Small Enterprise Development and the Employment-Output Trade-Off

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This paper analyzes the potential of small-scale enterprise development for absorbing labor while maintaining output growth in developing countries. Addition of a small-scale, intermediate sector to the modern-informal framework of a Harris-Todaro type model demonstrates that negative migration and unemployment responses to urban job creation can be avoided. The multi-sector model shows that observed characteristics of large and small firms are explainable by capital market segmentation, and the model is used to analyze the effects of changes in policy variables. Expansion of demand for small-scale products is a particularly promising approach. Conditions for an employment-output trade-off to arise are analyzed to show the need for balance between small and large scale sector expansion.

Introduction

Research on small-scale enterprises (SSEs) in less developed countries (LDCs) has flourished during the 1970s with the popularizing of the concept of the "informal sector" (Hart, 1973; ILO, 1972). The term focused attention on activities outside the modern, organized sector that enable large numbers of urban workers to earn income. These activities were omitted from dualistic Lewis-type models of economic development and migration, which treated work outside the modern sector as a form of temporary unemployment while awaiting an opportunity in the modern sector (Harris and Todaro, 1970; Todaro, 1969). Such models were nevertheless useful in explaining the continuing expansion of excess urban labor supply in spite of the inability of the modern sector to absorb it. Investigations of informal activities indicate that they are permanent features in the urban developing world and that they do not necessarily represent a form of disguised unemployment.

The dualistic approach presents a policy dilemma in the form of a trade-off between output growth and employment. Modern production methods embodying technical efficiency, economies of scale, and corporate
organization appear to provide the most effective use of capital to generate output growth. The observed inability of large-scale, modern firms to absorb the expanding urban labor supply in LDCs, however, conflicts with the goal of full employment. Absorption of this labor into the informal sector to raise employment is seen as inconsistent with maximum output growth because average productivity is lowered.

Recent evidence on the economic characteristics of SSEs is not consistent with the preceding notions about the modern and informal sectors. Many of the SSEs implicitly included in the so-called informal sector appear to use capital at least as productively as modern sector firms, and to employ labor productively. The evidence suggests that the employment-output trade-off can be resolved by channeling resources into small-scale rather than large-scale establishments. Some countries have attempted to pursue this prospect through assistance to SSEs. Policies based solely on observed relationships are risky, however, unless the reason for the observed relationships and the conditions under which they hold are known. One purpose of this paper is to investigate conceptually the conditions under which important economic policy consequences follow from sectoral differences.

The first problem is how to incorporate the observed characteristics of informal activities into a model that explains their existence in equilibrium. The views of empirical researchers range from characterizing a portion of informal activities as the "modern informal sector" (Nihan, et al., 1979) to considering as invalid any arbitrary differentiation of different parts of the continuum of employment activities (Breman, 1976). This paper opts for incorporating SSEs as a third, or intermediate sector between modern and informal-type activities, to analyze the consequences of replacing the dichotomized model by a closer approximation of the continuum.

In order to justify the assumptions through which this small-scale (intermediate) sector is introduced, the paper first seeks to clarify intersectoral relationships observed between it and both the large-scale (modern) sector and the residual portion of the informal sector. In particular, the evidence on capital and labor market segmentation is reviewed. The object is to develop a simple multi-sectoral model in terms functionally related to economic conditions and policies found in LDCs, so as to analyze the implications of policies to promote SSEs. Although the model is a variant of the Harris-Todaro model, introduction of an intermediate sector generates quite different policy conclusions. The analysis shows that segmented capital markets and capital-based incentives to the modern sector provide a reasonable explanation for the observed characteristics of small versus large firms. Stimulating demand for SSE output offers an especially promising approach for generating self-sustained employment and output growth. Extending the availability of official (low-cost) capital is likely to have perverse employment effects, and may not increase output as much as does demand stimulation.
**Review of studies on small-scale/large-scale differences**

Studies comparing small-scale and large-scale production in LDCs consistently find small size to be associated with less capital per worker, lower labor productivity, and more output or value added per unit of capital. Most of these studies also indicate that a range of activities (especially those in manufacturing) included in the broadly-defined informal sector are potentially competitive with modern sector production rather than complementary, as is often presumed for informal activity. An interesting policy implication is that small-scale establishments using intermediate technology may generate more output as well as more employment for a given investment than does the modern sector. Even if their products are not perfect substitutes for those of the modern sector in terms of quality, they substitute in the sense of satisfying the demand for simple manufactures that results from rising income per capita. These findings, together with disappointing performance of large-scale import substitution industries, are leading an increasing number of LDCs and international organizations to adopt policies assisting SSEs.

The source of observed differences between small and large firms must be known in order to direct policies at the appropriate economic variables. Several possible explanations for the association between size and capital/labor ratios arise out of the literature. The evidence on and policy implications of these explanations are reviewed briefly as a basis for the assumptions of the model that follows.

1. **Capital-based economies of scale**

Certain production processes may be characterized by economies of scale that can be captured only through capital-intensive methods (White, 1978). Aggregate figures that include such industries would therefore show a bias toward capital intensity among larger firms. Within a single industry, however,

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2 Studies that describe the informal sector as complementary to and dependent on the modern sector include Bose, 1974; Mazumdar, 1975; Moser, 1978; and Tokman, 1978. The degree of competitiveness between intermediate and modern sector products depends on how strictly quality differences are considered. In practice, small-scale firms may produce a lower-quality product that fulfills the same function for lower-income consumers as does the higher-quality product of a modern factory for upper-income consumers (e.g., furniture, clothing, beverages). Even if the products of the two sectors are not presently identical, they may be considered substitutes in terms of satisfying the needs of the population or in terms of their potential (Nihan *et al.*, 1979). To the extent that different sectors satisfy needs of different income groups, sectoral bias of policies has important income distribution implications.

this explanation would apply only if small-scale labor-intensive tech-
niques have recently been rendered obsolete by capital-intensive methods that
capture economies of scale. The traditional method could compete for some
time with new investment because its capital costs are sunk rather than
variable. The limited direct evidence available on this hypothesis suggests
that increasing returns to scale are insufficient to explain large-scale/small-
scale differences, and that firms of different sizes and capital intensities
co-exist because of different relative factor prices (Byerlee, et al., 1979; Ho,
1980). In any case, the existence of economies of scale would not warrant
policies that discriminate against (or favor) SSEs. Small-scale production that
is inefficient at all factor prices would soon be driven out, and should not be
subsidized.

2. Segmented capital markets

Capital markets are commonly segmented in LDCs both in terms of
access to credit and its cost. Credit from “modern” financial institutions is
generally available only to large investors with established credit experience.
Small-scale investors must rely on “traditional” sources, especially personal
and family savings, and to a lesser extent cooperative credit/savings schemes
and money lenders. The limited availability of such savings and credit forces
them to economize on capital. Others (especially farmers) who are unable to
generate personal savings and who are not known to moneylenders as
suitable risks have no source of capital other than credit from suppliers of
goods.

The official cost of institutional capital is usually held low as a stimulus to
investment, thus favoring intensive use of capital relative to other factors by
borrowers from financial institutions. The high opportunity cost of personal
savings (as well as high interest on loans from moneylenders) relative to
regulated interest rates, on the other hand, further encourages conservation
of capital in small firms. Interest rates generally range from under 10 per
cent per annum for official institutional loans, to an average for the unor-
ganized money market around 25–35 per cent, to 100 per cent or more for
short-term moneylending. Segmentation persists in spite of these differen-
tials because the unorganised money markets are highly localized and there
is little penetration of financial intermediaries that could mobilise available
savings for use by organised investors, so that there is no link between loan
rates and deposit rates.

Policies that create or reinforce segmented capital markets tend to bias
the investment decisions of large firms toward capital-intensive products and

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4 Abdi, 1978; Byerlee, et al., 1979; Karkal, 1967; McKinnon, 1973; Nisbet, 1967; Page,
1979; Wai, 1957.
5 Byerlee, et al., 1979; Chandavarkar, 1971; Karkal, 1967; McKinnon, 1973; Page, 1979;
Wai, 1957.
technology by lowering their cost of capital relative to its opportunity cost and relative to labor. A policy of raising the official interest rate is often recommended to induce more efficient use of resources and shift demand toward labor. The success of this approach may, however, be inhibited by structural segmentation and by other price distortions (Abdi, 1978; Berry, 1978). Another approach is to stimulate SSEs, which are observed to be relatively labor-intensive. The labor intensity of SSEs, however, is itself achieved within the context of the original segmentation and interest rate differentials. Hence, whether policies to expand SSEs represent appropriate corrective measures depends on what instruments are used. Analysis of the implications of such policies for capital and labor flows and productivity must incorporate the capital market segmentation observed to characterize LDCs.

3. Labor market segmentation

The existence of a wage gap between the modern sector and the informal sector is well documented in the literature on labor markets in LDCs. The range of wages outside the modern sector is wide (Sabot, 1977), but the evidence suggests that the average wage for unskilled workers in small-scale firms is on the order of half that in large firms. The fact that the modern sector wage is consistently above the minimum wage while small-scale wages are frequently below it indicates that this gap is at least partly attributable to institutional factors. The visibility of large firms makes them subject to minimum wage requirements, union demands, pressure to appear progressive, and other institutional determinants of wage structure. Smaller firms can more readily escape regulation, and their wages are more likely to respond to excess labor supply by falling. The evidence is increasingly clear that workers find permanent employment in the latter firms, rather than regarding them as a temporary transition to modern sector employment. Segmentation can persist because large firms are reluctant to risk paying illegally low wages, and because the wide range of opportunities in self-employment enables some people to earn more than they would in the

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8 A wage for unskilled workers in the small-scale sector of about 50 per cent of that in the large-scale sector is reported by Byerlee, et al. (1979), Mazumdar (1979), and Page 1979. Steel (1977) finds that workers in small manufacturing enterprises without full-time non-family wage workers earn about 54 per cent of the median wage in large-scale firms with 10 or more employees in Ghana, while the median wage in small-scale firms with 1–9 employees is 86 per cent of that in large firms. Child (1977) similarly finds a wage gap between the intermediate and modern sectors in Kenya, with approximately two-thirds of the Kenyans employed in the modern sector earning more than the median wage of semi-skilled intermediate sector workers.

9 Other explanations (besides the argument that labour is heterogenous) that have some empirical support are returns to education and experience (Mazumdar, 1978) and the lower supply price of migrant workers found disproportionately in small firms (Mazumdar, 1979).

modern sector. In addition, a portion of non-modern employment is protected by barriers to entry, and workers obtain some degree of job security through dependency relationships (apprenticeship being the most common example).

Labor market segmentation parallels capital market segmentation and reinforces the factor price differentials that tend to make capital/labor ratios rise with firm size. The model that follows incorporates both types of segmentation, but focuses on capital market segmentation, which is generally seen as the more significant and interesting policy variable. There is little evidence that elimination of minimum wages would greatly affect wage gaps or technology choice. Nevertheless, it must be remembered that removal of distortions in both factor markets is necessary to achieve unambiguously desirable results (Berry, 1978).

**Urban sectors: modern, intermediate, residual**

In order to analyze the implications of capital market segmentation and of policies to offset it, two divisions of productive activities are necessary. First, those activities that require fixed capital investment must be distinguished from those with negligible capital requirements. Second, capital-using investments must be divided into those that do and do not have access to low-interest official capital. The “modern-informal” dichotomy does not adequately represent small firms that are on more labor-intensive portions of the same production function as large firms. “Informal” is associated primarily with easy-entry activities in which surplus urban labor can gain an income without substantial capital or skill requirements, and which therefore tend to be overcrowded and unproductive. In our model, capital is a barrier to entry that separates these activities from those that combine labor more productively with capital—the exact relationship depending on policies affecting supply of capital and demand for output.

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11 This borderline between the large-scale and small-scale sectors in the model therefore depends on policy as well as on the nature of firms. A number of countries (e.g., India, Cameroon, Morocco) have introduced new institutions or regulations to channel capital to small enterprises that previously lacked access to official capital. Although these policies sometimes involve introduction of new capital into the economy (notably from the World Bank), they do not resolve the large difference in cost of capital to borrowers from official and non-official sources and they cannot meet the needs of all small-scale entrepreneurs desiring to undertake fixed investment. Hence, the analysis of the model still applies, even if the composition of the sectors changes.


13 The ILO (1972) report that helped popularize the term “informal” used it partly to emphasize the potential productivity of certain activities outside the modern sector, and most users recognize the diversity of activities included. In a dichotomized model, however, the characteristics of the opposite extremes are inevitably attributed to the two categories.
Although these distinctions apply within both urban and rural sectors, our model focuses on urban production and employment. It is consistent with models of the Harris–Todaro type, enabling us to show that their policy conclusions are significantly altered by the introduction of SSEs. The large-scale sector (LSS) has access to official institutional capital and pays an institutionally-determined wage ($w_m$). The residual sector represents the informal sector defined strictly to have no fixed capital requirements (or other significant barriers to entry) and a wage determined by the average product (so that marginal product can fall to zero). The small-scale (intermediate) sector falls between these two, with capital requirements (fixed assets or investment in human capital) but no access to low-interest institutional credit and with a market-determined wage based on the marginal product of labor. Although conceptually clear, these borderlines mark points on a continuum, and operational definitions for empirical work must depend on observable differences and local policies regarding capital requirements and accessibility. The labor market assumptions also represent a simplification; in reality, the most appropriate operational divisions by labor market criteria may not correspond to those for the capital market.

The basic sectoral equations are as follows:

Production:
- Large-scale (LSS) $X_1 = f(N_1, K_1, T_1)$
- Small-scale (SSE) $X_2 = g(N_2, K_2, T_2)$
- Residual $X_3 = h(N_3, T_3)$
- Unemployment $N_4 = N_U - N_1 - N_2 - N_3$
- Capital Stock $K = K_1 + K_2$

Wage:
- Large-scale $P_1 f N = w_1 \equiv w_m$
- Small-scale $w_2 = P_2 g N$
- Residual $w_3 = P_3 (X_3/N_3)$

where the sectors are 1 = large-scale, 2 = small-scale, 3 = residual, 4 = unemployment, and $U =$ urban; $X =$ production, $N =$ employment, $K =$ capital (fixed assets), $T =$ technology (given), $w =$ wage rate, and $P =$ price of output.

Profit-maximizing behavior is assumed for both the large and small scale sectors, so that equilibrium ratios of factor marginal productivities ($MPK =$

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14 R. A. Berry's (1978) model using these assumptions shows that low-cost capital availability to a limited group of firms diminishes output and demand for labor through excessive expansion of these firms into the decreasing cost range.

15 This sector corresponds to the traditional sector (agriculture) in a Lewis-type model. Harris and Todaro (1970) treat all non-modern activities with unemployment.
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\( f_K, g_K; \) MPL = \( f_N, g_N \) equal the ratios of capital costs \( (k) \) to wages:

\[
\begin{align*}
\text{Large-scale} & \quad \frac{f_K}{f_N} = \frac{k_1}{w_1} \\
\text{Small-scale} & \quad \frac{g_K}{g_N} = \frac{k_2}{w_2}
\end{align*}
\] (9, 10)

Segmented capital markets are represented by assuming a given official interest rate to the large-scale sector such that \( k_1 < k_2 \). The resulting difference in relative factor prices gives a lower equilibrium MPL and higher MPK in the small than the large-scale sector, consistent with the observed relationship.

We focus on the employment decision of labor (assumed homogeneous and unskilled), first among urban sectors and then including the rural/urban (migration) choice. In equilibrium, the expected value of income \( E(Y) \) must be equalized between unemployment and the small-scale and residual sectors:

\[
E(Y_2) = E(Y_3) = E(Y_4)
\] (11, 12)

Open unemployment exists in equilibrium if workers have a higher expectation of obtaining LSS employment if they remain unemployed than if they are working. Taking into account the probability \( \rho_{i,t} \) that a worker in sector \( i \) will get a modern sector job, the present discounted value (at rate \( r \)) of expected income may be represented generally as:

\[
E(Y_i) = \int_{t=0}^{\infty} \left[ 1 - \rho_{1,t}(t) \right] w_i(t)e^{-rt} dt + \int_{t=0}^{\infty} \rho_{1,i}(t)w_i(t)e^{-rt} dt \quad i = 2, 3, 4
\] (13, 14, 15)

Realistically, the probability of employment in a large-scale firm is a function of the size of the LSS and the number of available workers:

\[16\] An equivalent approach would be to fix the amount of capital allocated to the large-scale sector \( (K_L) \).

\[17\] Labor is completely free to enter the residual sector, by definition. Factor substitutability is assumed in the small-scale sector, so that unskilled workers can find employment there (at a diminishing wage), even though the capital investment barrier may prevent them from entering as entrepreneurs.

\[18\] A positive relationship between probability of employment and time spent in job search gives this result (see Feldstein, 1973, and Eaton and Neher, 1975). Educated labor force entrants may also refuse employment that is below their expectations (which may later be revised). Furthermore, unemployment is rational even if job search does not raise probability of employment as long as enough support is available (from relatives, friends, or unemployment benefits) and the leisure time provides more utility than does working.
\( \rho_{1,4} = \rho(n_1) \), where \( n_1 = N_1/N_U \). For simplicity, the probability of entering the LSS through the small-scale and residual sectors can then be represented as a proportion \( (\alpha) \) of the probability for the unemployed: \( \rho_{1,2} = \rho_{1,3} = \alpha \rho_{1,4} \). Using a two-period model for convenience, we have:

\[
E(Y_i) = \left( 1 + \frac{1 - \rho}{1 + r} \right) w_i + \frac{\alpha \rho}{1 + r} w_m, \quad i = 2, 3, 4 \quad (13', 14', 15')
\]

\[
\rho = \rho(n_1)
\] (16)

Substituting equations (13'), (14'), and (15') in (11) and (12) and assuming the unemployment wage \( w_d = 0 \):

\[
\left( 1 + \frac{1 - \rho}{1 + r} \right) w_2 + \frac{\alpha \rho}{1 + r} w_m = \frac{\rho}{1 + r} w_m \quad (11')
\]

\[
\left( 1 + \frac{1 - \rho}{1 + r} \right) w_3 + \frac{\alpha \rho}{1 + r} w_m = \frac{\rho}{1 + r} w_m \quad (12')
\]

19 The total supply of workers seeking urban modern sector employment is presumed to be \( N_2 + N_3 + N_4 \). The rates at which new modern sector jobs open up each period is defined as the net of turnover (through firing, retirement, and death) plus output growth minus productivity growth. The probability of an unemployed worker obtaining such a job is a function of the ratio of these variables:

\[
\rho_{1,4} = \phi \left( \frac{s N_1}{N_2 + N_3 + N_4} \right), \quad \phi' > 0
\]

Substituting from equation (4) and dividing through by \( N_U \):

\[
\rho_{1,4} = \phi \left( \frac{s n_1}{1 - n_1} \right)
\]

or if \( s \) is assumed to be constant:

\[
\rho_{1,4} = \rho(n_1), \quad \phi' > 0.
\]

This latter formulation is used for simplicity, although the impact of policies that affect \( s \) could also be investigated. For detailed discussion of different models and formulations of this probability, see Collier, 1975; Harris and Sabot, 1978; Harris and Todaro, 1970; and Stiglitz, 1974.

20 The probabilities could be differentiated between the small-scale and residual sectors. Small-scale employment is sometimes viewed as a conduit to the LSS by providng experience and training that make workers more valuable to modern sector employers than unemployed workers. SSEs may also include former LSS workers who have gone into business for themselves, but who would have a relatively high probability of re-entering the modern sector, in view of their experience. The expectation that SSE training enhances future job prospects explains why many people are willing to become apprentices for very low remuneration (or even for a net payment to the master). In order to abstract from training and skill effects, however, we are here assuming homogeneous labor and equal probabilities of LSS employment. The implication of equations (11') and (12') then is that \( w_2 = w_3 \).

The training effect of SSE employment could also be introduced to give its workers a higher probability of large-scale employment than the unemployed (\( \alpha = 1 \)). On the other hand, where employment exchanges do not work efficiently, unemployed workers have the advantage of being able to devote more time to job search. Again abstracting from skill differentials, we assume that the latter effect dominates, so that \( \alpha < 1 \). Note that this is a necessary condition for open unemployment to exist in equilibrium.
At this point, we have a closed urban model for a given $N_U$. More realistically, the urban labor supply $N_U$ is a variable, with migration occurring whenever the expected value of rural income $E(Y_R)$ plus migration costs $C$ is below the expected value of income in any of the urban sectors:

$$E(Y_2) = E(Y_3) = E(Y_4) \leq E(Y_R) + C$$

(11, 12, 17)

$$N_U + N_R = N$$

(18)

where $Y_R$ = rural labor and $N$ = total labor (given). For simplicity, we assume a given rural wage $w_R$ and a perfectly elastic supply of labor at that wage, or in a two-period equilibrium:

$$\frac{2 + r}{1 + r} w_R + C = \frac{\rho}{1 + r} w_m$$

(17')

We now have an open urban employment model of the Harris-Todaro type, with small-scale and residual employment represented explicitly. The equilibrium configuration is shown in Fig. 1. The shaded areas represent total production in each sector; urban surplus labor is assumed sufficiently large to have MPL to zero.

**Effects of policies to promote sectoral expansion**

The model permits analysis of the implications of various policy changes: in demand (e.g., due to income redistribution; represented in the

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21 The model has a recursive structure: equations (1), (6) and (9) determine $N_1$, $K_1$, and $X_1$; these determine $K_2$ and $\rho$ through equations (5) and (16); these in turn determine $w_2$ and $w_3$ through equations (11') and (12') and then $N_2$ and $N_3$ through equations (7) and (8); the remaining variables, $X_2$, $X_3$, $N_4$, and $K_3$ are determined by equations (2), (3), (4) and (10). $P_3$ is set $= 1$, and everything else is given. Equations (13')–(15') have been dropped by substitution into (11)–(12). If $w_R$, $C$, $w_m$, and $r$ in equation (17') are unchanged then $\rho$ is determined and $n_1$ in equation (16) does not change. Since $n_1 = N_1/N_U$, then $N_U$ must increase (through rural-urban migration) whenever $N_1$ does, to maintain this ratio.

22 Potential migrants are implicitly assumed to have accurate information on urban job prospects, and to expect to be unemployed or engaged in the small-scale or residual sector before entering the modern sector. If potential migrants base their expectations principally on the modern sector wage and overestimate the probability of obtaining it, then the migration-stimulating effects of LSS expansion are increased, while SSE expansion is even less likely to have an effect. Equation (17) may involve an inequality in equilibrium because return migration does not occur unless $E(Y_a) + C > E(Y_d)$.

23 Rural labor is treated as earning $w_R$ with certainty and as having access to modern sector employment only by moving to the city. Under the assumptions used here, probability is a function of the size of the modern sector (equation (16)). A rise in expectations or inaccurate information flows could have the same effect.

The rural sector could be articulated through equations corresponding to (1–3) and (6–8), representing modern plantation agriculture; market-oriented farming (or nonfarm intermediate production, i.e., Hymer and Resnick's [1969] z-goods) with positive marginal product; and subsistence-type farming with income-sharing arrangements and negligible marginal product of labor. Migration would then raise rural wages and result in output losses that would offset gains from urban expansion. In the analysis, however, agriculture is treated as if it were entirely subsistence with surplus labor.

24 The structure is as described in footnote 21, except that $\rho$ is now determined by equation (17'), $N_U$ by equation (16), and $N_R$ by equation (18).

25 See Appendix with mathematical presentation of the comparative statics.
model by relative price changes); in the interest rate; in capital allocation (e.g., social overhead capital); and in technology or management (represented by T).

An increase in demand for LSS products translates into increased demand for labor and capital through the initial rise in the values of their marginal products that results from a higher product price, given a fixed minimum wage and interest rate. An increase in large-scale employment raises the probability of modern sector employment and therefore generates expected income differentials both within the urban sector [E(Y₄) rises more than E(Y₂) or E(Y₃)] and between urban and rural areas. Rural-urban migration occurs until the probability of modern sector employment returns to its former level.²⁶ Residual sector employment also returns to its original level, as a result of this migration, after an initial outflow to the large scale sector and/or unemployment. The LSS’s increased demand for capital, however, reduces capital available to the small-scale sector and leads to a contraction in its employment and output.²⁷ A net decline in marginal product of both capital and labor results.

The initial job-creation from expansion of the LSS is more than offset by rural-urban migration and contracted SSE employment, so that unemployment actually increases. In a dualistic model, this “Todaro paradox” can be resolved only by lowering the minimum wage or by direct restrictions, both generally unacceptable to LDC politicians. A demand shift toward the

²⁶ This result follows from the assumption of perfectly elastic supply of rural labor; otherwise, the new equilibrium could be reached at a higher p.
²⁷ This contraction is even greater if the large-scale demand increase comes at the expense of small-scale demand (i.e., P₂ falls). The likelihood that unemployment will increase is also enhanced.
residual sector (represented by a decrease in both $P_1$ and $P_2$) offers little promise: its increased employment comes at the expense of some LSS employment and possibly even some SSE employment (unless capital released from the LSS more than offsets the fall in $VMPL_2$ associated with a decreased $P_2$), while LSS (and possibly SSE) production falls with no offsetting increase in residual sector output.

An increase in demand for (price of) small-scale sector products, however, raises its marginal product of labor and creates an expected income differential between it and both residual employment and unemployment, without affecting the rural-urban differential. Workers therefore shift into SSEs from residual employment (causing a temporary rise in that sector's wage) and from unemployment. Unemployed also move into residual employment until its wage returns to its former level. $MPK_2$ and $k_2$ rise in the small-scale sector while $MPL_2$ falls, heightening incentives to conserve capital by using labor-intensive methods. Small-scale output increases without any offsetting reduction, and unemployment decreases.

The effects of different policy variable changes on output and employment are shown in Table 1. The impact of improvements in technology or management ($T$) in each sector on output and employment correspond to those of increases in demand, as does reduction of the interest rate facing the LSS (or an increase in capital allocated to it). Reducing the interest rate (or raising capital allocation) to SSEs is not a direct policy option in the original model, but can be accomplished indirectly by raising the interest rate or reducing the capital allocation to the LSS (col. 2).

A direct policy of low interest or increased capital to SSEs can be introduced by increasing the total supply of capital—e.g., from an international loan for re-lending to SSEs. Although qualitatively similar to increased demand in its output and employment effects, this approach has limitations because the lower cost of capital reduces SSEs' incentive to substitute labor for capital and because it does not provide increased demand to absorb the additional supply.

Analysis of the trade-off

The effects of policies to promote the LSS and SSEs can be compared to analyze the conditions under which an employment-output trade-off occurs. Policies may be defined as comparable or equivalent when they result in the same additional capital invested in a sector. Under the assumptions of the

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28 This is based on the assumption that potential rural migrants respond to the probability of modern sector employment only. If they instead react to average urban income, small-scale sector expansion would have some effect on migration, albeit much less than a comparable large-scale sector expansion.

29 These effects are enhanced if the increase in SSE demand comes at the expense of demand for LSS products, although there is some offsetting contraction in LSS output and employment.

30 I.e., if demand is not perfectly elastic at $P_2$, then $P_2$ must fall, which reduces the total impact on SSE expansion and employment.
### Table 1
Effects of policy changes on output and unemployment

<table>
<thead>
<tr>
<th>Sector directly affected by the policy measure:</th>
<th>Large-scale sector</th>
<th>Small-scale sector</th>
<th>Residual</th>
</tr>
</thead>
<tbody>
<tr>
<td>Alternative policy variables:</td>
<td>(1)</td>
<td>(2)</td>
<td>(3)</td>
</tr>
<tr>
<td>Demand</td>
<td>Increase $P_1$</td>
<td>Decrease $P_1$</td>
<td>Increase $P_2$</td>
</tr>
<tr>
<td>Technology, management</td>
<td>Improve $T_1$</td>
<td>Lower $T_1$</td>
<td>Improve $T_2$</td>
</tr>
<tr>
<td>Interest rate</td>
<td>Lower $k_1$</td>
<td>Raise $k_2$</td>
<td>(Lower $k_2)^b$</td>
</tr>
<tr>
<td>Capital</td>
<td>Increase $K_1$</td>
<td>Decrease $K_1$</td>
<td>(Increase $K_2)^b$</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Resulting effects on:</th>
<th>(4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output</td>
<td>$dX_1 &gt; 0$, $dX_2 &lt; 0^d$</td>
</tr>
<tr>
<td>Unemployment</td>
<td>$dN_4 &gt; 0$</td>
</tr>
</tbody>
</table>

* An improvement in technology or management in the residual sector raises $X_3$ (in existing production, even though marginal product of labor is nil), increases $N_3$, and reduces $N_4$; other variables are unaffected.

* Not a policy variable in the original model, but may be introduced by increasing total capital without making it available to the LSS.

* Residual sector output does not change. Agricultural output is also assumed to be unchanging.

* If total capital is increased by the same amount as the increase in $K_1$, then $dX_2 = 0$.

Model, LSS expansion increases unemployment as well as output. Introduction of a small-scale sector in the model potentially resolves this conflict. That is, under certain conditions a policy favoring expansion of SSEs generates more output than a comparable policy favoring expansion of the LSS (quadrant a in Table 2 and Fig. 2a), as well as reducing rather than increasing unemployment. Net output from a given increase in investment can be higher for SSE than LSS expansion because of the offsetting reduction in SSE output under LSS expansion and because of changes in labor productivity with increased employment. In general, this result is more likely: the closer is SSE marginal product of labor and capital to that in the LSS; the slower MPL in the LSS rises with increased capital; the more responsive is the expected probability of modern sector employment (and hence migration) to LSS expansion; and the slower MPL in SSEs falls with increased employment or decreased capital. Considerably less likely is the prospect of LSS dominance (quadrant d), which requires unresponsive migration, weak labor absorption in SSEs, and high labor absorption in LSS firms—inconsistent with policies biased toward capital-intensive LSS investment. The likelihood that comparable policies would generate greater unemployment absorption in the LSS than in SSEs may be similarly discounted (quadrant c). Both c and d are inconsistent with the assumptions of the model.
TABLE 2  
Comparison of policies to expand large and small scale sectors

<table>
<thead>
<tr>
<th>Net policy impact on output value</th>
<th>LS outcome(^a)</th>
<th>Difference (LS–SS)(^b)</th>
<th>LS outcome(^a)</th>
<th>Difference (LS–SS)(^b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>((P_1 , dX_1 + P_2 , dX_2):)</td>
<td>-</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>difference (LS–SS)(^b)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>+</td>
<td>(d) LS policy superior</td>
<td>(b) Trade-off:</td>
<td>(b) LS policy maximizes</td>
<td>(b) SS policy minimizes</td>
</tr>
<tr>
<td></td>
<td>in both output and employment effects</td>
<td>output</td>
<td>unemployment</td>
<td></td>
</tr>
<tr>
<td>-</td>
<td>(c) Trade-off:</td>
<td>(a) SS policy superior</td>
<td>(a) SS policy superior</td>
<td>(a) SS policy superior</td>
</tr>
<tr>
<td></td>
<td>SS policy maximizes output</td>
<td>in both output and employment effects</td>
<td>in both output and employment effects</td>
<td></td>
</tr>
<tr>
<td></td>
<td>LS policy minimizes unemployment</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

\(^a\) LS outcome = result of policy promoting the large-scale sector. Under the strict assumptions of the model, net output and unemployment both increase (quadrants a and b). The unlikely possibility of large-scale expansion reducing unemployment is also included to allow for different assumptions and for completeness (represented by curve \(E_0m'\) in Fig. 2).

\(^b\) LS–SS = effect of policy promoting the large-scale sector minus effect of equivalent policy promoting the small-scale sector. These policies may be any of those listed in Table 1; they are considered equivalent when they result in the same additional investment in a sector. The net output increase from a policy favoring the LSS may be less than that from an equivalent SS policy because of indirect effects on other sectors. The relationship between equivalent LS and SS policies may change as the scale of implied investment increases because of differential rates of change in capital and labor productivity.

The presumed trade-off between maximizing output through LSS promotion and absorbing labor through SSE expansion is represented by quadrant b (Table 2 and Fig. 2). This situation occurs when the net output increase from expanding the LSS exceeds that from an equivalent policy favoring SSEs, while the LSS policy worsens unemployment (\(m_b\) in Fig. 2a) or absorbs less than does the SSE approach (\(m'_b\)). This outcome requires a substantial differential of factor productivity in the LSS over the SSE sector.

Conceptually, the choice between two mutually exclusive policies involving a trade-off can be made on the basis of a social welfare function. In Fig. 2, the LSS policy represented by \(m'_b\) is above the indifference curve (\(U_I\)) through the equivalent SSE policy equilibrium (\(s_i\)) and is therefore superior, whereas \(m_b\) is inferior. More interesting and realistic is the choice of an appropriate combination of policies when simultaneous expansion of both sectors is possible: e.g., if additional capital is to be made available, or if
FIG. 2. Employment-output trade-off. (a) Sectoral expansion paths. (b) Trade-off for given investment.

- $E_0 = \text{initial equilibrium.}$
- $s_1 = \text{new equilibrium from a given policy to expand the SSE sector.}$
- $m_{sa}, m_1, m_b = \text{alternative new equilibria from an equivalent policy of LSS expansion, representing SSE dominance (quadrant a), no trade-off, and employment-output trade-off (quadrant b), respectively. Prime indicates a new equilibrium from LSS expansion with the same output increase but with decreased instead of increased unemployment; the expansion path $E_0m'$ requires flexibility in $w_R$ (or $w_m$).}$

Demand for both sectors can be stimulated to different degrees. A trade-off from capital expansion is especially likely if MPK in the SSE sector falls relatively rapidly as larger amounts of capital are added, so that the slope of the SSE expansion curve $E_0s$ falls faster than does the LSS curve $E_0m$ or $E_0m'$. The range of choice is then represented by the curve $s_1m_b$ in Fig. 2b. A higher level of social welfare ($U_{II}$) can be attained by the combination of sectoral expansion represented by the tangency point $E^*$ than by a policy aimed at one sector alone.

Policy conclusions

A model with an intermediate, small-scale sector explicitly rejects the dualistic model common in the literature on modern and informal sectors. Capital market segmentation can be introduced by assuming that SSEs lack the modern, large-scale sector's access to low-cost institutional capital but require a minimal capital investment. The barrier to entry represented by this fixed capital requirement distinguishes SSEs from easy-entry informal activities that provide income to the residual labor force. Differential access to capital is shown to be sufficient to explain observed associations between size and capital intensity or productivity.

Harris–Todaro type models imply that modern sector wage reduction is necessary to avoid the paradox that urban job creation only stimulates more
unemployment through migration. Analysis of our model, however, shows this conclusion to be dependent on dualistic assumptions. Policies to expand the SSE sector can generate more output as well as more employment than comparable policies promoting the LSS, provided that marginal product of labor is reasonably high in SSEs and that migration is relatively unresponsive to SSE growth.

Improvement of demand conditions for products of SSEs provides a particularly promising means of absorbing labor productively while maintaining output growth. Demand-oriented policies generate upward pressure on the value of labor's marginal product in SSEs while maintaining their incentive to use capital efficiently. Income redistribution in favor of lower-income groups that have a high propensity to consume SSE products is the most general demand-oriented policy. Elimination of taxes, duties, and fees paid by SSEs can improve their ability to compete with larger ones (which frequently are granted exemptions). In practice, however, such measures are likely to benefit less productive residual activities as well as SSEs, thereby reducing the net output gain for a given employment absorption. Demand can be targeted more specifically at SSEs by restricting the expansion of (or availing subsidies to) large-scale producers of goods that compete directly with small-scale production.

The appropriate policies with regard to capital are to facilitate linkages between organised and unorganised money markets and to raise its cost to the LSS, thereby encouraging more efficient use of capital while improving the ability of SSEs to compete. Subsidization or direct allocation of capital to SSEs has several important drawbacks. First, a limited capacity of the small-scale sector to absorb official capital means that actual output generation may be less than expected on the basis of average capital/output ratios. In particular, providing industrial estates or other infrastructure for SSEs immediately raises their overall capital/output ratio, offsetting their advantage in conserving capital. Second, supply-side assistance does not ensure a market for increased intermediate sector output; demand is not likely to be perfectly elastic, as implicitly assumed in the model. Finally, capital assistance for investment (as distinct from working capital) risks replacing the personal savings predominantly used to finance small investments. Intermediate technology development, management assistance, and accessibility of raw materials are supply-side policies that should be explored as alternatives (or complements) to capital assistance.

In evaluating the ability of SSE promotion to resolve the employment-output conflict involved in LSS expansion, research should focus on the two sectors' relative labor productivities and importance to potential migrants. Further research is also needed on the small-scale sector's ability to absorb additional resources, its degree of substitutability for other sectors' products, its input-output interrelationships with other sectors, its reinvestment of profits, and other dynamic considerations. The model presented in this paper shows the importance of introducing an intermediate small-scale sector into the modern-informal framework for policy analysis and for
understanding the appropriate long-run balance between large-scale, small-scale, and residual sources of employment.

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Doshisha University, Japan

APPENDIX. COMPARATIVE STATICS

The equations of the model may be grouped as follows:

**Group A** determines \( N_1, K_1, X_1, \) and \( \rho \):

\[
X_1 = f(N_1, K_1, T_1) \quad (1)
\]

\[
P_1 f_N = w_m \quad \text{(assuming } w_1 = w_m) \quad (6)
\]

\[
k_1 = P_1 f_K \quad \text{(substituting (6) in (9))} \quad (9')
\]

\[
\frac{\rho w_m}{1+r} = \frac{2+r}{1+r} w_R + C \quad (17')
\]

**Group B** and the above determine \( K_2, w_2, w_3, \) and \( N_U \):

\[
K_2 = K - K_1 \quad (5)
\]

\[
\left( 1 + \frac{1 - \rho}{1 + r} \right) w_2 = p(1 - \alpha) \frac{w_m}{1 + r} \quad (11')
\]

\[
\left( 1 + \frac{1 - \rho}{1 + r} \right) w_3 = p(1 - \alpha) \frac{w_m}{1 + r} \quad (12')
\]

\[
\rho = \rho(N_1/N_U) \quad (16)
\]

**Group C** and the above determine \( N_2 \) and \( N_3 \):

\[
w_2 = P_2 g_N(N_2, K_2, T_2) \quad (7)
\]

\[
w_3 = h(N_3, T_3)/N_3 \quad (8)
\]

**Group D** and the above determine \( X_2, X_3, N_4, k_2, \) and \( N_R \):

\[
X_2 = g(N_2, K_2, T_2) \quad (2)
\]

\[
X_3 = h(N_3, T_3) \quad (3)
\]

\[
N_4 = N_U - N_1 - N_2 - N_3 \quad (4)
\]

\[
k_2 = P_2 g_K \quad \text{(substituting (7) in (10))} \quad (10')
\]

\[
N_R = N - N_U \quad (18)
\]

1. *Increase in \( P_1 \) (the relative price of \( X_1 \) in terms of \( X_3 \))*

From Group A, given no change in the given \( k_1 \) and \( w_m \):

\[
0 = dP_1 f_N + P_1 f_{NN} dN_1 + P_1 f_{NK} dK_1
\]

\[
0 = dP_1 f_K + P_1 f_{KN} dN_1 + P_1 f_{KK} dK_1
\]

which gives:

\[
dN_1 = -\frac{1}{|H|} \frac{(f_{KK} f_{KK} - f_{KN} f_{NK})}{P_1} \frac{dP_1}{P_1} > 0
\]

\[
+ \quad + \quad +
\]

\[
dK_1 = -\frac{1}{|H|} \frac{(f_{NN} f_{NN} - f_{NK} f_{KN})}{P_1} \frac{dP_1}{P_1} > 0
\]

\[
+ \quad + \quad +
\]
where
\[ |H| = \begin{vmatrix} f_{NN} & f_{NK} \\ f_{KN} & f_{KK} \end{vmatrix} > 0 \]
from the sufficient condition for the existence of maximum profit.

Further:
\[ dX_1 = f_N dN_1 + f_K dK_1 > 0 \]
\[ d\rho = 0 \text{ (given no change in } w_m \text{ or } w_R) \]

From Group B:
\[ dK_2 = -dK_1 < 0 \]
\[ dw_2 = dw_3 = 0 \text{ (given no change in } w_m \text{ or } \rho) \]
\[ dN_U = -\rho N_t dN_t/\rho N_t > 0 \]
\[ + + - \]

From Group C (given no change in \( w_2 \) and \( w_3 \)):
\[ dN_2 = -g_{NK} dK_2/g_{NN} < 0 \]
\[ + - - \]
\[ dN_3 = N_3 dw_3/(h_N - w_3) = 0 \]

From Group D:
\[ dX_2 = g_N dN_2 + g_K dK_2 < 0 \]
\[ + - + - \]
\[ dX_3 = h_N dN_3 = 0 \]
\[ dN_4 = dN_U - dN_t - dN_2 - dN_3 > 0 \]
\[ + - 0 \]
\[ dk_2 = P_2 g_{KN} dN_2 + P_2 g_{KK} dK_2 \geq 0 \]
\[ + - - - \]
\[ dN_R = -dN_U < 0 \]

Note: \( dN_U - dN_t = (1 - n) dN_t > 0 \)
\[ \text{given } w_m, Cw_m, r \]

2. Increase in \( P_2 \) (the relative price of \( X_2 \) in terms of \( X_3 \))

Groups A and B are unaffected by a change in \( P_2 \), so there is no change in \( N_1, K_1, X_1, \rho, K_2, w_2, w_3, \) and \( N_t \). From Group C:
\[ dN_2 = -g_N dP_2/P_{2g_{NN}} > 0 \]
\[ + + - \]
\[ dN_3 = 0 \text{ (given no change in } w_3) \]

From Group D:
\[ dX_2 = g_N dN_2 + g_K dK_2 > 0 \]
\[ + + + 0 \]
\[ dX_3 = 0 \]
\[ dN_4 = dN_U - dN_t - dN_2 - dN_3 < 0 \]
\[ 0 0 + 0 \]
\[ dk_2 = P_2 g_{KN} dN_2 + g_K dP_2 > 0 \]
\[ + + + + \]
\[ dN_R = 0 \]
3. Decrease in \( P_1 \) and \( P_2 \) (increase in relative price of \( X_3 \))

Changes are the reverse of the preceding two cases. From Group A:

\[
\begin{align*}
\frac{dN_1}{dK_1} &< 0 \\
\frac{dK_1}{dN_1} &> 0 \\
\frac{dX_1}{dN_1} &< 0 \\
\frac{d\rho}{d\rho} & = 0
\end{align*}
\]

From Group B:

\[
\begin{align*}
\frac{dK_2}{dK_2} &> 0 \\
\frac{dw_2}{dK_2} & = 0 \\
\frac{dw_2}{dK_2} & = 0
\end{align*}
\]

\( dN_2 < 0 \) (may be \( = 0 \) if there are return migration costs and the decrease in urban expected income is small)

From Group C:

\[
\frac{dN_2}{dN_2} = \frac{1}{P_2g_{NN}} \left( \frac{dN_2}{dN_2} - \frac{g_{N}}{dP_2} - \frac{P_2g_{NK}}{dK_2} \right) \geq 0
\]

\[ dN_3 = 0 \]

From Group D:

\[
\begin{align*}
\frac{dX_2}{dK_2} & = g_{N} \frac{dN_2}{dN_2} + g_{K} \frac{dK_2}{dK_2} \geq 0 \\
\frac{dX_2}{dX_2} & = 0 \\
\frac{dN_4}{dN_4} & = dN \\
\frac{dk_2}{dk_2} & = g_{K} \frac{dN_2}{dN_2} + P_2g_{KN} \frac{dN_2}{dN_2} + P_2g_{KK} \frac{dK_2}{dK_2} \geq 0 \\
\frac{dN_4}{dN_4} & = 0
\end{align*}
\]

4. Improved \( T_1 \) (technology or management in production of \( X_1 \))

Assume Hicksian neutral technological progress so that:

\[
\begin{align*}
X_1 & = T_1(f(N_1, K_1)) \\
\psi_m & = P_1T_1f_{N_1} \\
k_1 & = P_1T_1f_{kk}
\end{align*}
\]

From Group A:

\[
\begin{align*}
0 & = P_1f_{N_1} \frac{dT_1}{dN_1} + P_1T_1f_{NN_1} \frac{dN_1}{dN_1} + P_1T_1f_{NK} \frac{dK_1}{dK_1} \\
0 & = P_1f_{k_1} \frac{dT_1}{dK_1} + P_1T_1f_{KN_1} \frac{dN_1}{dK_1} + P_1T_1f_{KK} \frac{dK_1}{dK_1}
\end{align*}
\]

which gives:

\[
\begin{align*}
\frac{dN_1}{dT_1} = \frac{-1}{|H|} \left( f_{fkk_1} - f_{fNK_1} \right) \frac{dT_1}{T_1} \geq 0 \\
\frac{dK_1}{dT_1} = \frac{-1}{|H|} \left( f_{fKN_1} - f_{ffkk_1} \right) \frac{dT_1}{T_1} \geq 0
\end{align*}
\]

The effects on the other variables are the same in sign as for an increase in \( P_1 \).
5. **Improved** T<sub>2</sub>

Assume Hicksian neutral technological progress, so that:

\[ X_2 = T_2 g(N_2, K_2) \]
\[ W_2 = P_2 T_2 g(N_2) \]
\[ k_2 = P_2 T_2 g(K_2) \]

Variables in Groups A and B and equations (3), (8) and (18) remain unchanged.

From Group C:

\[ dN_2 = -g(N_2) dT_2 / g(N_2) dT_2 > 0 \]

From Group D:

\[ dX_2 > 0 \]
\[ dN_4 = -dN_3 < 0 \]
\[ dk_2 = P_2 g(K_2) dT_2 + P_2 T_2 g(N_2) dN_2 > 0 \]

6. **Improved** T<sub>3</sub>

Assume Hicksian neutral technological progress, so that:

\[ X_3 = T_3 h(N_3) \]
\[ W_3 = T_3 h(N_3) / N_3 \]

Variables in Groups A and B and equations (2), (7), (10) and (18) remain unchanged.

From Group C:

\[ dN_3 = h(N_3) dT_3 / (W_3 - T_3 h(N_3)) > 0 \]
\[ dN_4 = -dN_3 < 0 \]

7. **Decrease in** k<sub>1</sub>

From Group A:

\[ 0 = P_1 f_{NNN} dN_1 + P_1 f_{NKK} dK_1 \]
\[ dk_1 = P_1 f_{KK} dN_1 + P_1 f_{K} dK_1 \]

which gives:

\[ dN_1 = 1 / |F| (-dK_1 f_{NKK}) > 0 \]
\[ dK_1 = 1 / |F| (f_{NNN} dK_1) > 0 \]

The effects on the other variables have the same sign as for an increase P<sub>1</sub>.

8. **Increase in** k<sub>1</sub>

All signs are the opposite of case #7.
9. Increase in capital (K) allocated to the large-scale sector (K₁)

From Group A:

\[ dN₁ = -f_{NK} dK₁/f_{NN} + dX₁ = f_N dN₁ + f_K dK₁ > 0 \]

\[ dk₁ = P₁f_{KN} dN₁ + P₁f_{KK} dK₁ \geq 0 \]

\[ dp = 0 \text{ (given no change in } w_m \text{ or } w_R) \]

From Group B:

\[ dK₂ = dK - dK₁ = 0 \text{ (given that } dK = dK₁) \]
\[ dw₂ = dw₃ = 0 \text{ (given no change in } w_m \text{ or } ρ) \]
\[ dN₄ = -ρ₁ dN₁/ρ₄ > 0 \]

From Group C (given no change in w₂ and w₃):

\[ dN₂ = -g_{NK} dK₂/g_{NN} = 0 \]
\[ dN₃ = 0 \]

From Group D:

\[ dX₂ = dX₃ = 0 \]
\[ dN₄ = dN₄ - dN₁ \geq 0 \text{ (see case #1, Group D)} \]

\[ dk₂ = 0 \]
\[ dN₀ = -dN₄ < 0 \]

10. Increase in capital (K) with no change in sector 1 parameters:

Variables in Groups A and B remain unchanged, except equation (5):

\[ dK₂ = dK > 0 \]

From Group C:

\[ dN₂ = -g_{NK} dK₂/g_{NN} > 0 \]
\[ dN₃ = 0 \]

From Group D:

\[ dX₂ = g_N dN₂ + g_K dK₂ > 0 \]
\[ dX₃ = 0 \]
\[ dN₄ = -dN₂ < 0 \]
\[ dk₂ = P₂g_{KC} dK₂ < 0 \]
\[ dN₀ = 0 \]
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