

The Todaro Model of Labor Migration: A Technical Analysis of Urban Unemployment in Developing Economies

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The phenomenon of rural-urban migration remains one of the most complex challenges in development economics. Historically, the transition from an agrarian society to an industrial one was viewed as a linear progression where surplus labor from the countryside would be seamlessly absorbed by a growing urban industrial sector. However, in many Less Developed Countries (LDCs), this transition has been characterized by a persistent and paradoxical trend: massive migration to cities despite high and rising levels of urban unemployment. This structural imbalance was first rigorously codified by Michael P. Todaro in his seminal 1969 paper, **"A Model of Labor Migration and Urban Unemployment in Less Developed Countries."**

By shifting the focus from actual wage differentials to **expected income differentials**, Todaro provided a behavioral framework that explained why rational individuals continue to migrate to urban centers even when the probability of immediate employment is low. This article provides an in-depth technical exploration of the Todaro Model, its mathematical foundations, policy implications, and its evolution through the Harris-Todaro framework.

The Theoretical Foundation: Beyond Neoclassical Assumptions

Traditional neoclassical economic models typically assumed that migration is a mechanism for labor market equilibrium. In these models, labor moves from low-wage rural areas to high-wage urban areas until wages equalize. If urban unemployment exists, it is viewed as a temporary friction that should, in theory, discourage further migration until the surplus labor is absorbed. However, empirical data from Africa, Asia, and Latin America in the mid-20th century contradicted this. Urban sectors were growing, but unemployment was also skyrocketing.

Todaro's breakthrough was the recognition that migration is an **investment decision** based on a rational economic calculation of lifetime expected utility. The migrant does not merely look at the prevailing urban wage but evaluates the **probability** of securing a job in the modern sector. This probabilistic approach fundamentally altered the understanding of labor mobility in the context of globalization and development.

The Concept of Expected Income

In the Todaro framework, the migration decision is governed by the difference between the discounted present value of the expected urban real income stream and the average real rural income. The core innovation is the probability variable. If the urban wage is significantly higher than the rural wage, a migrant may still find it rational to move even if they face a 50% or even 70% chance of being unemployed in the short term, provided the long-term gains of eventually securing a high-paying job outweigh the costs.

Technical Analysis of the Todaro Migration Model

To understand the mechanics of the model, we must examine the mathematical relationship between rural-urban wage gaps and the rate of migration. The model assumes a two-sector economy: a rural agricultural sector and an urban modern sector.

1. The Migration Function

The rate of migration (M) is expressed as a functional relationship of the difference between the **expected** urban

real income (E_u) and the average rural real income (W_r):

$$M = f(E_u - W_r)$$

Where $f' > 0$, meaning migration increases as the expected income gap widens. Unlike previous models that used actual wages (W_u), Todaro defines E_u as:

$$E_u = W_u \times P$$

Here, W_u is the fixed urban real wage (often kept artificially high by unions or government regulations) and P is the probability of the migrant obtaining a job in the urban sector.

2. Determining the Probability of Employment

The probability P is generally defined as the ratio of modern sector employment (L_u) to the total urban labor force (N_u):

$$P = L_u / N_u$$

Because N_u includes both those currently employed and the unemployed migrants searching for work, an increase in migration without a corresponding increase in job creation leads to a decrease in P . This creates a self-regulating, albeit inefficient, equilibrium where migration continues until the expected urban wage equals the rural wage.

3. The Equilibrium Condition

The system reaches a structural equilibrium when the rural wage is exactly equal to the probability-adjusted urban wage:

$$W_r = (L_u / N_u) \times W_u$$

This equilibrium is significant because it allows for the existence of **urban unemployment** ($N_u - L_u$) in a steady state. As long as the urban wage W_u is maintained above the rural wage W_r , the urban labor force N_u must be larger than the available jobs L_u to satisfy the equation.

Comparison of Migration Theories

To contextualize Todaro's contribution, it is essential to compare it with the Lewis Two-Sector Model and the subsequent Harris-Todaro refinements. The following table highlights the technical differences between these frameworks.

Feature	Lewis Two-Sector Model	Todaro Model (1969)	Harris-Todaro Model (1970)
Labor Surplus	Assumes infinite supply of rural labor at subsistence wage.	Focuses on individual decision-making and rational expectations.	Integrates general equilibrium between two sectors.
Unemployment	No urban unemployment; labor is absorbed as industry grows.	Explains persistent urban unemployment as an equilibrium state.	Models unemployment as a result of rigid urban wages.
Migration Driver	Actual wage differentials.	Expected income differentials (probabilistic).	Expected income with specific focus on sector trade-offs.
Policy Focus	Industrial expansion and capital accumulation.	Rural development and wage policy.	Endogenous wage determination and shadow pricing.

The Todaro Paradox: Why Job Creation May Increase Unemployment

One of the most critical and counter-intuitive implications of the Todaro model is what is often termed the **"Todaro Paradox."** Traditional policy-making suggests that to solve urban unemployment, the government should create more urban jobs through industrial subsidies or public works.

However, Todaro demonstrates that an increase in urban employment ($\$L_u$) can lead to an even larger increase in the urban labor force ($\$N_u$). If the probability of finding a job ($\$P$) improves because more jobs are created, more rural dwellers are incentivized to migrate. If the **elasticity of migration** with respect to the probability of employment is greater than one, every new job created in the city could attract two or more new migrants from the countryside.

The Mechanism of Induced Migration

- Step 1: Government creates 100 new urban jobs.
- Step 2: The probability $\$P$ (Jobs/Labor Force) increases temporarily.
- Step 3: The expected urban income $\$E_u$ rises above the rural wage $\$W_r$.
- Step 4: 300 rural workers migrate to the city to compete for those 100 jobs.
- Step 5: Urban unemployment actually increases by 200 people.

This technical realization suggests that **urban-biased development strategies** are often self-defeating in the context of reducing poverty and unemployment in LDCs.

Critical Evaluations and Technical Revisions

Since its publication in 1969, the Todaro model has faced several technical critiques, notably from **R.C. Porter (1973)** and **P. Zarembka (1970)**. These critiques often focus on the assumptions regarding the growth of the urban sector and the nature of the rural labor supply.

The Porter Critique

Porter argued that if the urban sector grows at a rate significantly faster than the population growth, and if certain capital-labor ratios are maintained, the equilibrium of unemployment might not persist in the way Todaro predicted. Porter suggested that under specific growth trajectories, the "correction" of the model might show that urban

unemployment could be eliminated. However, for most developing nations, the rate of population growth and the capital-intensive nature of modern industry have validated Todaro's more pessimistic outlook.

The Informal Sector Integration

The original 1969 model primarily focused on the modern (formal) urban sector. Modern extensions of the model now incorporate the **Urban Informal Sector** (e.g., street vending, small-scale services). In these revised models, migrants don't just choose between rural work and urban unemployment; they often transition through the informal sector while waiting for a formal sector opening. This adds a layer of complexity to the expected income calculation, as the informal sector provides a non-zero survival wage during the job search period.

Practical Implementation: A Field Guide for Policy Formulation

Based on the technical insights of the Todaro model, development economists and urban planners must adopt a multi-faceted approach to manage migration and unemployment. Relying solely on urban industrial growth is insufficient.

1. Rural-Urban Wage Gap Mitigation

Policies should aim to reduce the gap between W_u and W_r . This does not necessarily mean lowering urban wages (which is often politically impossible) but rather raising rural incomes through:

- Agricultural price supports.
- Investment in rural infrastructure (roads, irrigation, electricity).
- Technological transfers to small-holder farmers.

2. Elimination of Factor Price Distortions

In many LDCs, capital is artificially cheap (due to subsidized interest rates or overvalued exchange rates) and labor is artificially expensive (due to high minimum wages). This encourages firms to use machines instead of people. Correcting these distortions helps the urban sector absorb more labor naturally.

3. Decentralized Industrialization

Promoting small-scale industries in rural towns (intermediate cities) can provide the "expected income" benefits of urban life without the massive social costs of mega-city congestion and unemployment.

4. Education and Skill Matching

As noted in neoclassical economics and the "new economics of migration," migration is often a household strategy to diversify risk. Improving education in rural areas can sometimes increase migration (by making individuals more employable in cities), but if paired with rural demand for skills, it can stabilize the local economy.

Case Study: The Dynamics of Migration in China

The relevance of the Todaro model is vividly illustrated by China's internal migration patterns. With a rural labor force of approximately **450 million** (accounting for roughly 74% of total social labor at the time of several major studies), China faced the exact pressures Todaro described. The **Hukou system** (household registration) was a policy intervention designed specifically to counteract the Todaro Paradox by physically and legally restricting migration to maintain urban stability. As China liberalized, the massive flow of "floating populations" into cities like Shenzhen and Guangzhou showcased the expected income hypothesis in action: migrants accepted poor living conditions and informal work for the **probability** of high-wage industrial employment.

Summary and Technical Implications

The Todaro Model of Labor Migration fundamentally changed the landscape of development economics by introducing the role of expectations and probability into the study of labor markets. By demonstrating that urban unemployment is an endogenous result of the imbalance between rural and urban economic opportunities, Todaro provided a powerful argument against urban-biased development.

For the modern technical writer or policy analyst, the model serves as a reminder that microeconomic rational choices—such as a farmer moving to a city—can aggregate into macroeconomic challenges—such as persistent urban poverty. The core technical takeaway remains: to solve urban unemployment, one must look to the countryside. As long as the expected rewards of urban life far outweigh rural realities, the migration stream will continue to flow, regardless of the number of jobs created in the city. Future research into remittances and globalization continues to build on this framework, but the fundamental 1969 hypothesis remains the cornerstone of migration theory in the developing world.

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