using the bivariate probit sample selection technique. The dependent variable is log hourly wage. *t*-ratios are in parentheses. The ability to read and write denotes literate individuals who did not complete primary school. Primary denotes individuals who earned a diploma after five years of primary school. Preparatory denotes individuals who earned a diploma after three years of preparatory school. General secondary denotes individuals who earned a diploma from a three-year secondary school that leads to the higher education system. Vocational secondary denotes individuals who completed a three-year vocational track. Technical institute denotes individuals who earned a diploma from a two-year postsecondary technical institute.

* Indicates significance at the 10 percent level.

** Indicates significance at the 5 percent level.

*** Indicates significance at the 1 percent level.

a. Illiterate is the reference category.

b. Greater Cairo is the reference category.

c. The subscript $j = (P, R)$ denotes the relevant sectoral wage equation.

d. ρ_{1j} is the correlation of the error term of the wage work selection equation with that of the relevant wage equation ($j = P, R$).

e. ρ_{2j} is the correlation of the error term of the public-private selection equation with that of the relevant wage equation.

Source: Author's calculations.

there is little evidence of selectivity bias due to nonrandom selection into non-agricultural wage work. The public-private selection terms are marginally significant for private sector males, but highly significant and negative for females in both sectors. The observed pattern of the error terms in both wage equations being negatively correlated with the error term in the selection equation ($\rho_{2P} < 0, \rho_{2R} < 0$) can be interpreted as follows: workers who select the public sector are below average quality and those who select the private sector are above average quality. This interpretation depends on the assumption that pay is related to unobserved worker quality in both sectors. Even though public sector pay is rather insensitive to performance, managers are sometimes able to reward good performance with occasional incentive payments and bonuses. The selection pattern is consistent with the idea that the queue results in adverse selection into the public sector as the more motivated workers are the first to find private sector work and drop out of the queue.

Predicted wages by sector and gender are shown in table 9. There appears to be no difference in the returns to experience for recent entrants between males in the public and in the private sectors, but the private sector wage-experience profile has a sharper curvature; male wages actually begin to decline within the relevant range of experience. This difference is probably caused by the greater

Table 9. *Predicted Wages by Institutional Sector and Gender, Egypt, 1988*
(Egyptian pounds per hour)

<i>Experience and educational attainment</i>	<i>Males</i>		<i>Females</i>	
	<i>Government^a</i>	<i>Private</i>	<i>Government^a</i>	<i>Private^b</i>
<i>Experience^c</i>				
Five years	0.49	0.54	0.48	0.22
Fifteen years	0.69	0.74	0.73	0.26
Twenty-five years	0.88	0.83	0.98	0.29
Thirty-five years	1.03	0.76	1.19	0.30
<i>Educational attainment^d</i>				
Illiterate	0.34	0.69	0.46	0.25
Ability to read and write	0.41	0.65	0.43	0.24
Primary	0.45	0.69	0.51	0.27
Preparatory	0.52	0.69	0.60	0.26
General secondary	0.72	0.74	0.80	0.39
Vocational secondary, blue collar	0.73	0.84	0.63	0.32
Vocational secondary, white collar	0.69	0.74	0.73	0.26
Technical institute	0.79	0.80	0.80	0.24
Engineering baccalaureate	1.16	1.90	1.12	0.69
Other baccalaureate	0.96	1.04	1.03	0.56
Postgraduate	1.35	1.56	1.42	0.78
Number of observations	1,694	1,232	1,180	352

Note: Predictions are based on the wage equation estimates (see table 8). The predicted wages are computed as the antilog of $X'\beta$ without the λ -terms, which means that they are the expected wage in each sector for a randomly selected individual from the population. The X s are the characteristics of a reference worker who lives in Greater Cairo, is not currently married, and is not a head of household. The reference public sector worker is a government employee. For the educational attainment categories, the ability to read and write denotes literate individuals who did not complete primary school. Primary denotes individuals who earned a diploma after five years of primary school. Preparatory denotes individuals who earned a diploma after three years of preparatory school. General secondary denotes individuals who earned a diploma from a three-year secondary school that leads to the higher education system. Vocational secondary denotes individuals who completed a three-year vocational track. Technical institute denotes individuals who earned a diploma from a two-year postsecondary technical institute.

a. On average, wages are 25 percent higher in public enterprises than in government for males and are 19 percent higher for females.

b. The wage equation estimates for private sector females have large standard errors due to a small sample.

c. White-collar vocational secondary graduates residing in Greater Cairo are the reference.

d. Individuals with fifteen years of experience and residing in Greater Cairo are the reference.

Source: Author's calculations.

reliance on seniority-based wage-setting rules in the public sector. At low levels of education, private sector wages are higher than public sector wages for males, but the gap nearly disappears at higher levels of education. An illiterate male with fifteen years of experience in the private sector earns nearly double what a similar worker would earn in the government, but starting at the secondary level there is near parity between the two sectors.

As shown in table 9, female wages are in general significantly lower in the private sector than in the public sector, and the gap increases with experience. Whereas female wages are in rough parity with male wages in the public sector,

there is a large gender-wage gap in the private sector even after correcting for observables and sample selection. Although it cannot be confirmed here, it seems that women face considerable discrimination in the Egyptian private sector. This discrimination is likely to be in the form of entry discrimination, whereby high barriers to entry into certain occupations result in overcrowding and, in turn, low pay in others.

To examine further the public-private wage differential, I use an extension of Oaxaca's (1973) decomposition of the wage differential that includes differences caused by selectivity bias (see also Idson and Feaster 1990; Terrell 1993). I decompose the total differential in mean wages between the government and the private sector, and between public enterprises and the private sector, into four components: (i) the difference in observed worker characteristics; (ii) the difference in the constant terms, which is sometimes interpreted as the premium or pure rent from being in a given sector; (iii) the difference in returns to worker characteristics in the two sectors; and (iv) the difference caused by selectivity.

$$(8) \quad \bar{y}_P - \bar{y}_R = 0.5(\beta_P + \beta_R)(\bar{X}_P - \bar{X}_R) + (\beta_{0P} - \beta_{0R}) + 0.5(\bar{X}_P + \bar{X}_R)(\beta_P - \beta_R) \\ + [\rho_{1P}\sigma_P\bar{\lambda}_{1P} + \rho_{2P}\sigma_P\bar{\lambda}_{2P} - \rho_{1R}\sigma_R\bar{\lambda}_{1R} - \rho_{2R}\sigma_R\bar{\lambda}_{2R}].$$

The components are evaluated at the sample means (indicated by bars over the variables). Recognizing that in the absence of differential wage-setting practices, the wage structure would lie between the two observed structures, I assign equal weights to the public and private sectors. (See Cotton 1988 for a discussion of this issue.)

The second and third components constitute the unexplained part of the mean wage differential. The decomposition is shown in table 10, which also shows the standard errors associated with each component. In all cases public sector workers have a positive and significant differential caused by differences in observed characteristics because they are generally more educated than private sector workers. The unexplained differential between government and private sector male workers is negative and statistically significant. It is caused primarily by a large difference in the intercept in favor of the private sector, which is partly counteracted by a higher return to human capital and other characteristics in the public sector. The unexplained differential between male workers in public enterprises and in the private sector is smaller and statistically insignificant. Given the queuing for public sector jobs, it is reasonable to assume that public sector workers receive some kind of rent. At least as far as males are concerned, this rent appears to be primarily in the form of nonwage benefits.

The situation for females is quite different. Because of the large gender-wage gap in the private sector and the more equitable wage-setting rules in the public sector, there is a large, positive unexplained differential in favor of both government and public enterprise workers. The differential appears to be primarily caused by higher returns to human capital in the public sector. Differences in the

Table 10. *Decomposition of Public-Private Wage Differentials, Egypt, 1988*

Log wage comparison	Total mean differential	Component				Total unexplained differential ii + iii	Selection iv
		Observed worker characteristics i	Constant term ii	Returns to worker characteristics iii			
<i>Mean differential between government and private sector workers</i>							
Males	0.058	0.306 (0.058)	-0.726 (0.179)	0.338 (0.149)	-0.387 (0.142)	0.139 (0.127)	
Females	0.382	0.234 (0.112)	0.276 (0.400)	0.514 (0.241)	0.790 (0.285)	-0.817 (0.370)	
<i>Mean differential between public enterprise and private sector workers</i>							
Males	0.208	0.264 (0.040)	-0.480 (0.180)	0.304 (0.140)	-0.177 (0.136)	0.120 (0.127)	
Females	0.523	0.299 (0.083)	0.457 (0.402)	0.446 (0.224)	0.903 (0.293)	-0.867 (0.374)	

Note: Calculations are based on the wage equations estimates (see table 8). See section IV and equation 8 in the text and Oaxaca (1973) for details of the decomposition procedure. Standard errors are in parentheses.

Source: Author's calculations.

constant terms are positive, but insignificant. The large negative selection differential captures the adverse selection of females into the public sector noted above.

To summarize, the wage equation estimates indicate that money wages are higher in the private sector than in the government for males, but the persistence of queuing suggests that the difference is not large enough to compensate private sector workers for differences in nonwage benefits. For females, government wages exceed wages in the private sector at all levels of education, and the gap increases with experience. Faced with a large gender-wage gap in the private sector and egalitarian wage setting in the public sector, educated females will clearly have a strong preference for the public sector.

Returns to Education

Using the wage equation estimates presented above, I compute private rates of return to schooling by sector and gender. Because of the large differences in benefits, job security, and work effort required in the public and private sectors, monetary compensation in the two sectors cannot be compared directly. A comparison of rates of return to schooling that does not disaggregate by sector would essentially compare lifetime income streams for educated workers, who are much more likely to be working in the public sector, with those of workers with less schooling, who are much more likely to be working in the private sector. The fact that public sector jobs have significantly higher nonpecuniary benefits reduces the overall rate of return to schooling. To get around this problem, I

calculate sector-specific rates of return to schooling by comparing lifetime streams of income for workers in the same sector at different levels of schooling. Subject to the assumption that the nonpecuniary benefits of a public sector job do not vary by level of schooling, this procedure overcomes the limitation of non-comparable compensation packages. However, because a given individual may be choosing between a job in the private sector at the lower level of education and one in the public sector at the higher level, keeping the comparison within one sector may not accurately reflect the choice set.

In computing rates of return to schooling, I assume that the direct costs of schooling are insignificant compared with the income forgone while in school and that the duration for which income is forgone is equal to the duration of the additional schooling. Although the first assumption is relatively unproblematic, the second may be a little problematic. Because graduates are much more likely to be unemployed at entry than nongraduates and, when unemployed, to have longer periods of unemployment, excess unemployment should be included in the calculation of the rate of return to schooling. The likely effect of such an adjustment would be to reduce the rate of return to secondary education and to increase the rate of return to university education because secondary school graduates face higher levels of unemployment than either university graduates or primary school graduates.

Private rates of return to schooling disaggregated by sector are shown in table 11. By international standards, rates of return to primary schooling are very low in Egypt. Psacharopoulos (1985) reports average private rates of return to primary schooling of 45 percent in Africa and 31 percent in Asia, compared with 2 to 4 percent for males and 4 to 8 percent for females in Egypt. Psacharopoulos (1983) also reports that rates of return tend to be lower in the noncompetitive public sector than in the competitive private sector because compression of pay scales in the public sector flattens mean earnings differentials and hence depresses the returns to education. I find the opposite to be true in Egypt up to the university level. The excess supply of vocational secondary school graduates seen in the high unemployment rates shows up again as very low or negative rates of return to that level of education.

Private returns to schooling are significantly higher on average at the university level than at the secondary or primary level and appear to be higher in the private sector than in the public sector, lending some credence to Psacharopoulos's wage-compression hypothesis. The gap between returns to schooling in the private and public sectors is largest for engineering graduates, who seem to be highly prized in the private sector.

Nonwage Benefits of Public Sector Employment

Given the importance of nonwage benefits in the public sector compensation package, it is worth attempting to quantify them. A search of the literature revealed very little work on this issue in the Egyptian context. Given the varied nature of these benefits, it is practically impossible to get a direct estimate of

Table 11. *Rate of Return to Schooling by Institutional Sector and Gender, Egypt, 1988*
(percent)

<i>Level of education</i>	<i>Males</i>		<i>Females</i>	
	<i>Public</i>	<i>Private</i>	<i>Public</i>	<i>Private</i>
Primary ^a	3.7	2.3	8.0	4.0
Secondary				
Vocational secondary, blue collar	8.2	2.1	1.3	1.2
Vocational secondary, white collar	6.9	Negative	5.1	Negative
General secondary	7.8	Negative	7.2	6.2
Tertiary				
Technical institute	8.4	4.8	5.3	Negative
Engineering baccalaureate	10.6	20.9	8.5	21.4
All other baccalaureate	8.2	8.8	8.6	20.6
Postgraduate ^b	11.6	14.6	11.2	11.7

Note: Calculations are based on the wage equation estimates (see table 8). Primary denotes individuals who earned a diploma after five years of primary school. Vocational secondary denotes individuals who completed a three-year vocational track. General secondary denotes individuals who earned a diploma from a three-year secondary school that leads to the higher education system. Technical institute denotes individuals who earned a diploma from a two-year postsecondary technical institute.

a. Assumes two years of labor income forgone compared with persons in the read and write category.

b. Uses the wage of "all other baccalaureate" to calculate opportunity cost.

Source: Author's calculations.

their value. The most obvious benefits include more complete social insurance and medical coverage and better job security, but other attractive aspects of public jobs may include fewer hours worked, less effort expended, access to bribes, opportunities for moonlighting, access to subsidized commodities and housing, and access to free transport. Although women are less likely to moonlight than men, they prefer public sector jobs because the lower level of effort and time required makes a public sector job more compatible with their domestic responsibilities. For example, in an interview quoted in the *Ahram* newspaper, a woman who resigned her job in a large private firm when faced with the possibility of losing her place in the queue for a government job said, "I want to rest. I have back pain as a result of the many hours of work I spend at the sewing machine at the factory. I want a position in the government so that I can rest" ("Escapees to the Public Sector," 1992). Another woman explained that a government job would enable her to work closer to home, thus allowing her to marry and start a family.

Elsewhere (Assaad 1996a), I obtained an estimate of the difference in nonwage benefits in favor of the public sector in Egypt by means of an indirect estimation strategy. I assumed that, on average, public sector workers receive some rent for being in the public sector, but that, at the margin, lifetime rent for some public sector workers is dissipated through queuing for public sector jobs. The marginal workers, whose lifetime rent is assumed to be fully dissipated, constitute the group of public sector workers (identified by a set of observable characteristics) who have the largest difference in monetary earnings over their lifetime in

favor of the private sector (that is, the lowest public sector rents). By equating the present values of total compensation across the public and private career paths, I estimated the ratio of nonwage benefits to wages. I then generalized the ratio to all workers on the assumption that nonwage benefits are proportional to wages. The results placed the value of nonwage benefits in the public sector at about 85 percent of wages, with a margin of error in the 10 to 20 percent range. Although still tentative, this estimate helps to explain why public sector jobs continue to be so attractive to graduates despite the long queues they must endure to get them.

IV. CONCLUSION

The employment guarantee for graduates and public sector compensation policies have indeed had a major effect on the Egyptian labor market. The employment guarantee has contributed to an unsustainable rate of growth in the government labor force, resulting in a bloated bureaucracy and severe overstaffing. By setting a floor for the wages and benefits that a graduate can achieve, compensation policies have encouraged queuing for government jobs, contributed to high graduate unemployment rates, and reduced graduate employment in the private sector. Despite de facto suspension of the program since 1990, the possibility of a government job continues to drive the labor market expectations of graduates. Because graduates can work part-time in the private sector while waiting for a government appointment, queuing is not excessively costly.

Rates of return to primary and secondary schooling in Egypt are well below those in comparable countries, especially in the private sector. Given these very low, sometimes negative, rates of return, why does anyone still invest in education? Clearly, education provides access to jobs with nonwage benefits that are not captured in the rate of return to education. The results of the sector selection equation confirm that education, and in particular secondary or higher education, is extremely important in obtaining a government job. Although access to such jobs for educated workers is in increasing jeopardy as the queues get longer, enrollment has not been sufficiently curtailed to reduce the excess supply of graduates.

Eligibility for the employment guarantee is achieved by reaching the secondary level of education. Because this threshold is most easily crossed by obtaining a vocational secondary degree, it is not surprising to find that the policy's greatest distortionary effect is observed for graduates at this level. They experience by far the highest unemployment rates and have the lowest rates of return to education in the private sector. Female vocational school graduates, who face much poorer prospects in the private labor market than their male counterparts, have an even greater incentive to queue for government jobs. With a public sector monetary wage nearly 200 percent higher than what they can expect to get in the private sector, not counting the supe-

rior nonwage benefits, queuing is a rational response despite the long waiting period.

Finally, because of wage compression in the public sector, the wage differential between the two sectors is less pronounced for university graduates. Wage compression, in effect, mitigates the effect of the public sector wage floor for this category of graduates.

REFERENCES

- The word "processed" describes informally reproduced works that may not be commonly available through library systems.
- Al-Qudsi, Suleyman. 1989. "Returns to Education, Sectoral Pay Differentials, and Determinants in Kuwait." *Economics of Education Review* 8(3):263-76.
- Assaad, Ragui. 1996a. "An Analysis of Compensation Programs for Redundant Workers in Egyptian Public Enterprise." Paper presented at the workshop Changing Size and Role of the State-Owned Enterprise Sector sponsored by the Economic Research Forum for the Arab Countries, Iran, and Turkey, Amman, Jordan, May 15-17. Processed.
- . 1996b. "Structural Adjustment and Labor Market Reform in Egypt." In Hans Hopfinger, ed., *Economic Liberalization and Privatization in Socialist Arab Countries: Algeria, Egypt, Syria, and Yemen as Examples*. Stuttgart: Justus Perthes Verlag Gotha.
- Basu, Kaushik. 1984. *The Less Developed Economy: A Critique of Contemporary Theory*. Oxford: Basil Blackwell.
- CAPMAS (Central Agency for Public Mobilization and Statistics). 1965. *Statistical Yearbook of the United Arab Republic: 1952-1964*. Cairo.
- . 1985. *Statistical Yearbook of the Arab Republic of Egypt: 1952-1984*. Cairo.
- . various years. CAPMAS Population Census. Cairo.
- . various years. CAPMAS Labor Force Sample Survey. Cairo.
- Corbo, Vittorio, and Morton Stelcner. 1983. "Earnings Determination and Labor Markets." *Journal of Development Economics* 12(February/April):251-66.
- Cotton, Jeremiah. 1988. "On the Decomposition of Wage Differentials." *Review of Economics and Statistics* 70(2):236-43.
- El-Issawy, Ibrahim. 1983. "Labour Force, Employment, and Unemployment." Technical Paper 4. International Labour Office/United Nations Development Programme Comprehensive Employment Mission to Egypt, 1980. International Labour Office, Geneva. Processed.
- "Escapees to the Public Sector." 1992. *Al Abram* (Cairo), September 10, p. 3.
- Fergany, Nader. 1991a. "A Characterization of the Employment Problem in Egypt." In Heba Handoussa, ed., *Employment and Structural Adjustment: Egypt in the 1990s*. Cairo: American University in Cairo Press.
- . 1991b. *Overview and General Features of Employment in the Domestic Economy: Final Report*. Cairo: Labour Information System Project, CAPMAS.
- Handoussa, Heba. 1989. "The Burden of Public Service Employment and Remuneration: The Case of Egypt." In Wouter Van Ginneken, ed., *Government and Its Employees*. Geneva: International Labor Office.
- Hansen, Bent, and Samir Radwan. 1982. *Employment Opportunities and Equity in a Changing Economy: Egypt in the 1980s*. Geneva: International Labour Office.

- Heckman, J. J. 1976. "The Common Structure of Statistical Models of Truncation, Sample Selection, and Limited Dependent Variables and a Simpler Estimator for Such Models." *Annals of Economic and Social Measurement* 5:475-92.
- . 1979. "Sample Selection Bias as a Specification Error." *Econometrica* 47(1):153-61.
- Idson, Todd, and Daniel Feaster. 1990. "A Selectivity Model of Employer-Size Wage Differentials." *Journal of Labor Economics* 8(1):99-122.
- Killingsworth, Mark, and James J. Heckman. 1986. "Female Labor Supply: A Survey." In Orley Ashenfelter and Richard Layard, eds., *Handbook of Labor Economics*, vol. 1. Amsterdam: Elsevier Science Publishers.
- Lee, L. F. 1976. "Estimation of Limited Dependent Variable Models by Two Stage Methods." Ph.D. diss., Department of Economics, University of Rochester, New York. Processed.
- Lindauer, David L., and Richard Sabot. 1983. "The Public/Private Wage Differential in a Poor Urban Economy." *Journal of Development Economics* 12(February/April):137-52.
- Oaxaca, Ronald. 1973. "Male-Female Wage Differentials in Urban Labor Markets." *International Economic Review* 14(October):693-709.
- Psacharopoulos, George. 1973. *Returns to Education: An International Comparison*. San Francisco: Jossey-Bass Inc.
- . 1983. "Education and Private Versus Public Sector Pay." *Labour and Society* 8(April-June):123-34.
- . 1985. "Returns to Education: A Further International Update and Implications." *Journal of Human Resources* 20(4):583-604.
- Richards, Alan. 1992. "Higher Education in Egypt." Policy Research Working Paper 862. Population and Human Resources Department, World Bank, Washington, D.C. Processed.
- Sanyal, Bikas C., R. Noonan, S. Balbaa, A. El-Koussy, M. K. Harby, and L. Yaici. 1982. *University Education and the Labour Market in the Republic of Egypt*. Oxford: Pergamon Press.
- Stelcner, Morton, Jacques van der Gaag, and Wim Vijverberg. 1989. "A Switching Regression Model of Public/Private Sector Wage Differentials in Peru." *Journal of Human Resources* 24(summer):545-59.
- Tansel, Aysit. 1994. "Wage Employment, Earnings, and Returns to Schooling for Men and Women in Turkey." *Economics of Education Review* 13(4):305-20.
- Terrell, Katherine. 1993. "Public-Private Wage Differentials in Haiti: Do Public Servants Earn a Rent?" *Journal of Development Economics* 42:293-314.
- Tunali, Insan. 1986. "A General Structure for Models of Double-Selection and an Application to a Joint Migration/Earnings Process with Remigration." *Research in Labor Economics* 8(part B):235-82.
- van der Gaag, Jacques, Morton Stelcner, and Wim Vijverberg. 1989. "Wage Differentials and Moonlighting by Civil Servants: Evidence from Côte d'Ivoire and Peru." *The World Bank Economic Review* 3(1):67-95.
- van der Gaag, Jacques, and Wim Vijverberg. 1988. "A Switching Regression Model for Wage Determinants in the Public and Private Sector of a Developing Country." *Review of Economics and Statistics* 70(2, May):244-52.

- . 1989. "Wage Determinants in Côte d'Ivoire: Experience, Credentials, and Human Capital." *Economic Development and Cultural Change* 37(2):371–81.
- Vijverberg, Wim. 1993. "Educational Investments and Returns for Women and Men in Côte d'Ivoire." *Journal of Human Resources* 28(4):933–74.
- Willis, Robert, and Sherwin Rosen. 1979. "Education and Self-Selection." *Journal of Political Economy* 87(5):S7–S36.
- World Bank. 1989. "Arab Republic of Egypt: Study on Technical Education." Vol. 1: Main Report. Report 7400-EGT. Washington, D.C. Processed.
- Zaytoun, Mohaya A. 1990. *Earnings*. Preliminary Report I/3. Cairo: Labour Information System Project, CAPMAS.
- . 1991. "Earnings and the Cost of Living: An Analysis of Recent Developments in the Egyptian Economy." In Heba Handoussa, ed., *Employment and Structural Adjustment: Egypt in the 1990s*. Cairo: American University in Cairo Press.