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Designed, composed, and finished at the Publications Division, PIDE.

### **ABSTRACT**

The Harris-Todaro hypothesis replaces the equality of wages by the equality of 'expected' wages as the basic equilibrium condition in a segmented but homogeneous labour market, and in so doing it generates an equilibrium level of urban unemployment when a mechanism for the determination of urban wages is specified. This article reviews work in which the Harris-Todaro hypothesis is embedded in canonical models of trade theory in order to investigate a variety of issues in development economics. These include the desirability (or the lack thereof) of foreign investment, the complications of an informal sector, and the presence of clearly identifiable ethnic groups.

*JEL classification:* J3

*Keywords:* Harris-Todaro, Wages, Labour Economics, Labour Market, Rural to Urban Migration



The Harris-Todaro hypothesis replaces the equality of wages by the equality of ‘expected’ wages as the basic equilibrium condition in a segmented, but homogeneous, labour market, and in so doing, generates an equilibrium level of urban unemployment when a mechanism for the determination of urban wages is specified. This entry reviews work in which the Harris-Todaro hypothesis is embedded in canonical models of trade theory in order to investigate a variety of issues in development economics. These include the desirability (or the lack thereof) of foreign investment, the complications of an informal sector and the presence of clearly-identifiable ethnic groups.

The replacement of the equality of wages by the equality of ‘expected’ wages as the basic equilibrium condition in a segmented, but homogeneous, labour market has proved to be an idea of seminal importance in development economics. Attributed originally to Todaro (1968, 1969) and Harris-Todaro (1970), and commonly referred to as the Harris-Todaro hypothesis, the idea was very much in the air around the late 1960s as can be seen from the contemporaneous writings of Akerlof-Stiglitz (1969), Blaug, *et al.* (1969) and Harberger (1971), among others.

The motivation for the Harris-Todaro hypothesis lies in an attempt to explain the persistence of rural to urban migration in the presence of widespread urban unemployment, a pervasive phenomenon in many, so-called less developed, countries [but also see Suits (1985) and Partridge-Rickman (1987)]. It is natural to ask why such unemployment does not act as a deterrent to further migration. According to the Harris-Todaro hypothesis, the answer lies in the migrant leaving a secure rural wage  $w_r$  for a higher expected urban wage  $w_u^e$  even though the latter carries with it a non-zero probability of urban unemployment. The expected wage is computed by using the rate of urban employment as an index for the probability of finding a job. Thus

$$w_u^e = w_u \frac{L_u}{L_u + U} + 0 \frac{U}{L_u + U} = w_u \frac{1}{1 + \lambda}, \quad \dots \quad \dots \quad \dots \quad (1)$$

where  $w_u$  is the urban wage,  $L_u$  is the number of urban employed,  $U$  the number of urban unemployed and  $\lambda = (U/L_u)$  the rate of urban unemployment. Thus, the Harris-Todaro hypothesis is precisely formulated by the equilibrium condition

$$w_r = w_u^e \Leftrightarrow w_r = w_u(1 + \lambda) \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (2)$$

Since the Harris-Todaro hypothesis introduces a further unknown, namely the rate of unemployment, a model in which the hypothesis is embedded must be buttressed by a theory of urban wage determination. The simplest setting is the one originally adopted by Harris-Todaro and subsequently by Bhagwati-Srinivasan (1971, 1973, 1974). This setting assumes the urban wage to be an exogenously given constant

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*Author's Note:* A version of the above text will appear in a new, forthcoming edition (2007) of *The New Palgrave: A Dictionary of Economics*.

and typically rationalizes it as a consequence of government fiat.

In the 1970s, however, several theories of endogenous urban wage determination were simultaneously proposed. Foremost among these is the work of Stiglitz who provides a microfoundation for the urban wage in terms of labour-turnover [Stiglitz (1974)], or in terms of biological efficiency considerations [Stiglitz (1976)]. One may also mention in this context the work of Calvo (1978), who sees the equilibrium urban wage as an outcome of trade union behaviour [also Quibria (1988) and Chau-Khan (2001)]; and of Calvo-Wellisz (1978), who see a higher urban wage as a consequence of costly supervision. At this stage of the development of the literature, each theory of urban wage determination led to a particular version of the Harris-Todaro model and the common structural similarities were obscured.

In Khan (1980a), the elementary observation is made that all these variants of the Harris-Todaro model could be studied under one rubric if the Harris-Todaro hypothesis is embedded in the Heckscher-Ohlin-Samuelson (HOS) two-sector, so-called general equilibrium model [see Jones (1965) or Johnson (1971)], and the determination of urban wages is seen in a somewhat more abstract way, i.e.,

$$w_u = \Omega(w_r, \lambda, R, \tau), \dots \dots \dots \dots \dots \dots \dots \quad (3)$$

where  $R$  is the rental on capital and  $\tau$  a shift parameter. This led to a model whose importance lay not so much in synthesising the several variants of urban wage determination, but in emphasising the points of contact with the trade theory literature. In particular, when (3) collapses to

$$w_u = w_r, \dots \dots \dots \dots \dots \dots \dots \quad (4)$$

that is, when the elasticity of the omega function  $\Omega(\cdot)$  with respect to  $w_r$  is unity, and those with respect to  $R$  and  $\lambda$  are zero, we obtain the HOS model.

This point deserves further articulation. Let a stylised economy consist solely of an urban and a rural sector, indexed by  $u$  and  $r$  respectively, and be endowed with positive amounts of labour  $L$  and capital  $K$ . Let the  $i$ th sector produce a commodity  $i$  in amount  $X_i$  in accordance with a production function

$$X_i = F_i(L_i, K_i), \quad i = u, r, \dots \dots \dots \dots \dots \dots \dots \quad (5)$$

which is assumed to exhibit constant returns to scale and is twice continuously differentiable and concave. The allocation of labour and capital,  $L_i$  and  $K_i$ , is determined through marginal productivity pricing. Thus, we have

$$p_r F_r^K = R = p_u F_u^K, \quad p_r F_r^L = w_r \text{ and } p_u F_u^L = w_u, \dots \dots \dots \quad (6)$$

where  $F_i^j$  is the derivative of  $F_i(i = u, r)$  with respect to  $j(j = L_i, K_i)$ . The economy is considered too small to influence the positive international prices of the two commodities,  $p_u$  and  $p_r$ . On rewriting the equilibrium condition (2) in the slightly more general form,

$$w_u = \rho w_r (1 + \lambda); \quad \rho \text{ a shift parameter, } \dots \dots \dots \dots \dots \quad (7)$$

(3), (5), (6) and (7), along with the material balance equations below, complete the specification of the model.

$$K_r + K_u = K \text{ and } L_r + L_u(1 + \lambda) = L. \quad \dots \quad \dots \quad \dots \quad \dots \quad (8)$$

The first point to be noticed about this model is a *decomposability property* whereby the factor prices,  $w_u, w_r, R$  and the unemployment rate  $\lambda$  are all independent of the endowments of labour and capital and depend solely on  $p_u, p_r$  and the shift parameters  $\tau$  and  $\rho$ . This can be seen most easily if we subsume the marginal productivity conditions (6) into price-equal-unit-cost equations

$$p_i = C_i(w_i, R), \quad i = u, r. \quad \dots \quad \dots \quad \dots \quad \dots \quad \dots \quad (9)$$

This allows one to decompose the model into a subsystem comprising Equations (7) and (3) along with (9). This basic observation leads to several interesting characteristics of the equilibria of the model. First, the market rural wage and market rental correctly measure the social opportunity cost of labour and capital if we use the international value of GNP as the relevant measure of social welfare. Second, despite the presence of a distorted labour market, there is no possibility of immiserising growth. Third, an increase in capital (labour) increases the output of the capital (labour) intensive commodity provided of the labour (capital) intensive commodity provided the intensities are measured in employment adjusted terms, that is

$$\frac{k_u}{1 + \lambda} = \frac{K_u}{L_u(1 + \lambda)} > (\text{or } <) \frac{K_r}{L_r} = k_r. \quad \dots \quad \dots \quad \dots \quad (10)$$

This third property is an analogue of the Rybczynski property of the HOS model. Not surprisingly, we also obtain an analogue of the Stolper-Samuelson property whereby the effect of changes in international prices on factor returns depends on factor intensities, provided these are now measured in elasticity adjusted terms. The urban sector is said to be capital intensive in elasticity adjusted terms if

$$\theta_r L(\theta_u K(1 - e_\lambda) + \theta_u L e_R) - \theta_u L \theta_r K(e_w - e_\lambda) > \text{or } < 0, \quad \dots \quad \dots \quad (11)$$

where  $\theta_{ij}$  is the share of the  $j$ th factor ( $j = K, L$ ) in the  $i$ th sector ( $i = u, r$ ), and  $e_i$  is the elasticity of the  $\Omega(\cdot)$  function with respect to the relevant variable. In the setting where  $e_w$  equals unity and  $e_R$  and  $e_\lambda$  are all zero, (10) and (11) collapse to the conventional physical and value intensities of Magee (1976) and Jones (1971) for the HOS model with proportional wage differentials. Under the further specialisation that  $\rho$  in (7) equals unity, there is no difference between these two kinds of intensities and a perfect correspondence between the Rybczynski and Stolper-Samuelson theorems.

This re-appearance of the divergence of the physical and value intensities of the wage-differential model leads us to inquire into the possibility of downward-sloping supply curves of  $X_r$  and  $X_u$ . This is indeed a possibility and a sharp generalisation is available in the result that there are perverse price-output responses



in the model if and only if the employment adjusted factor intensities do not conflict with the elasticity adjusted intensities; see Khan (1980b) for details. Another direct consequence of the decomposability property of the model is a generalisation of the Bhagwati (1968), Johnson (1971), Brecher-Alejandro (1977) paradox. This states that capital inflow in the presence of a tariff and with full repatriation of its earnings is immiserizing if and only if the imported commodity is capital intensive in employment adjusted terms. This result is independent of the various mechanisms for the determination of urban wages; see Khan (1982a) for details, and also subsequent work by Beladi-Naqvi (1988), Grinols (1991), Chao-Yu (1994, 1995c), Chaudhuri-Mukhopadhyay (2002), Chaudhuri (2003a) and Sen, *et al.* (1997). Both of these results have a trade-theoretic flavour, and one question that has remained in the forefront of analytical work on the Harris-Todaro hypothesis relates to the effect of urban wage subsidies on urban unemployment and urban output. (As emphasized above, this question could indeed be seen as the *raison d'être* for the introduction of the hypothesis.) A seminal result here is the Corden-Findlay (1975) paradox which draws attention to the fact that urban employment and urban output could rise if the urban wage is increased. This question has been readdressed by Neary (1981) and completely resolved in the context of endogenous urban wage determination by Khan (1980b).

So far we have focused on the comparative-static properties of the Harris-Todaro equilibrium. It is also worth emphasizing that the actual existence of the Harris-Todaro equilibrium cannot be taken for granted and must be proved. In the original Harris-Todaro model with an exogenously given rigid wage, equilibrium exists if and only if the rural sector is more capital intensive in employment adjusted terms; see Khan (1980a) and Basu (1991) for an application of the geometric technique. Furthermore, once the 'isomorphism' with the HOS model is established and understood, one can follow Neary's (1978) lead and ask for 'reasonable' adjustment processes under which the Harris-Todaro equilibrium is locally asymptotically stable. It can be shown that an adjustment process of the Marshallian type leads to a stable equilibrium if and only if the employment adjusted factor intensities do not conflict with the elasticity adjusted intensities; see Khan (1980b) for details. Since the elasticity adjusted intensities of (11) collapse to  $\theta_r, \theta_u, \theta_K$  in the Harris-Todaro model with a rigid wage, we have the satisfying result that the criteria for the existence of equilibrium and its stability coincide; also see Neary (1981) for this special case.

The 1987 Palgrave entry on this subject was furnished under the title Harris-Todaro model, and the model presented above referred to as the 'generalized Harris-Todaro' (GHT) model. This is somewhat misleading in that any model in which the Harris-Todaro hypothesis is embedded has a justifiable claim to the title of a Harris-Todaro model. Indeed, unlike the case of the HOS model where capital is intersectorally mobile, the hypothesis can be embedded in the Ricardo-Viner model, a setting with three factors, or under an alternative interpretation, one where capital can be viewed as non-shiftable (for details on this and other basic constructions of classical trade theory, [see, for example, Caves-Jones (1985)]. In many ways, this

case of a two sector model with sector-specific capital is more difficult and also more interesting; see Khan (1982) and Bhatia (2002) for details. And there is at least one example in the literature where a particular Harris-Todaro model has been exported to international trade theory rather than imported from it: Jones-Marjit (1992) investigate a multi-sectoral setting of Khan (1991) by stripping it of the Harris-Todaro hypothesis.

This updated entry would be seriously incomplete if it did not note a criticism of the Harris-Todaro hypothesis centering on the urban unemployed living on a zero wage, and a corresponding generalisation of the hypothesis. This criticism also dovetails into an issue that has received increasing attention from sociologists and development economists in the last fifteen years: the existence of a dynamic informal urban sector, and the possibility of the urban unemployed being incorporated in it; see Portes (1989) and Fields (1975, 2005b) and their references. This has led to a reformulation of (1) and (2) to

$$w_u^e = w_u \frac{L_u}{L_u + U} + w_i \frac{U}{L_u + U} = \frac{w_u + \lambda w_i}{1 + \lambda} \Rightarrow w_r = w_u^e \Leftrightarrow$$

$$w_u + \lambda w_i = w_r(1 + \lambda), \dots \dots \dots \dots \dots \dots (12)$$

where  $w_i$  is the wage in the informal sector. Again, as in the original Harris-Todaro hypothesis, this generalised hypothesis can be embedded in alternative production structures to yield a variety of models tailored to the purpose the investigator has in mind; see Chandra (1991) and Chandra-Khan (1993) for a more detailed elaboration of this point of view. The subject continues to receive attention; see Stiglitz (1982), Fields (1990, 1997, 2005), Rauch (1991), Gupta (1993, 1997), Bandyopadhyay-Gupta (1995), Kar-Marjit (2001), Yabuuchi, *et al.* (2001, 2005) and Chaudhuri (2003b).

We conclude this entry with a partial list of some other issues in trade and development that have been discussed in the context of urban-rural migration: gains from trade, now depending on the asymmetric nature of the model and on whether the rural or the urban commodity is being exported, as in Khan-Lin (1982), Chao-Yu (1993, 1997, 1999) and Choi-Yu (2006); underemployment or educated unemployment as in Bhagwati-Srinivasan (1977) or in Chaudhuri-Khan (1984) and Chaudhuri-Mukhopadhyay (2003); public inputs as in Chao-Lafargue-Yu (2006); variable returns to scale as in Panagariya-Succar (1986), Beladi (1988) and Choi (1999); growth and technical progress as in Bourguignon (1990), Choi-Yu (1993, 1995a) and Chow-Zeng (2001); foreign enclaves as in Gupta-Gupta (1998); capital markets, distorted or otherwise, as in Khan-Naqvi (1983) and Chao-Yu (1992); interaction of ethnic groups as in Khan (1979, 1991) and Khan-Chaudhuri (1985); risk and uncertainty as in Beladi-Ingene (1994); environmental issues, as in Chao-Kerkviliat-Yu (2000) and Chao-Yu (2003); cost-benefit analyses as in Srinivasan-Bhagwati (1975), Stiglitz (1977, 1982), Gupta (1988) and Chao-Yu (1995b); poverty and income inequality as in Moene (1992) and Rauch (1993). In summary then, the Harris-Todaro hypothesis is a versatile and useful analytic instrument for investigating a variety of questions arising in international and development economics where urban unemployment is a prominent issue.

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