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Did Public Wage Premiums Fuel Agglomeration in LDCs?

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Abstract

We build and test a model of how the growth of public jobs with wage premiums may help to explain the high and potentially inefficient level of urbanization in LDCs. Public jobs comprise about 40% of non-agricultural employment in LDCs, and have frequently offered substantial wage premiums. The Harris-Todaro model - and its extensions- suggest that wage premiums induce inefficient agglomeration, but that model critically assumes that wage premium jobs are allocated to favor local residents. This is inapplicable to public appointments in various LDCs. In the two-region general equilibrium model discussed here, the existence of spatial mobility costs are shown to be sufficient for wage premiums to result in inefficient agglomeration in regions that are allocated wage premium jobs. This weakens the assumptions under which wage premiums promote agglomeration, and extends the idea to LDCs such as Egypt, Ethiopia, and Kenya, where public jobs have, until recent reforms, offered substantial wage premiums, but are not allocated so as to favor local residents. The policy implications of this model also differ from Harris-Todaro. For example, if wage premiums are later reduced, the agglomeration persists: with mobility costs, the history of the location of jobs with wage premiums matters. We explore our hypothesis using Egyptian data. Between 1960 and 1986 the share of public jobs increased from 10% to 34% of the labor force, public jobs were centrally allocated, and offered a high total compensation premium. We find that public jobs' growth has substantially altered the pattern of regional mobility and population shares, in a way that is consistent with this theory of agglomeration due to wage premiums and mobility friction.

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1. Introduction

What explains the high levels of urbanization that, in only a few decades, became commonplace in LDCs? Whereas studies of the share of urban employment in nineteenth century Europe emphasize the growth of spatially concentrated labor demand arising from the exploitation of economies of scale in new manufacturing technologies, and an accommodating rural labor supply – for example, Mathias (1969) - the consensus explanation of urbanization in contemporary LDCs has a different focus. Urbanization in LDCs is conventionally viewed as the result of high aggregate population growth, with rural labor overflowing into urban areas- for example, Williamson(1982) and Lucas(1997)- with comparatively little emphasis on increases in urban labor demand. A feature of LDCs that has been widely thought to reinforce this supply-side explanation of urbanization, is an artificially high wage in some urban sectors. This idea is associated with Harris-Todaro (1970) and its' extensions. However, empirical tests of this model of inefficient concentration have proved at best inconclusive, so that the influence of wage premiums on urban growth remains unsettled.[1]

The purpose of this paper is to present and test a different model of how wage premiums promote inefficient spatial concentration. This model focuses on the interaction between wage premiums and mobility costs. Since our concern is with the growth of cities in LDCs we attach the argument to the implications of public wage premiums, but discuss below how the basic mechanism can generate inefficient concentration when wage premiums are set by other institutions such as unions. Public jobs provide the focus because of their recent importance in the provision of wage premium jobs in LDCs: a large proportion of non–farm jobs in LDCs are provided in the public sector[2], and country-level studies often find that public employees receive large wage premiums.[3]

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[1] For example, Williamson (1982) concludes that empirical work does not support the Harris-Todaro approach, whereas Lucas (1988) reaches a more open-minded view.

[2] For example, van Ginneken (1990) and World Development Report (1995). Public employment in LDCs grew rapidly for two decades from the 1960s and by the mid 1980s averaged 44% of non-agriculture employment in a survey of LDCs – Heller & Tait (1983).

[3] A useful survey is produced in the World Development Report (1995) and Schiavo-Campo et al. (1997). Recent evidence of Sri Lanka – Rama (1999) – suggests that substantial premiums of the order of 60% in public pay continue to exist in some LDCs. Structural reforms have recently reduced wage premiums in some countries. In many LDCs, the total compensation premium exceeds the wage premium because of the existence of health, pension and social security benefits. Much of the evidence that wage premiums are paid in LDCs comes from studies of public wage premiums.

Thus any theory and empirical test of the implications of wage premiums in LDCs needs to be consistent with the working of the public sector and its' consequences for concentration.[4]

In Harris and Todaro (1970) wage premiums cause *inefficient* employment concentration because living near to wage premium jobs is conjectured to increase the probability of a wage premium job offer. Thus, workers have an incentive to distort their location choice and accept a relatively low wage near to wage premium jobs. However, although this model is applied indiscriminately to all wage premium jobs, in many countries it is not applicable to *public* wage premiums. This is because the public appointments system – frequently centralized so that the dispensation of patronage meets the objectives of national government - does not give a search advantage to locating near public jobs. The model in Section II of how wage premiums inefficiently concentrate employment requires weaker assumptions than the Harris-Todaro model, and extends the idea that wage premiums cause agglomeration to LDCs such as Egypt, Ethiopia and Kenya,[5] where public jobs are not allocated to favor local residents. It provides empirical predictions that are tested against (i) two explanations of how public jobs efficiently influence urban employment growth, and (ii) the Harris-Todaro model of inefficient urban growth.[6]

We analyze a general equilibrium model with two regions and two goods that is a development from Roback (1982). In keeping with the marginal role of local government in many LDCs, central government is assumed to allocate public jobs to each region. Public sector workers receive a wage premium and produce a local public good that may influence individual utility and firms' costs. Unlike Roback's model, the local public good is impure, and services diminish with total local employment. The degree of dilution of the impure local public good is used to replace land prices as an equilibriating mechanism. We do this in order to simplify the analysis and focus on the relationship between wage premiums and mobility costs. Central Government levies an

[4] See the survey of agglomeration by Fujita and Thisse (1996), which points to the absence of the role of government production in studies of employment concentration. There are, of course, several other models of urban concentration in LDCs – for example, Krugman and Elizondo (1992) in which protectionism increases this incentive to locate near to domestic suppliers and the size of cities.

[5] See Krishnan et al. (1998) for details on Ethiopia and Milne and Neitzert (1996) on Kenya.

[6] Lucas (1997) provides a valuable survey of empirical analysis of the Harris-Todaro model.

economy-wide income tax to pay public wages Competitive firms produce a traded good, and choose employment to maximize profit. Workers choose where to locate, given local wages and public services, and buy goods out of income net of mobility costs.[7]

If migration is costless, a regional allocation of public jobs causes net - migration (which may be positive or negative according to whether the productivity of public jobs exceeds the incremental local congestion that more public workers generate), and under certain assumptions does not change local wages. The change in total regional employment provides a compensating change in the provision of impure regional public services. Additional public jobs cause total employment in the recipient region to increase if, and only if, public jobs are at least slightly productive. Crucially, wage premiums do not affect the equilibrium.

If migration is costly there exist a continuum of equilibria, and allocating public jobs with wage premiums to a region will increase total employment in the recipient region, even if public jobs are unproductive (sinecures). Why is this? An urban allocation of sinecures will induce those living elsewhere who do not have such a job, to accept any offer and migrate, provided the wage premium exceeds migration costs. The resulting increase in urban congestion reduces urban private labor demand and relative urban wages until at a critical relative wage, determined by mobility costs and the initial equilibrium, offsetting out-migration begins. Mobility costs create a friction that limits out-migration from the urban area below the in-migration that is funded by the increase in wage premium jobs. Out-migration is only fully offsetting if the initial equilibrium is a corner point at which relative urban wages are initially at a low level. Wage premiums induce inefficient migration that could be eliminated if private sector urban workers may 'purchase' wage premium jobs from those rural workers who have received an offer. In practice workers holding offers do not have these property rights. The policy implications of this model differ from those of the Harris-Todaro model. In this model, i) structural reforms that layoff urban public workers, or reduce the

[7] Mobility costs arise not only in separating from family and the physical costs of moving, but also when leaving an urban area, in the loss of variety of consumption goods, learning externalities from skilled workers, and access to public services. These are unlikely to be viewed as unimportant, and perhaps help to explain why those migrating from the major cities of Egypt- Cairo and Alexandria- migrate only short distances.

public wage premium, do not necessarily reduce the urban labor force, and ii) allocating urban jobs with wage premiums directly to rural applicants will increase the equilibrium labor force.

At least two arguments in the literature link public jobs and 'over- urbanization'. One school of thought has argued that too many public jobs have been located in urban areas - for example, Lipton (1977) – and another that the (urban) public sectors may have become too large – for example Keyfitz (1982) - but these conjectures are not pursued here.[8] These studies give political economy reasons for both the urban bias to public services and high public pay, and add a theory – usually Harris-Todaro – of household location, for example, Lipton (1977), Gelb, Knight, and Sabot (1991), and Keyfitz (1982).[9] However, the resulting partial equilibrium arguments do not explain, for example, how public jobs and services influence private labor *demand* at each location. Thus it is unclear whether a regional allocation of local public goods will in equilibrium be offset by a compensating regional wage differential or attract in-migration to reduce the public service. An exception is Ades and Glaeser (1995) who develop a political economy model of regional taxation in which dictatorial regimes choose lower urban relative to rural taxes than democratic regimes, and thereby stimulate city growth. Although public wage premiums and urban bias to public jobs are not discussed, these authors' framework explains one form of urban fiscal bias, and provides a way to explain an urban bias to public jobs. Rather than take this path, the intuition for which appears largely worked-out, we instead take the location and high pay of public jobs as exogenous, and explore a new model of their consequences for total urban employment.

Unfortunately there is no directly relevant econometric evidence[10] that public jobs subsequently influence the spatial location of economic activity in LDCs. However, analysis of the

[8] Large public sectors may be the efficient response to twentieth century technologies in health care and education, and insofar as public goods are efficiently supplied in spatially discrete amounts, the urban locations of public jobs may have been efficient.

[9] The economic geography models of urban areas and development – for example, Henderson (1988), Krugman (1991), and Krugman and Elizondo (1992), Black and Henderson (1997), and summarised by Fujita and Thisse (1996) – have yet to incorporate location distortions resulting from government policy.

[10] Wheaton and Shishido (1981) provide interesting aggregate cross-section evidence concerning the influence of the public sector on agglomeration, but are not concerned to analyse the allocational implications of government policy in the way adopted here. Various studies for developed countries are relevant, including empirical analysis of regional climatological amenities and for crime and air quality amenities are available for developed countries, for example Graves (1979) and Roback (1982). For developing countries perhaps the most relevant work is Rosenzweig and

influence of defense expenditure on US regional employment – for example, Markusen et al. (1991) – and less directly, that of provincial tax and expenditure policies on inter-provincial migration in Canada – Day (1992) – suggest that these effects could be substantial.

The theory of how wage premiums inefficiently influence migration and employment concentration is developed in Section 2. Since the hypothesis proposes a specific micro influence upon agglomeration, it appears more instructive to test against the alternatives by examining a single economy in detail rather than, for example, urbanization in cross-country relationships. Sections 3 & 4 describe a case study of Egypt, 1960-1988,where public jobs offered a high total compensation premium, and their share in employment increased from 10 to 35%. Section 3 provides empirical analysis using individual and regional data, of whether a provincial allocation of public jobs subsequently influences provincial total employment, and Section 4 describes the empirical tests of our explanation of why this occurs.

2. A Model of Public Jobs, Wage Premiums and Agglomeration

In this economy a unitary government reserves the power to make regional appointments to public office, and offers public jobs with wage premiums to selected workers. We focus on how a central government decision to increase a regional allocation of public jobs offering wage premiums, will influence total regional employment – and thus the endogenous provision of public services – and unregulated regional wages. A private good and a local impure public good are produced in each of two featureless regions,[11] rural (*R)* and urban (*U*).

(i) *The Supply of Public Goods*. The government allocates G^U public jobs to urban areas, and G^R to rural areas. These employees produce $\alpha^j G^j \ (j = U, R)$ units of public goods per period

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Wolpin (1988) who explore the effects of a child health care programme in a Colambian village on the selectivity of migrants from nearby villages. Krugman (1998) points out the limited advances made by computable geographic equilibrium models owing to the difficulties of calibration to actual data.

$\alpha \varepsilon [o, \overline{\alpha}]$. The productivity of government jobs, α^j, may vary between regions. The public goods are impure so that an increase in the region's population, $G^j + L^j$, negatively influences the services provided by the public goods – for example, roads become crowded. Since the regional allocation of private jobs, L^j, is endogenous, the services provided by regional public goods ϕ^j is also endogenous and given by

$$\phi^j = \phi(\alpha^j G^j, G^j + L^j) \qquad \phi_1 \geq 0, \phi_2 \leq 0 \qquad (j = R, U) \tag{1}$$

An increase in G^j increases the supply of public goods, provided $\alpha^j > 0$, but also increases congestion. Thus an increase in government jobs to a region has an ambiguous effect on the supply of public services, $d\phi / dG \gtrless 0$. The public good is local so that firms and households in region *j(j = U,R)* benefit only from public goods produced in region *j*.

(ii) *Firms* produce output with labor and capital, *K*, in a constant returns to scale technology,

$$y^j = \phi^j F(L^j, K^j) \qquad F_L, F_K \geq 0 \qquad (j = R, U) \tag{2}$$

and local public services influence total factor productivity. Capital is traded at an exogenous world price *r*. Given constant returns to scale, firms minimize unit cost, which in equilibrium is equal to the unit price. Thus from (2) for a Cobb-Douglas production function, if firms may freely enter or leave each region, employment in each region is given by

$$\phi(\alpha^U G^U, G^U + L^U) = (w^U)^\alpha r^{1-\alpha} \tag{3a}$$

$$\phi(\alpha^R G^R, \overline{L} - G^U - L^U) = (w^R)^\alpha r^{1-\alpha} \tag{3b}$$

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[11] There is apparently no loss of generality by having only two regions. These regions might be labelled *A* and *B* since there is no intrinsic difference between them in the model. However the discussion of how increments to one region's allocation of public jobs is made somewhat more realistic by referring to the recipient region as "urban".

where we have used the total employment constraint, $\overline{L} = L^R + G^R + L^U + G^U$, in (3b). If L^U is such that the LHS of (3a) exceeds the RHS, then urban congestion is sufficiently low that urban firms can increase employment. An equivalent argument applies to rural areas in (3b). Equations (3a) and (3b) may be combined to define the equilibrium relationship between the relative regional wage and the demand for urban labor, L^U, both of which are endogenous. Thus

$$L^U = L(\frac{w^U}{w^R}; G^U, G^R, \alpha^U, \alpha^R) \tag{3c}$$

$$L_1^U < 0, \quad L_2^U \gtrless 0, \quad L_3^U \gtrless 0, \quad L_4^U > 0, \quad L_5^U < 0$$

When relative urban wages are high, urban private employment is low, ceteris paribus, since with less urban employment congestion is also lower, which increases the local public services received by firms enabling a higher wage to be paid. The properties of (3c) are straightforward: an increase in G^U, will increase urban private employment, L^U, provided α^U exceeds a critical value, so that the increase in urban public services outweighs the effect of an increase in relative urban congestion. Conversely for an increase in G^R. An increase in urban public worker efficiency, α^U, will enhance public services and unambiguously increase L^U. The demand for urban employment, given the relative urban wage, is described by *ll* in Figure 1.

(iii) *Workers* are homogenous and supply one unit of labor. The public net wage is $\overline{w}$; private sector workers in region *j* earn gross wage w^j. Workers choose location to maximize utility, *V*, with the consumption of private goods and local impure public goods as arguments. Since the price of private goods is one, private consumption is income net of taxes and mobility costs. Mobility costs are assumed to be predominantly time costs and a migrant's wage net of these costs is proportionate to the wage at destination. Thus in region *j* a migrant earns mw^j where $m<1$ for migrants and $m=1$ for non-migrants. Thus utility for private workers in *j*, *V*, is

$$V = V(mw^j(l-t); \phi(\alpha^j G^j, G^j + L^j)) \qquad V_1, V_2 > 0 \qquad (j = U, R) \tag{4}$$

(iv) The *government* wage bill is financed by a proportionate income tax, *t*. Thus the government budget constraint is given by

$$\overline{w}(G^R + G^U) = t \sum_{j=U,R} w^j L^j \tag{5}$$

(v) *Equilibrium without mobility costs, m = 1. Definition*: The economy is in equilibrium if, given government policy variables $(\overline{w}, G^U, G^R, t)$ workers have no incentive to migrate, firms have unit costs, and the government has a balanced budget. At the beginning of each period the Government allocates G^j jobs to region *j*, and sets the government wage, $\overline{w}$, net of tax. Government jobs are allocated to certain workers, and all accept, if necessary migrating, since by assumption $m\overline{w} > w^j(1-t) \forall j$. Utility of workers in private jobs is equalized between regions if,

$$V(w^R(l-t); \ \phi(\alpha^R G^R, \overline{L} - G^U - L^U))$$

$$= V(w^U(1-t); \ \phi(\alpha^U G^U, G^U + L^U)) \tag{6}$$

Firms have unit costs if (3a) and (3b) hold. The government budget constraint is given by (5). We may solve (6) (3a) (3b) and (5) for (L^U, w^U, w^R, t), conditional upon $\overline{w}, G^U, G^R$. Since public services in each region determine regional wages offered by firms in (3a) and (3b), we may substitute ϕ out of (6). If utility, *V*, is Cobb-Douglas, $V = w^j(1-t))^c(\phi^j)^{1-c}$, the income tax, *t*, can be eliminated from (6), and using (3a) and (3b) in (6), gives

$$w^U = w^R \tag{7}$$

It follows that, if utility is a Cobb-Douglas function, the equilibrium values of w^U, w^R, and L^U can

be found from (6) (3a) (3b), and are independent of *t*. Thus the government can vary *t* to ensure that tax revenue equals the public wage bill, $\overline{w}(G^U + G^R)$, without changing the private sector equilibrium $\{(w^j L^j)\, j = U, R\}$. [12] Using (7) to substitute (w^U/w^R) from (3c) gives L^U, as a function only of public service provision, $\alpha^j G^j\, (j = U, R)$. Thus we have,

PROPOSITION 1. *If regional mobility is free (m=1) and utility is a Cobb-Douglas function of public and private goods (i) regional wage rates are equal, regardless of the allocation of public jobs, (ii) urban private employment, L^U, is determined by the allocations of public jobs (G^U,G^R), and their productivity, α^U and α^R, (iii) the properties of L^U, from (3c) and (7) are:*

$$L^U = L(1, G^U, G^R, \alpha^U, \alpha^R) \tag{8}$$

$$\textit{where } \frac{dL^U}{dG^U}, \quad \frac{dL^U}{dG^R} < 0, \quad \frac{dL^U}{d\alpha^R}, \quad \frac{dL^U}{d\alpha^U} > 0,$$

and, (iv) if urban public jobs are unproductive, then from (3c) and (7), dL^U/dG^U = -1, so that urban sinecures crowd out an equal number of private jobs.

Proposition 1 gives assumptions under which an allocation of public jobs to a region, funded by a national income tax, will be offset by in-migration which changes impure public good provision, rather than by a compensating change in regional wages. The intuition is that regional change household utility and firms' profits in the same direction - both are increased by local public services, ϕ^U. In-migration restores the regional equilibrium by diluting public service quality, thereby reducing profits and utility relative to that elsewhere. In contrast, a change in relative

[12] From the tax function (5), tax revenues are a monotone increasing function of *t*, so that there is a unique value of *t* that balances the budget.

wages cannot restore equilibrium because to offset the effect of more regional public services, workers require a regional wage cut, whereas firms require a wage increase.[13, 14]

The ambiguity of dL^U/dG^U arises because more public jobs increase both public services and congestion, as discussed above for (3c): if α^U falls below a critical level then the congestion, created by new public jobs is sufficient to reduce the regional demand for labor. Since regional supply is perfectly elastic at unchanged wages, this causes out-migration from the region with more public jobs. The intuition for (iv) is similar to that for (i). Urban sinecures, if partially filled by rural migrants, create urban congestion and reduce rural congestion. This reduces urban firms' productivity and urban workers utility, and has a converse outcome in rural areas. To raise both urban utility and productivity, the level of public services must increase, since the alternative of a regional wage change will have opposite effects on profits and utility. To increase urban public services, private urban employment is reduced until the urban congestion from the additional public jobs is unpacked. This returns total urban employment to its original level. A regional allocation of public jobs will not change total regional employment if public jobs are unproductive, but given $dL^U/d\alpha^U > 0$ will increase total regional employment provided public jobs are slightly productive. Note that the regional allocation of employment is independent of the wage premium, $\overline{w}$.

(iv) *Equilibrium with Mobility Costs*. If $m < 1$ then (3a) and (3b) are unaltered, so that urban labour demand is again given by (3c). Consider the urban labor supply to private jobs. At the beginning of the period some urban private employees quit to accept public jobs. The migration

[13] Thus in our model the land market is not modelled. However this would not appear to alter the basic intuition provided by this model, if land is introduced, increased public employment continues to attract migrants to clear markets but land prices also bear the incidence of more local private employment. The way in which wage premiums foster agglomeration when there exist mobility costs would not appear to be sensitive to using the degree of impurity of public goods, rather than land prices, as the equilibrating mechanism.

[14] Departures from the Social Optimum: A Further Result. If policy variables are initially at a welfare maximizing level, then a small increase in G^U funded by an increase in the economy wide tax, *t*, will increase L^U for all positive α^U. To see this, consider a welfare optimum. There are diseconomies in the supply of impure public goods from concentrating total public employment in one of the two identical regions. Thus a welfare maximizing government will support two symmetric regional economies and set a) identical government employment and income tax rates to achieve a Samuelson first-best in each region; and b) government wages equal to private wages. This gives a distortion free economy. Consider now a marginal increase in G^U financed by increased federal income tax, *t*. We found that increasing *t* does not alter L^U, thus the only effect on L^U arises from the increase in G^U funded by an economy-wide tax, *t*, must raise the utility of residents of *j* relative to residents elsewhere, which induces immigration.

equilibrium condition (6), for the remainder who seek private work in the next period, now reflects migration costs. If utility is Cobb-Douglas, workers migrate to private urban job if

$$\frac{w^U}{w^R} > \frac{1}{m}\left(\frac{\phi^R}{\phi^U}\right)^{1-c}$$

Using (3a) and (3b) to eliminate (ϕ^R/ϕ^U), workers migrate to private urban jobs if

$$\frac{w^U}{w^R} > m^{-\delta} \qquad (>1) \tag{9}$$

where $\delta = \frac{c}{c+\alpha(1-c)} < 1$. Conversely workers migrate to private rural jobs if

$$\frac{w^U}{w^R} < m^{\delta} \qquad (<1) \tag{10}$$

Thus the urban private sector labor supply is (a) inelastic between m^{δ} and $m^{-\delta}$ at the level determined in the previous period net of quits to the public wage premium jobs, and (b) infinitely elastic at $m^{-\delta}$ and m^{δ}. This is drawn on Figure 1 where we assume L^U is the previous urban private employment net of quits to public jobs. If the demand for labor is *ll*, there is no migration. If the demand for labor is l_1l_1 then $L_a^U - L_0^U$ migrate to the urban area. If labor demand is l_2l_2 then $L_O^U - L_b^U$ migrate from the urban area. Points on the urban labor demand schedule *ll* where relative urban wages either exceed $m^{-\delta}$ or are less than m^{δ}, are not equilibria since workers will migrate to or from the urban area.

PROPOSITION 2. A*n allocation of public jobs with wage premiums to urban areas will increase total urban employment, even if public jobs are unproductive, provided i) mobility costs are positive but less than the wage premium, ii) some of the public jobs are offered to rural workers and iii) the initial equilibrium is not one of the corner solutions.*

The intuition for Proposition 2 is as follows. Suppose urban public jobs with a wage premium are offered to rural workers, who accept and migrate, and assume initially that these jobs are sinecures. This increases urban congestion, and reduces urban employee utility. In the absence of mobility costs this prompts migration to private rural jobs equal to migration to public urban jobs, since this restores the original level of congestion, (Proposition 1 (iv)). However, mobility costs diminish this offsetting flow. This is because the regional utility differential between private jobs declines to zero if migration is fully offsetting, but migration costs are finite and thus prevent a full offset. If the additional public jobs are not sinecures ($\alpha^U>0$) then the extra public goods provided reinforce the agglomeration effect of mobility costs, by reducing offsetting migration from urban areas.

Total urban employment increases because the high wage urban jobs are partly filled by rural workers who pay migration costs to secure a wage premium. Wage premiums are not pure rents, and instead induce workers with costs of taking-up a job to relocate. Efficient migration and urban employment requires that following an increase in urban public employment, rural-urban migration only occurs when urban private wages net of mobility costs exceed rural wages $mw^U>w^R$. Without wage premiums this is exactly what happens. With wage premiums, this condition is *sufficient* to prompt rural-urban migration, but not *necessary* since $\overline{w} > w^U$ which increases the incentive to migrate. Thus, socially excessive migration and urban employment result. What are the policy implications?

To demonstrate Proposition 2, consider an increase in urban public jobs, G^U. Assume a fraction β of these urban public jobs are allocated to rural workers, and $(1 - \beta)$ to urban workers. The equilibrium conditions are (3c), (9), (10) and the previous urban employment level minus $(1-\beta)G^U$. The migration conditions (9) and (10) are unaffected, but urban labor demand, (3c), is changed. From equation (3c) the change in urban labor demand is given by

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$$\frac{dL^U}{dG^U}\Big|_{(w^U/w^R)=c} = -1+\alpha^U\left(\frac{-\phi_1^U}{(w^U/w^R)\phi_2^R+\phi_2^U}\right) \tag{11}$$

This gives the horizontal movement of *ll* in Figure 2. Consider an arbitrary previous period equilibrium, *h*, at which urban private employment is L_2^U. We first discuss the case $\alpha^U = 0$, and then show that if $\alpha^U > 0$ the agglomeration effect is strengthened. If $\alpha^U = 0$, from (11), $dL^U/dG^U = -1$, so that in Fig 2, *ll* shifts to the left by the increase in G^U. For simplicity of notation, set $dG^U = A$, so that *ll* shifts to the left by *A*, to l_0l_0. If labor demand is l_0l_0, the critical level of private urban labor supply that triggers urban-rural migration is L_2^U. Prior to any urban-rural migration, the supply of urban workers to the private urban sector is reduced to $L_1^U - (1-\beta)A$.

There are two cases to consider: (i) If $L_1^U - (1-\beta)A$ is greater than L_2^U (as it is drawn in Figure 2), then this cannot be an equilibrium urban private labor supply since the relative urban wage (at e_1) is below m^δ so that migration occurs. Thus urban private labor supply is at most, L_2^U Since the wage at all initial equilibria, except *n*, is above m^δ, the wage at L_2^U, then $L_1^U - L_2^U < A$, provided the initial equilibrium is not the corner point *n*. Thus total urban employment is increased. (ii) If $L_1^U - (1-\beta)A$ is less than L_2^U, then no migration to private jobs occurs. In this case urban private labor supply has fallen by $(1-\beta)A$ which is less than *A*, since $\beta > 0$. In both the case with and without migration, private employment declines by less than the increase in public jobs, provided the initial equilibrium is not *n*, and $\beta > 0$. If the initial equilibrium is *n*, the urban wage cannot be driven lower to offset public service reduction from incremental government jobs, so that public jobs fully "crowd out" private jobs. If $\alpha^U > 0$, then from the second term of the RHS of (11), the demand for urban labor is higher than in the previous analysis, and potentially to the right, of its initial position, *ll*. This may only reduce any urban to rural migration and thereby increase the total urban employment that results from the increase in urban public jobs.

The implications of a change in β, the fraction of urban public jobs given to rural workers.

An increase in β shifts the vertical segment of the urban labor supply curve to the right, since following an allocation of urban public jobs, fewer workers leave the urban private sector for public jobs. From (3c), urban labor demand is unchanged. This increases equilibrium urban employment, unless prior to the increase in β, equilibrium employment required urban to rural migration, as in $l_2 l_2$, Figure 1. Intuitively, the greater is β, the greater is migration from rural areas to accept a given increase in urban public jobs, *A*. This is only fully offset by greater urban-rural migration if the equilibrium is initially at the low relative wage m^{δ}, on the elastic section of the urban labor supply curve. Thus an increase in β will either leave unchanged or increase total urban employment. Fields (1975) carefully shows how the Harris–Todaro model predicts the opposite outcome.

PROPOSITION 3. *If an allocation of urban public jobs with wage premiums has caused total urban employment to increase, subsequent structural reform to reduce either (i) the size of the wage premium, or (ii) the number of urban public sinecures, will not reduce total urban employment.*

The intuition is as follows. A lower public wage premium, by itself, alters nothing once the original addition to public jobs has occurred. Public employees may consider that their wage is no longer sufficient to cover sunk migration costs, but no reallocations occur. Suppose holders of urban sinecures are fired and that some of these migrate. Public output is unaltered, but a smaller urban population reduces urban congestion, thereby increasing private labor demand and (w^U/w^R). This attracts in-migrants. This continues until urban private employment is increased sufficiently to absorb all the laid-off workers with relative private wages and total regional employment unchanged.

To demonstrate Proposition 3, suppose that structural reforms reduce G^U by *A* unproductive jobs. The migration conditions (9) and (10) are unaffected, but equation (3c), the urban demand for labor is changed. Using (3c) to derive (11), and since $\alpha^U = 0$, the private demand for urban labor is now increased by *A*. This is because there are fewer sinecures, which reduces urban congestion,

and increases private labor productivity by this amount. (Shifting l_0l_0 to the right by A.) Given mobility costs, the supply of labor to the urban private sector is increased by the A displaced workers. Thus the urban private sector can absorb all the displaced public workers, with no change in relative wages. Total urban labor employment is thus unaffected. The asymmetry of response of total urban employment to positive and negative changes in G^U arises because some of the additional urban public jobs are offered to rural workers who migrate, given that wage premiums exceed mobility costs. In contrast, reductions in public jobs do not create an offsetting reduction in urban labor supply since displaced urban public workers are not offered rural jobs with premiums, and in the presence of mobility costs remain in the urban sector.

3. Do Public Jobs Influence the Spatial Allocation of Employment?

The primary empirical implication of the model in Section 2 is that, if there exist mobility costs, regions allocated centrally funded public jobs with wage premiums will experience socially inefficient in-migration, and an increase in total employment. This occurs even if wage premium jobs provide no local services, which would attract immigrants in a conventional way. What is the key intuition? Extra wage premium jobs in region A provide workers elsewhere with an incentive to migrate, even if individual productivity is not increased. This is inefficient because mobility is costly. As region A is now more congested, workers without wage premium jobs will have lower utility. In the absence of mobility costs, migration from A occurs until employment is reduced to its original level; with mobility costs, migration from A is insufficient to restore either the original utility in A, or to reduce employment to the initial level. Thus, under weak assumptions, inefficient migration and agglomeration may occur due to wage premiums: even if jobs are allocated so as not to distort the *applicant's* location choice, the wage premiums distort the *workplace* location choice.

This section provides a case study of employment location and public jobs in Egypt, where an expanding public sector, 1960-1990, with a centralized system of appointments, paid substantial

wage premiums. An overview of public jobs in Egypt, focusing on their location, compensation premiums, and methods of appointment, is provided in the Appendix.

We first discuss whether Egyptian public jobs growth has subsequently influenced the spatial allocation of employment. After giving supporting evidence, we then test our explanation of this against the alternatives in Section 4. To study whether public jobs location has subsequently altered the spatial distribution of employment, we examine the impact of public jobs on (i) inter-provincial migration, and (ii) the provincial evolution of population shares, 1976-1996.

i) *Do governorates with public employment growth attract migrants?*

An implication of the hypothesis is that workers are attracted into governorates (provinces) with public jobs growth. To study mobility we use the 1988 Labor Force Survey[15] that samples approximately 10,000 individuals. The Survey reports residential and work locations at the time of the survey and retrospective information concerning October 1981.[16] Respondents were classed as migrants if their employment location in 1988 was in a different governorate to that in 1981. There are 26 governorates (provinces) in Egypt, and these are sub-divisions of the six regions, listed in Table 1B. The analysis concerns male labor force participants, aged 15-64.

Migration rates by characteristic are shown in Table 2A, together with the distribution of characteristics amongst migrants and those of the total sample. About 10% of our sample migrated over the preceding seven years. Migration rates are high amongst those who in 1981 worked in Greater Cairo and low amongst those who worked in Upper (i.e. South) Egypt; rates are also higher amongst the educated. As in most other studies, migration rates increase with education, and generally decline with age, although the youngest workers have low migration rates. Columns 2

[15] The survey was carried out by the Central Agency for Public Mobilization and Statistics (CAPMAS).
[16] October 1981 was chosen since President Sadat was assassinated in that month and it was considered that this would facilitate accurate recollection.

and 3 contrast the characteristics of migrants to public and private sector jobs. Migrants working in public jobs, tend to be older and to have higher than average education.

Our hypothesis requires that a substantial flow of migration to public jobs arises from workers formerly in the private sector. From Table 2B we find that of the 186 migrants to public jobs, 80 (43%) originated in the private sector. Furthermore, of the 1329 workers in public jobs in 1988, 6.02% had migrated between governorates in the previous seven years, having previously held *private sector* positions. We also find that migration to public jobs, 1981-88, is disproportionately large relative to the share of public jobs in the economy; whereas 32% of workers were employed in public jobs, 42.8% of all migration is to public jobs.

To study whether public jobs growth influences provincial migration, we estimate, for three educational groups, a binomial logit model of the probability of migrating between governorates (provinces), 1981-88. Our hypothesis is that governorates with public jobs growth attract migrants into public jobs, and so we next estimate a trinomial logit that distinguishes between the determinants of migration to accept public and private jobs, relative to not migrating. Thus, we assume that the probability that an individual of category *i* from governorate *j* makes choice *k* may be described as a logistic function:

$$Prob(M_j^i = k) = \exp(\beta_K' X_K^i) / [1 + \sum \exp(\beta_K' X_K^i)] \qquad for \quad k = 0, \ 1 \ \ and \ \ 2.$$

In both models the reference category (*k = 0*) is non-migration. In the trinomial model *k = 1* is migrating to a public sector job; *k = 2* is migrating to a private sector job. The explanatory variables comprise both provincial level and individual variables that normally enter migration models, and also additional variables capturing: (i) the influence of wage premium jobs on migration, and (ii) the provision of local public services. These variables are now discussed. *Public sector employment*. First, we allow for the possibility that certain public employees produce local public goods or subsidized services. The level of these services influences utility, and from

the analysis in Section 2 we expect that shocks which reduce local public service provision will induce out-migration.[17] To capture this effect we use the change in the level of public service jobs divided by total employment in the origin governorate, $\Delta(\varphi^i / N^i)$.

Secondly, we have modeled in Section 2 how wage premiums may prompt migration. To derive an econometric specification we must be more specific about public appointments. We assume that during each period a fraction of public jobs turnover, but that public workers cannot anticipate which. Thus each period all workers apply for a public job.[18] The probability that an individual in education group *i* receives a public sector job offer is given by Q^i / E^i, where Q^i is the number of positions created over a given period, and E^i is the number of workers without public jobs in education category *i*. In our model all successful applicants accept public sector jobs regardless of location since $m\overline{w} > w^j \ (j = U, R)$. Now consider a worker living in governorate *j*. If the number of public sector jobs created in *other governorates* is $Q^i_{\sim j}$, and governorate of residence does not influence where an offer is located,[19] then the probability that an individual in educational category *i* migrates to a public sector job is given by

$$Q^i / E^i)(Q^i_{\sim j} / Q^i) = Q^i_{\sim j} / E^i$$

The denominator, E^i, is independent of *j*. Thus, in a model of migration within educational category *i* we conjecture that the probability of migration to public sector jobs is positively influenced by provincial variations in $Q^i_{\sim j}$, the increase of public sector jobs located in governorates other than that in which the individual is located. In the notation of Section 2, $Q^i_{\sim j}$ is given by $\Delta G^i_{\sim j}$.

[17] We have also used a regional human development index based on components such as life expectancy and literacy which might be thought to reflect the consequences of public service outputs. This index gives similar conclusions to the variable reported.

[18] These jobs may produce local public goods or be sinecures but all offer the same high compensation.

[19] This specification of the allocation of public jobs is reinforced by the procedure whereby public jobs are allocated by a central government agency, such as that in Egypt, which minimizes the influence of residential location on job offers.

The two public job variables $\{\Delta(\varphi^i / N^i)$ and $\Delta G^i_{\sim j}\}$ are thought of as determining the migration flows created by shocks to the levels of G^U and G^R in our equilibrium model in Section 2. The first variable captures changes in provision of local public goods, and the latter an uneven geographic distribution of new jobs with wage premiums. In our model wages are endogenous and thus in our preferred empirical models we exclude relative provincial wages from the list of regressors. Relative provincial unemployment rates may similarly be thought of as endogenous with respect to government job creation and are excluded from our preferred models. *Public Sector Employees* may experience different migration propensities. Since less educated public employees frequently hold short-term contracts, we allow illiterate public employees to have a separate influence. We also allow for the following familiar influences.

Age: Many studies have confirmed the conjecture that the probability of a move decreases with age – for example, Mazmundar (1987). The influence of age is examined using six age groups: 15-21, 22-26, 27-34, 35-44, 45-54 and 55-64.

Education: The propensity to migrate is generally found to be higher for the more educated. In addition, a few studies find that the more educated are more sensitive to economic variables affecting mobility, for example, Fields (1982), Schultz (1982) and Levy and Wadycki (1974).[20] We distinguish three education groups: illiterates; literate, but less than secondary schooling and university graduates.

Cost of living: Regional differences in cost of living are captured by six regional fixed effects: Greater Cairo, Alexandria and Canal Cities, Lower and Upper Urban, Lower and Upper Rural.

[20] A one per cent increase in local wage rates reduces the migration rate by only 0.3 per cent for the uneducated and by 1.7 per cent for those with secondary education. They argue that education clearly increases information directly and reduces the cost of obtaining more information. Thus, the educated tend to be much more responsive to wage and income opportunities than are the uneducated. Fields (1982) in his study of Colombia finds that the better educated groups exhibit more responsiveness to differences in income as shown by the higher coefficient of origin and destination income in the macro migration function. Similar results are obtained by Schultz (1982) in his work on macro-migration in Venezuela using separate regressions for different educational groups. He finds that the destination employment conditions are statistically significant only for the secondary and higher educational group. For the less educated groups the traditional wage gap appears to be the predominant determinant of interregional migration. Levy

Industry: Evidence from Table 2A, shows that the agricultural sector contains 34% of the total sample, but only 18% of the migrants. One reason may be that the experience gained in agriculture usually has little value elsewhere. Table 2A shows that only 6% of the total sample are employed in the construction sector compared to 17% of migrants, perhaps as a result of the spatially fluctuating nature of construction demand.[21] Thus, four private industry effects are used: agriculture, manufacturing, construction and services.

Relative provincial (governorate) wage and unemployment rates traditionally play a central role in empirical migration analysis where migration is modelled as arising from spatial differences in utility levels, which are usually captured by relative wage and unemployment rates. In the model in Section 2 wages are endogenous so that in our preferred model we exclude familiar measure of labor market tightness, and use shocks to the government employment variables, described above, as the appropriate exogenous regressors.[22]

Results: Table 4 gives estimates of binary logit models of the probability of migration. Columns 1, 3, and 5 show the full model for the three types of workers, while columns 2, 4, and 6 give the parsimonious version where insignificant variables have been deleted. The parameter estimates in Table 4 suggest that the geographic distribution of incremental public sector employment has a highly significant influence on migration, except for illiterate workers, where the effect is economically meaningful but poorly determined. The more public jobs that are created outside a given governorate in the period 1981-88, within an educational category, the higher is the probability of out-migration, ceteris paribus. This confirms the prediction that increases in the relative size of the public sector in governorate *j*, results in greater in-migration flows. We could not, however, uncover a significant effect for any educational group of the change in the public

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and Wadycki (1974) study interstate migration rates in Venezuela, and they find that the wage elasticity of migration increases sharply with education.

[21] Similar patterns have been found in developed countries – for example, the UK, where construction and service workers are found to be more likely to move than other workers, ceteris paribus.

services variable; $\Delta(\varphi^i / N^i)$. (We have also used a provincial development index, but this too gives insignificant results.) The primary impact of public jobs on migration would appear to be as a source of high compensation employment rather than through local public goods provision.

The parameter estimates for other variables support the specification. For the less educated, the probability of migration peaks among those aged 22-26, and for the educated, slightly later, i.e. among those aged 27-34. Amongst the less educated, workers engaged in agriculture, are less prone to migrate – as found by Tunali (1996) – while construction workers are more likely to move. Also, the estimates show that amongst illiterate workers, those in the rural areas are more likely to migrate. The impact of being a public employee on migration depends on education, and only migration amongst illiterates is increased.[23]

ii) *Public jobs and the evolution of the provincial distribution of population*

Section 3 (i) provides evidence that an increase in public sector jobs in a governorate (province) induces in-migration. This section explores how far this is consistent with evidence about the evolution of provincial population levels. We study time series evidence of whether the distribution of public jobs has subsequently redistributed population between Egypt's governorates. We use a sequence of the Egyptian Population Census to estimate the effects of the location of public jobs on the evolution of the provincial shares of population, 1986-96. A pooled cross-section time series model of provincial population share is estimated using as the dependent variable the shares of provincial population, S^j, in 1996 and 1986 for twenty-two governorates.[24] The explanatory variables are a) the population and public job shares ten years earlier; b) the change in

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[22] However to check the robustness of our findings we also estimate disequilibrium models which include wage and unemployment effects. These provide very similar findings and are available from the authors on request.

[23] The most likely explanation is that public jobs for illiterates tend to be short-term contracts, and that these provide on-the-job training and information about the worker, which in the absence of formal credentials, help to secure another public job.

[24] Separate data for five "Frontier" governorates: Red Sea, El-Wadi El-Gidid, Matrouh, North Sinai and South Sinai do not exist for 1976. These governorates are therefore combined and treated as one geographic unit. Thus only 22 governorates rather than 26 are used.

public job shares over the intervening period. This specification allows the share of public jobs in year *t* to be influenced differently by the accumulation of public jobs before (*t-10*), than by that in the more recent ten year period between *t* and (*t-10*). Thus we estimate

$$S^j(t) = \beta_0 + \beta_1 S^j(t-10) + \beta_2 p^j(t-10) + \beta_3[p^j(t) - p^j(t-10)] + e^j$$

where $S^j(t)$ is the provincial share of population in period *t*, and $p^j(t)$ is the provincial share of public jobs in period *t*. Since the 'recent' change in public job shares $p^j(t) - p^j(t-10)$, might be thought to be partly determined by population share in $S^j(t)$, we estimate the model using instrumental variables as well as by ordinary least squares. Sargan statistics to test for mis-specification were found to be insignificant in both of the models ($Col\ \ 1: \chi^2(2) = 2.14; \quad Col\ \ 2: \chi^2(2) = 1.54$).

The results are described in Table 5. The coefficients on both variables capturing the effects of public sector job shares are of the correct sign, and are statistically significant. We are unable to reject the null hypothesis that $\beta_2 = \beta_3$, so that whether the public jobs were created in the 10 year period prior to, forecast population share, or at an earlier point, is not of significance. We can therefore assume $\beta_2 = \beta_3$ and collapse in the model to one with only $p^j(t)$ representing the evolution of public jobs. Once again we estimate the model using both ordinary least squares and by instrumenting [25] the public sector variable, $p^j(t)$. This is represented in columns 2 and 4 of Table 5. In each case the parameter estimate on $p^j(86)$ is highly significant, with an estimated value of about 0.5. This implies that a 10% increase in a governorate's share of public jobs leads to a 5% increase in population share. Since on average one third of jobs are in the public sector, this is consistent with the view that three extra public jobs in a governorate increases the governorate's population by about five. Since in Egypt the labor force participation rate in 1996 was 30% the

estimate suggests that ten extra governorate *j* public sector jobs will attract about five extra migrant workers to governorate *j*, each accompanied by two dependants. In summary, the evidence in this Section supports the mobility evidence in Section 3 (i) that public jobs growth has influenced the provincial allocation of labor.

4. Why Do Governorates with Public Jobs Growth Attract Migrants?

In Section 3 we discussed evidence showing that provincial public jobs growth has attracted migrants, and that provincial population shares have increased after being allocated public jobs. The model in Section 2 shows how one important cause of this may be the wage premiums attached to public jobs, which enable rural applicants to accept urban jobs that they would otherwise reject, and induce inefficient migration. Other causes are not excluded, but of these alternatives only the H-T model implies that this process of concentration is inefficient. In this Section we test our explanation of why public jobs spatially concentrate the population against the alternatives.

The leading alternative hypotheses are that 1) public jobs offer wage premiums, and those living nearby have a search advantage (H-T), and 2) public jobs create an increased demand for local private services, which therefore expands and attracts in-migration. We shall continue to control for the potentially efficient influence of the supply of provincial public services, $\Delta(\varphi^i / N^i)$. As discussed in the Appendix, Hypothesis 1 is unappealing for Egypt since public jobs requiring at least secondary education (the majority) are centrally allocated. However, amongst the least educated there may be migration to be near wage premium jobs as H-T speculate. Thus, to allow for this, we shall disaggregate the analysis by educational category. The hypothesis in Section 2 emphasizes how wage premiums facilitate public sector hiring of migrants in governorates with more public jobs. In contrast, both of the alternative hypotheses predict that the provincial growth

[25] The instruments are listed below Table 5. The Wu-Hausman test suggests that the exogeniety assumption is rejected

of public wage premium jobs will cause in-migration to fill private as well as public jobs. Why is this? In the H-T model, more wage premium jobs attract a larger stock of workers into low pay jobs, some of whom eventually acquire wage premium jobs. Hypothesis 2 proposes that governorates with more public jobs grow because of a local multiplier effect through the demand for local services, with no emphasis on wage premiums so that immigrants are indifferent to accepting public and private jobs. Thus we explore migrants' jobs at destination and examine whether the growth of public jobs in a governorate stimulates migration to undertake public jobs, private jobs, or both. In Section 4 (ii) we again contrast the alternative hypotheses, but by using urban wage data.

(i) Does public employment growth in a governorate attract migrants to public or private jobs?

In our model of inefficient mobility, migrants are attracted to governorates with growing public sectors in order to accept public jobs. Migration to private jobs in a supporting service sector, prompted by nearby public sector growth, is not inconsistent with the model but it is not part of our argument that it occurs. In contrast both of the other hypotheses predict that the growth of wage premium jobs prompts agglomeration by attracting migrants to unregulated nearby jobs of some type. In the H-T model migration to low pay jobs near to an expanding wage premium sector is the crucial mechanism whereby wage premiums prompt urbanization. We contrast these implications by estimating a multinominal logit model that distinguishes migration flows to public and private jobs. The samples of illiterates and those with less than secondary education are combined since the public hiring procedures are the same for workers in these categories. However, because of the centralized hiring practices for those with at least secondary education, as discussed in the Appendix, these workers are considered separately.

The estimates in Table 6 indicate than an increase in public jobs in other governorates has a positive highly significant impact on migration to public jobs relative to not migrating for both educational groups. In other words, the more public jobs that are created in other governorates, the

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and that instrumental variables estimators are preferred.

more likely is out-migration for all educational groups to a public sector job. However, public jobs growth in other governorates has an insignificant impact on migration to private sector jobs relative to not migrating, for the less educated groups, and a positive significant effect for the better educated. Thus support for the alternative hypotheses appears to be concentrated amongst educated workers. In Egypt, expansion of public jobs has not caused the low-waged to accumulate in nearby private jobs. This is particularly striking since for the poorly educated a local search advantage for public jobs might exist so that some evidence for the H-T view would not be inconsistent with the institutional context. We have pointed out that in Egypt the more educated group has no local search advantage for public jobs so that the effect uncovered for that group is best interpreted as evidence for an expanding service sector attracting migratory inflow in the conventional way (hypothesis 2).

The evidence in this section is consistent with the view that socially inefficient migration and agglomeration are induced by public job offers with wage premiums, but is inconsistent with the H-T claim that the *prospect* of premiums causes inefficient migration by low-skill workers to nearby unregulated jobs. This is significant since it was the plight of the urban poor that provided the primary motivation for the Harris-Todaro theory of wage premiums and agglomeration.

The role of public service provision as captured by origin-governorate public jobs per head is not strong, although for the less educated there is some evidence that a larger public sector per head reduces provincial out migration to public sector jobs in other governorates. The absence of a similar effect for migration to private jobs casts doubt on the view that this strongly reflects the utility consequences of a simple increase in the public services of the origin governorate.

The interaction effect of being illiterate and being employed in the public sector is included in the model (cols. 1 and 2). The estimates suggest that public sector employment growth increases the mobility of illiterates, primarily to accept other public jobs. The effects of age and industry are similar to those in the binomial models.

Simulations: Table 7 shows the predicted out-migration probabilities for five types of workers based on Table 6. The importance of provincial public jobs growth is captured in the top panel which compares the migration probability for five types of workers when increases in public sector jobs in other governorates is one standard deviate greater than the provincial average, and those when it is one standard deviate below the provincial average. Such a change reduces migration rates by slightly less than 50% amongst poorly educated workers, and by about 60% amongst graduates from secondary or higher education.

The other parameter estimates give support to the specification. The more educated are more likely to migrate, by a factor of four. This is very similar to findings for Colombia, where the migration rate also rises sharply with education and is four times as high for those with higher education as those with non – Fields (1982). Also, our findings indicate that rural workers are more likely to migrate between governorates than urban ones. The rate of migration of a rural illiterate worker is predicted to be at least twice that of an urban illiterate worker. The rate of migration of a rural educated worker is predicted to be four times that for an urban educated worker.

(ii) Urban private wages and the influence of jobs with wage premium

The migration evidence suggests that public wage premiums have facilitated inefficient agglomeration by attracting workers to accept public jobs in growing regions. We now look at wage data to explore further evidence capable of discriminating between this and the H-T view. First, we consider the implications of each hypothesis for the relationship between the size of the public sector and unregulated private wages in urban areas.

A basic implication of the Harris-Todaro model (Hypothesis 1), is that unregulated wages are lower in cities with greater proportion of jobs with wage premiums, for otherwise expected wages are not equalized across cities.[26] The model in Section 2 implies that if mobility is costless,

[26] Consider the simplest version of the Harris-Todaro-Fields where city *j* has *Gj* public jobs offering wage $\overline{w}$, and there is a region with exogenous wage *w* and no public jobs. If all public jobs turnover each period, and all workers in

urban private wages are independent of the local proportion of high wage government jobs. If mobility is costly, relative urban wages may rise or fall with proportion of public jobs according to their productivity, α.[27] The local public good aspect of government jobs reduces firms' costs and increases the private demand for labor (the second term in (11)). Thus in Figure 1, if α^U is large an increase in government jobs to governorate *i* may shift *ll* to the right, and for all initial equilibria except *v*, *increase* labor demand and relative private wages in governorate *i*. For two other reasons the response of wages in a governorate to an increase in government jobs may be dependent upon local phenomena. First, the sensitivity of utility to congestion may well differ between governorates so that the slope of *ll* (see (12)) may differ between governorates. Secondly, governorates may differ in the proportion of public appointments to migrants β. Thus, additional government jobs, which shift *ll*, will change relative wages by different amounts in different governorates.

In order to explore whether these data are consistent with the H-T prediction that, in equilibrium, unregulated wages are lower in urban areas with a larger share of public jobs we have used individual data to estimate "Mincer" earnings equations for male private sector urban workers. These individuals are distributed across 26 urban areas, and we use our data to calculate the proportion of workers in government jobs, by educational group for each area. This variable is then used as the explanatory regressor, to capture the Harris-Todaro effect on unregulated wages. Since jobs for those with less than secondary education may offer local residents a search advantage, we run separate regressions for a) university and secondary educated persons and b) those with less than secondary education. Within the latter group we distinguish between those who are illiterate, can read, have completed only primary education, and have completed preparatory education. To

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city *j* apply, then the probability of a public job offer, *p*, is *Gj(Gj + Lj)* where *Lj* is private employment in town *j*. Then in migration equilibrium $(1-p^j)w^j = p^j\overline{w} = w$. Thus totally differentiating we have $dw^j / dp^j = -(\overline{w} - w^j)/(1 - p^j) < 0.$

[27] Here private wages near public jobs fall as rural appointments to public urban jobs increase urban congestion and reduce the urban private demand for labour private employment. Mobility costs inhibit migration from areas congested by more public jobs.

control for variations in the urban cost of living we have added a fixed effect which takes the value 1 for Cairo, Giza and Alexandria, and value 0, otherwise.

Our main results are given in columns 1 and 3 of Table 8 and in both cases we find insignificant and extremely small parameters, for the variable capturing the relative scale of government jobs. In columns 2 and 4 we have added a measure of the change in the proportion of local jobs that are public in an attempt to capture disequilibrium effects. The resulting parameters are close to statistical significance but inexplicably have different signs for the two educational groups. We conclude that the evidence from urban wage data is inconsistent with the H-T model, but is consistent with both the argument in Section 2, and the hypothesis that public sector jobs encourage the conventional growth of a supporting service sector.

5. Conclusion

Many LDCs possess a unitary system of government in which central government allocates public jobs to regions and pays a wage premium. This paper shows how, if migration is costly, regions that receive public jobs with wage premiums experience inefficient in-migration and employment concentration, even if these jobs do not produce local public services, and jobs are not offered to favor local applicants. This is because governments may for reasons of patronage distribute offers for wage premium jobs to workers who must undertake costly migration to accept them, and are unable to trade these jobs with workers who have lower mobility costs. Although in-migration funded by wage premiums creates urban congestion and reduces public services, the various costs of migration from the city are sufficient for the equilibrium city size to increase, since wage premium jobs are concentrated in certain locations.

Although both the Harris-Todaro model and the 'frictional mobility cost' model described in Section 2 allow wage premiums that are unevenly distributed over space to create inefficient employment concentration, the empirical implications and policy inferences of the models differ. Empirical evidence from Egypt shows in Section 3 that public jobs growth has altered the pattern of

regional mobility and population shares. However this could reflect efficient labor reallocation or either of the models of inefficient employment concentration. Secondly, in Section 4, we show how the theory developed in Section 2 may be tested against alternative theories of why public jobs may cause agglomeration. The exploration of individual mobility to public and private jobs, together with wage and regional population shares data, is supportive of our hypothesis relative to the Harris-Todaro model. However, there is also evidence that public sector growth induces conventional in-migration to nearby high-skill private employment.

In this model wage premiums are attached to public jobs, but wages in some sectors are also set above competitive equilibrium levels by trade unions or for efficiency wage reasons. While the modeling is complicated by the endogeneity of unionized or efficiency wage employment - public employment can more easily be thought of as exogenous - the labor market equilibrium capturing costly migration between non-rationed jobs to maximize utility has a similar structure. We therefore conjecture that other causes of wage premiums will promote employment concentration under similar assumptions.

Williamson (1988) has pointed out that primary cities in LDCs generally have large population shares relative to primary cities in developing European countries in the nineteenth century. The evidence gathered above suggests that this may in part be explained by the scale of public employment in primary cities, and the migration incentives provided by substantial public wage premiums that have been paid in the developing countries in the modern era.

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Appendix

The public sector share in total employment rose from 10% to 37% during the three decades after 1960 – see Table 1A – and by 1990 it produced almost half of GDP.[28] Public jobs are unevenly allocated among regions, with much higher proportions of public sector employees in urban areas – see Table 1B. For example, in 1993 public employment accounted for 49% of total employment in urban areas and 23% in rural areas. Among urban areas, public jobs are also unevenly allocated.[29] While only 32% of public employees are educated to secondary level and above, these comprise 69% of the entire working population in this education category.

The growth of public jobs has been underpinned by an 'employment guarantee' which entitled university and secondary school graduates to a public appointment two and three years after graduation respectively, and a generous total compensation package.[30] When the growth of the public wage bill became unsustainable in the mid 1980s, the government responded by eroding real public wages and increasing waiting periods for jobs.[31] By 1987 blue collar workers were on average earning the same wage rate in the public and private sectors, while white collar workers were only earning around 67% of the private wage rate. However, the non-pecuniary advantages of public jobs in Egypt – health care, pension and job security – are substantial (for a careful documentation of this, see Assaad and Commander (1994)), and excess supply to public jobs amongst all educational groups existed throughout our period of study.[32] Amongst those with less than secondary education, the central job allocation mechanism did not apply during 1981-8, and there may have been incentives to live near to public jobs. Public appointments are centrally coordinated by the Ministry of Manpower which reviews applications from eligible graduates and invites requests from government agencies and enterprises for graduate employees. Since the agencies and enterprises are provided with funding for appointments, demand exceeds supply. Graduates are not necessarily matched to jobs in governorates in which they are resident. Apart from certain specified categories (medical doctors and teachers), public agencies have only been allowed to hire graduates through this system, although in 1978 public enterprises were allowed to opt out, and to select their own hiring levels and employees – Hansen and Radwan (1982).

[28] Between 1960 and 1976, while the rate of growth of Egypt's labour force was 2.2%, that of public employment was 7.5%. Egypt: Human Development Report 1995.

[29] For example, in 1986 (1993), public employment as a percentage of total employment was 45.5 (48.3) in Cairo, 21.6 (29.2) in Damietta and 18.1 (26.7) in Fayoum - Egypt: Human Development Report 1994 and 1995.

[30] Similar systems for public appointments are in place in other LDCs – for example, Ethiopia. The waiting period allowed males to complete military service. In 1973 the employment guarantee was extended to demobilized military with lower educational qualifications, but this was withdrawn in 1976. The guarantee stimulated the demand for secondary and university education, which in turn, increased applications for public employment.

[31] See Assaad (1997). The wage structure was also compressed by increasing wages at the lower end while restraining the wages of the more skilled, Said (1996).

[32] In addition to the basic wages, workers can receive allowances for hazardous work, accommodation, and various other aspects of the job. The sum total of allowances and incentives is limited to 100% of the basic wage (Assaad 1997). Zaytoun's (1991) analysis of the earnings differential also reveals that private sector workers in general earn higher wages than public sector workers, and that this differential is substantial for white-collar employees. Assaad and Commander (1994) point out that the public sector is the preferred employer, not for the wage reasons but for a combination of status, security and benefits such as free medical care and priority access to subsidized goods and services.

Table 1A
Employment by sector in Egypt

Year	Public Sector (PS)		Private Sector		Urban Population*	
	Thous	% of Total Employment	Thous	% of Total Employment	Thous	% of Total Pop
1947[1]	310	4.4	6685	95.6	6363	33.5
1960[1]	770	10.0	6957	90.0	9965	38.2
1970[2]	1300	15.7	6975	84.3	na	na
1976/77[3]	2958	31.1	6536	68.9	16037	43.8
1981/82[3]	3851	33.6	7908	66.4	na	na
1986/87[3]	4794	35.8	8589	64.2	21216	44.0
1989/90[3]	5275	36.6	9125	63.4	na	na
1995[4]	5308	34.9	9900	65.1	na	na

Notes: Data on urban population are only available for population census years.
The public sector comprises four main categories: central and local government, public authorities and public enterprises.

Sources: [1] *Mabro (1974)* pp.209-210.
[2] *Abdel-Fadil (1980)* p.6.
[3] *Egypt: Human Development Report 1995*, p.35.
[4] Assaad (1997) pp. 85-118.

Table 1B
The location and educational structure of public jobs

Working Region	PS Jobs as a % of Total Employment in 1981	PS Jobs as a % of Total Employment in 1988
Greater Cairo	44.35	46.00
Alex & Canal Cities	44.96	43.87
Lower Urban	38.57	41.65
Upper Urban	41.77	44.54
Lower Rural	12.75	13.95
Upper Rural	14.59	16.87
All Regions	30.27	32.17

Educational Level in 1988	Distribution (%) of PS Jobs by Educational Group	Distribution (%) of Educational Group Working in PS
No education	13.60	10.83
Less than Secondary[1]	54.53	39.17
Secondary & University	31.87	69.23

[1] Less than primary, primary and preparatory schooling
Note: The data for Table 1B is drawn from the 1988 LFSS, which as can be seen, gives us a lower estimate for the share of Public Sector employment for both, 1981 & 1988 than Table 1A.

Table 2A
Inter-governorate migration summary statistics

	Migration Rates[1]	Public Migrants[2]	Private Migrants[3]	Sample Characteristics[4]
Age (Mean)	-----	35.9	33.2	38.6
Age Groups[5] *(%)*				
15-21	9.47	5.91	22.98	16.36
22-26	15.59	19.89	27.02	15.19
27-34	13.61	37.63	24.19	21.61
35-44	8.78	24.70	11.69	19.45
45-54	4.63	8.06	6.45	15.26
55-64	6.18	3.76	7.66	9.59
Educational Level (%)				
No education	8.1	20.97	41.94	40.39
Less than Secondary[6]	9.7	40.86	45.96	44.80
Secondary & University	15.5	38.17	12.10	14.81
Economic Activity (%)				
Agriculture	5.3	19.89	16.53	33.60
Manufacturing	9.6	8.06	20.56	15.67
Construction	27.1	10.75	21.77	6.22
Services & Others	11.1	61.30	58.86	44.51
Public Jobs in 1981 (%)	11.0	56.99	16.13	30.27
Origin Working Region (%)				
Greater Cairo	14.8	35.48	36.29	23.99
Alex & Canal Cities	9.6	8.06	10.48	9.73
Lower Urban	9.4	13.98	11.69	13.35
Upper Urban	3.5	2.15	4.84	10.52
Lower Rural	8.7	27.42	18.95	25.56
Upper Rural	9.2	12.90	17.74	16.86
Sample Size	---	186	248	4390

[1] Migrants per 100 persons in the seven year period, 1981- 88.
[2] Distribution of migrants to public sector jobs by category.
[3] Distribution of migrants to private sector jobs by category.
[4] Distribution of whole sample by characteristic.
[5] Age in 1985.
[6] Less than primary, primary and preparatory schooling.
Source: 1988 LFSS.

Table 2B
Migration and public sector employment: 1981-88

	Public Sector Employment in 1988		Private Sector Employment in 1988		Total Employment in 1988	
	Migrants[1]	Total Employment[2]	Migrants	Total Employment	Migrants	Total Employment
Origin Sector						
Public Sector Employment in 1981	106	1199	40	130	146	1329
Private Sector Employment in 1981	80	207	208	2854	288	3061
Total Employment in 1981	186	1406	288	2984	434	4390

Source: 1988 LFSS.

Notes:

[1] The number of Public Sector employees in 1988 who have migrated (moved between governorates) between 1981 & 1988.

[2]Total number of Public Sector employees in 1988.

Table 3
Definitions of the explanatory variables

VARIABLE	DEFINITION
1. Public Sector (PS)	
PS Employee in 1981	= 1 if employed in the public sector in 1981
PS Employee * Illiterate	= 1 if employed in the public sector in 1981 and illiterate
Increase in PS Jobs in OTHER governorates	Increase in public *sector* jobs (by educational group) in other governorates, 1981-1988
Increase in public services in OWN governorate per employee	Increase in public *service* jobs in own governorate, 1981-1988, as a percentage of total employment in own governorate in 1981
2. Educational Levels	
Illiterate	No education
Less than Secondary	Primary and preparatory education
Secondary & Above	Secondary and university degrees
3. Regional Dummies (Greater Cairo is the reference group)	
Alex & Canal Cities	=1 if working in Alexandria or Canal Cities in 1981
Lower Urban	=1 if working in Lower Urban in 1981
Upper Urban	=1 if working in Upper Urban in 1981
Lower Rural	=1 if working in Lower Rural in 1981
Upper Rural	=1 if working in Upper Rural in 1981
4. Industry Dummies (Services are the reference group)	
Agriculture	=1 if employed in the agriculture sector in 1981
Manufacturing	=1 if employed in the manufacturing sector in 1981
Construction	=1 if employed in the construction sector in 1981

Table 4
Logit models of the probability of governorate out-migration

Variables	Illiterates		Less than Secondary		Secondary & Above	
	1	2	3	4	5	6
Constant	-2.58	-2.51	-4.90	-4.92	-7.68	-11.03
	(-3.79)	(-6.51)	(-3.87)	(-3.90)	(-3.04)	(-5.03)
Public Sector (PS)						
Increase in PS Jobs in OTHER governorates	0.07	0.07	0.02	0.02	0.04	0.05
	(1.03)	(1.03)	(2.80)	(2.80)	(2.75)	(4.96)
Increase in public services in OWN governorate per employee	0.0004	----	0.01	0.01	0.009	0.01
	(0.02)		(0.65)	(0.66)	(0.28)	(0.31)
PS Employee in 1981	0.54	0.55	-0.30	-0.32	-0.03	-----
	(1.99)	(2.05)	(-1.54)	(-1.67)	(-0.12)	
Age Group Dummies						
15-21	0.36	0.38	-0.42	-0.47	-1.40	-1.57
	(1.16)	(1.45)	(-1.86)	(-2.34)	(-2.12)	(-2.37)
22-26	1.02	1.03	0.08	-----	-0.66	-0.65
	(3.53)	(4.29)	(0.37)		(-2.07)	(-2.06)
35-44	0.10	----	-0.69	-0.72	-0.41	-0.35
	(0.35)		(-2.66)	(-2.98)	(-1.32)	(-1.14)
45-54	-0.69	-0.69	-1.58	-1.62	-0.54	-0.53
	(-1.93)	(-2.18)	(-4.08)	(-4.28)	(-1.34)	(-1.34)
55-64	-0.18	-----	-1.06	-1.08	0.14	----
	(-0.51)		(-2.55)	(-2.67)	(0.25)	
Educational Levels						
Secondary only	-----	-----	-----	-----	-0.89	-0.72
					(-2.59)	(-2.08)
Regional Fixed Effects						
Alex. & Canal Cities	-0.89	-0.94	-0.77	-0.76	-1.17	-1.63
	(-2.01)	(-2.21)	(-2.50)	(-2.49)	(-2.75)	(-4.02)
Lower Urban	-0.06	-----	-0.79	-0.79	-1.83	-2.41
	(-0.17)		(-2.18)	(-2.17)	(-3.14)	(-4.39)
Upper Urban	-1.13	-1.21	-2.12	-2.09	-2.63	-3.28
	(-2.42)	(-2.91)	(-4.34)	(-4.28)	(-3.71)	(-4.81)
Lower Rural	-0.38	-0.50	-0.54	-0.53	-0.02	-----
	(-1.15)	(-2.19)	(-1.74)	(-1.70)	(-0.04)	
Upper Rural	0.24	-----	-0.57	-0.54	-0.91	-----
	(0.73)		(-1.66)	(-1.59)	(-1.57)	
Rural (Lower + Upper)	-----	-----	-----	-----	-----	-1.92
						(-4.51)
Industry Dummies						
Agriculture = 1	-1.01	-0.94	-0.75	-0.70	0.17	-----
	(-3.70)	(-4.20)	(-2.87)	(-2.73)	(0.34)	
Manufacturing = 1	0.10	-----	-0.22	-----	0.38	-----
	(0.38)		(-1.02)		(1.10)	
Construction =1	1.09	1.06	0.83	0.89	0.16	----
	(3.90)	(4.11)	(3.41)	(3.75)	(0.27)	
Log-Likelihood	-438.56	-439.44	-574.15	-534.37	-251.58	-242.01
Chi-Squared	117.04	115.29	100.88	180.47	58.36	77.50
DF	16	10	16	15	17	11
Total Sample	1773	1773	1967	1967	650	650
No of migrants	143	143	190	190	101	101

t-statistics are in parentheses Reference group: 27-34 years old, Greater Cairo & other industries (services).

Table 5

The determination of governorate population shares (S_t^j) ; 1986 - 1996

Regressors	IV (1)	IV (2)	OLS (3)	OLS (4)
Governorate Population Share lagged ten years (S_{t-10}^j)	0.24 (2.36)	0.26 (2.58)	0.36 (2.98)	0.32 (3.12)
Share of Governorate PS Jobs (p_t^j)	-----	0.54 (5.46)	-----	0.55 (5.24)
Share of Governorate PS Jobs lagged ten years (p_{t-10}^j)	0.51 (4.58)	-----	0.40 (4.09)	-----
Increase in Share of Governorate PS Jobs over preceding 10 years ($p_t^j - p_{t-10}^j$)	0.51 (5.96)	-----	0.41 (2.27)	-----
*Regional Fixed effects**				
Upper Egypt	1.89 (3.93)	1.73 (4.04)	1.89 (3.10)	1.69 (3.45)
Lower Egypt	2.07 (4.27)	1.79 (4.17)	2.16 (3.76)	1.80 (3.84)
Greater Cairo	-0.53 (-0.87)	-0.73 (-1.18)	-0.30 (-0.49)	-0.95 (-1.57)
Intercept	-0.46 (-1.05)	-0.41 (-1.01)	-0.53 (-0.94)	-0.62 (-1.22)
Sample Size	44	44	44	44
R^2	----	----	0.87	0.89
Generalized R^2	0.87	0.89	----	----
Wu – Hausman Test	----	----	F (1, 36) = 4.97	F (1,37) = 3.51

t-statistics are in parentheses

Note:

* Alexandria and Canal Cities are the reference group.

a) Census Data for 1960,1976, 1986 and 1996 are used.

b) In column 1, increase in share of Public Sector jobs $p_t^j - p_{t-10}^j$ is instrumented out. In column 2, share of Public Sector jobs in 1986 and 1996 p_t^j is instrumented out. The following variables are used as instruments: population share in 1960 and 1976; percentage rural workers 1976 and1986; dummies for rural regions; literacy rate by region; share of public sector jobs, lagged ten years.

c) The Wu - Hausman's statistic test was used to test for exogeneity of the regressors and the disturbance term. The test rejects the null hypothesis that that the OLS estimates are consistent. Thus, to get a consistent estimator we use instrumental variable (IV) estimation.

Table 6

Multinomial logit models of the sector of employment for inter-governorate migration

Variables	Illiterates & Less than Secondary		Secondary & Higher	
	Public Sector	Private Sector	Public Sector	Private Sector
Constant	-2.31	-2.40	-12.39	-11.22
	(-6.13)	(-9.35)	(-4.64)	(-3.20)
Public Sector (PS)				
Increase in PS Jobs in OTHER	0.004	-0.001	0.05	0.05
governorates	(3.08)	(-1.03)	(4.18)	(2.68)
Increase in public services in OWN	-0.11	0.03	-0.01	0.09
governorate per employee	(-3.69)	(1.50)	(-0.26)	(1.43)
PS Employee in 1981	0.69	-1.06	0.63	-0.76
	(2.60)	(-3.89)	(1.93)	(-1.93)
PS Employee* Illiterate	1.92	0.63	----	----
	(4.49)	(1.23)		
Age Group Dummies				
15-21	-0.86	0.13	-----	-----
	(-2.36)	(0.63)		
22-26	0.10	0.52	-----	-----
	(0.36)	(2.51)		
35-44	-0.28	-0.49	-----	-----
	(-1.04)	(-1.92)		
45-54	-1.62	-0.94	-----	-----
	(-3.75)	(-3.02)		
55-64	-1.44	-0.33	-----	-----
	(-2.87)	(-1.10)		
27 – 34	-----	-----	0.62	0.22
			(2.22)	(0.53)
Educational Levels				
Secondary only	-----	-----	-1.00	-0.57
			(-2.31)	(-1.11)
Regional Fixed Effects				
Alex. & Canal Cities	-1.69	-0.07	-1.47	-1.55
	(-4.29)	(-0.25)	(-3.82)	(-2.20)
Lower Urban	-0.12	-0.46	-1.97	-4.15
	(-0.40)	(-1.56)	(-3.38)	(-2.49)
Upper Urban	-2.56	-1.10	-3.11	-3.31
	(-3.47)	(-3.14)	(-3.82)	(-2.77)
Rural (Lower + Upper)	-2.32	0.38	-2.06	-1.26
	(7.59)	(1.98)	(-4.10)	(-1.74)
Industry Dummies				
Agriculture = 1	0.72	-1.33	1.06	-10.75
	(2.34)	(-5.77)	(1.92)	(-0.06)
Manufacturing =1	-0.96	0.23	0.20	0.53
	(-2.89)	(1.16)	(0.48)	(1.05)
Construction =1	0.59	1.08	-----	-----
	(1.78)	(5.20)		
Log-Likelihood	-1154.98		-294.02	
Chi-Squared (DF)	365.57 (32)		96.35 (22)	
Total Sample	3740		650	
No of migrants	115, 218		71, 30	

t-statistics are in parentheses. Reference group: 27-34 years old, Greater Cairo & other industries (services).

Table 7
Predicted probabilities of inter-governorate migration

	A	B	C	D	E
	Illiterates			Educated	
Reference Group for that governorate	0.012	0.037	0.073	0.040	0.169
Increase in PS Jobs in other governorates equal to mean minus 1 standard deviation for relevant educational group	0.008	0.024	0.048	0.024	0.102
Increase in PS Jobs in other governorates equal to mean plus 1 standard deviation for relevant educational group	0.013	0.042	0.084	0.058	0.243

A: Illiterate, between 27-34 years old, working in *Upper Urban*, in the services industry and in the private sector in 1981. Increase in PS jobs in other governorates equal to the national average mean for illiterates. Wages in the private sector and unemployment equal to national average unless otherwise indicated.

B: As *A* but working in *Lower Urban*.

C: As *A* but in *Upper Rural*.

D: Educated (secondary or higher), between 27-34 years old, working in *Lower Urban*, in the services industry and in the private sector in 1981. Increase in PS jobs in other regions equal to the national average mean for the educated. Wages in the private sector and unemployment equal to national average unless otherwise indicated.

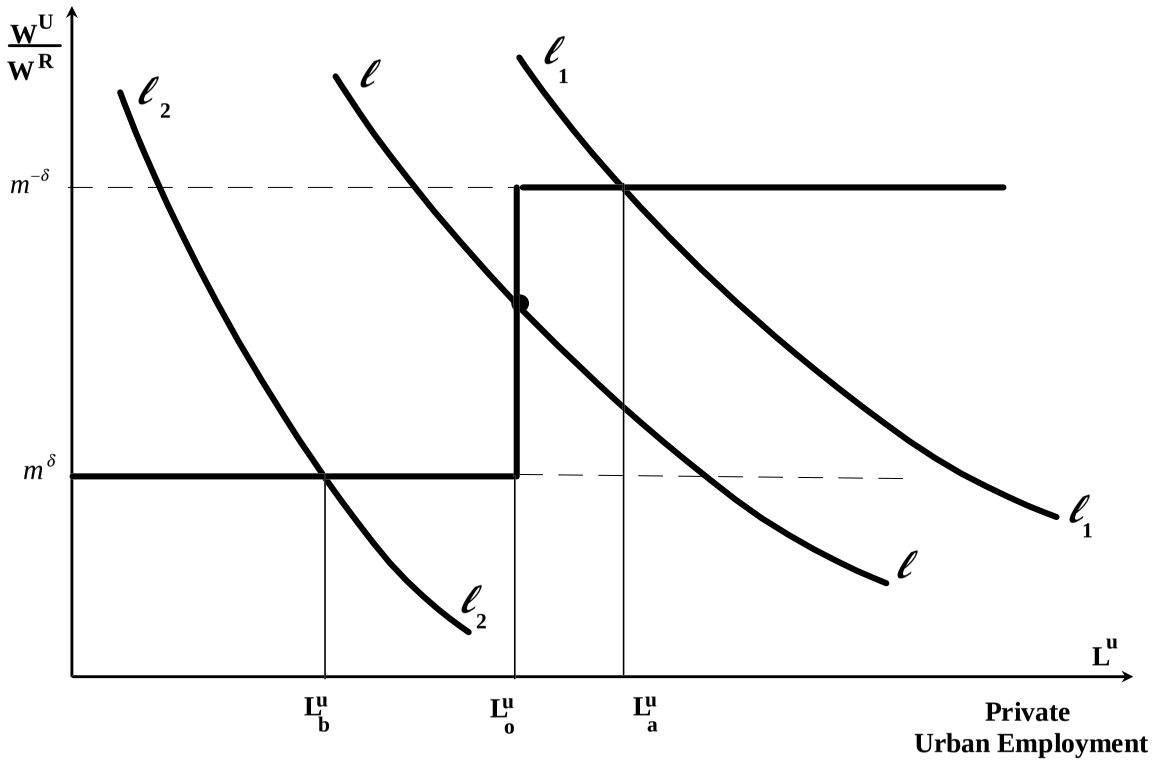
E: As *D* but working in *Upper Rural*.

Table 8
Estimates of ln earnings of males in private urban employment; 1988

Variables	Less than Secondary		Secondary & Higher	
Constant	5.14	5.11	6.58	6.64
	(63.84)	(62.06)	(36.91)	(35.97)
Ln (Experience)	0.10	0.10	0.11	0.11
	(21.54)	(21.60)	(12.21)	(12.25)
Ln (Experience)^2	-0.001	-0.001	-0.002	-0.002
	(-15.13)	(-15.21)	(-7.43)	(-7.46)
Public Sector Jobs as a % of Labor Force in urban governorate in 1988	-0.00002	0.0004	-0.0005	-0.001
	(-0.01)	(0.24)	(-0.23)	(-0.49)
Change in Public Sector Jobs as a % of Labor Force in urban governorate;1988 – 81	-----	-0.004	-----	0.004
		(-1.52)		(1.33)
Educational Dummies[1]				
Literate	0.20	0.19	-----	-----
	(3.16)	(2.88)		
Primary	0.37	0.36	-----	-----
	(5.51)	(5.28)		
			-----	-----
Preparatory	0.72	0.71		
	(10.79)	(10.52)		
Secondary	-----	-----	-0.39	-0.39
			(-7.09)	(-7.17)
Non-Cosmopolitan dummy[2]	-0.16	-0.16	-0.31	-0.31
	(-6.52)	(-6.31)	(-5.68)	(-5.72)
N	1612	1612	771	771
R^2	0.384	0.385	0.411	0.413
Adj. R^2	0.382	0.382	0.407	0.408

[1] Illiterates are the reference group for less than secondary, and university graduates are the reference group for secondary and university.
[2] Cairo, Giza and Alexandria are the cosmopolitan reference group in which the price level is likely to be greater.

Figure1


$\frac{W^U}{W^R}$
$m^{-\delta}$
m^{δ}
ℓ_2
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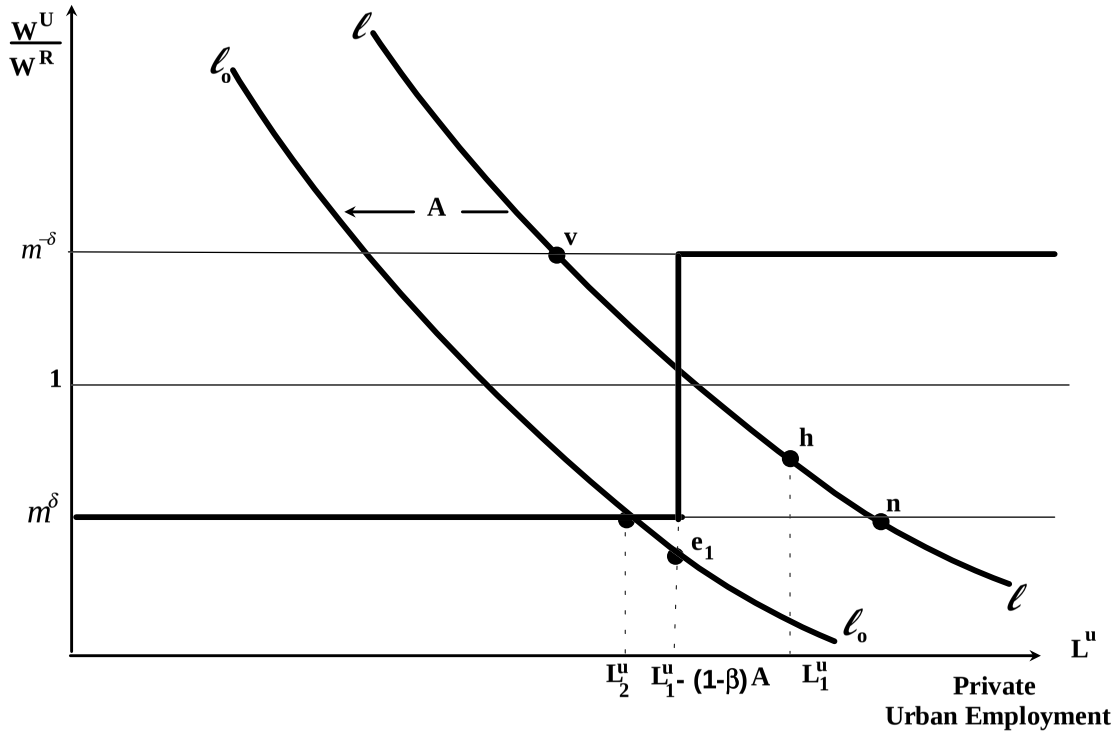
Private
Urban Employment

Figure 2


W^U / W^R
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L^u
L^u_2
L^u_1 - (1-β) A
L^u_1
Private
Urban Employment