Microeconomic Foundations of Myrdal's Circular Causation Theory

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Abstract: This paper shows that the theory of circular causation as stated by Myrdal can be cast in a rigorous microeconomic neoclassical model. In doing this, Myrdal's theory of equilibria is extended by showing the existence of stable and unstable types of equilibria and the conditions under which each is more likely to occur. The use of a formal model permits the derivation of some important additional implications in relation to underdevelopment and inequality and to income and wealth distribution policies. The model can be useful for analyzing several other policies in an economy where subsistence and capitalistic forms of production coexist.

Introduction

The idea of a "vicious circle" of poverty is not new. Nurkse (1952) advocated such a model, and Myrdal (1957) (drawing on his experience in investigating the socioeconomic status of US blacks) provided a systematic analysis of poverty and economic inequality on the basis of what he called "circular causation theory." Myrdal's theory is that market forces tend to enhance rather than diminish economic inequalities. Because of inadequate infrastructure, human capital, or demand, backward regions or segments of society are not able to attract or cling to economic resources, which tend to migrate towards prosperous regions. The inability of backward segments of society to generate adequate savings causes a deterioration of the overall resource base of those segments. The end result is an inherent tendency of market forces to make poor segments of society poorer and rich segments richer. Stable equilibrium does not exist in an environment where market forces are left unchecked. Equilibrium only occurs by chance in situations where socioeconomic forces moving in different directions counterbalance each other. However, such equilibria are inherently fragile. If a disturbance occurs leading to the dominance of one set of forces, a cumulative process will be initiated leading the system away from the original equilibrium. Neoclassical economics, because it is concerned mostly with stable equilibrium, and because of its piecewise approach (i.e., by neglecting "noneconomic" variables), is unable to account for rather profound observed economic inequalities.

This paper shows that a rigorous neoclassical model can provide an explanation of the "vicious circle" of poverty or of the process of cumulative circular causation at the household or firm level. This neoclassical model predicts the existence of unstable equilibria ("subsistence" equilibria), which, if disturbed, initiate cumulative forces moving the system away from equilibrium. However, in contrast with Myrdal, the present model also predicts the existence of stable equilibria in the sense that the system (under certain circumstances) can return to the original equilibrium after a shock. The model developed below provides a rigorous microeconomic foundation of a widely discussed view of the economics of poverty and inequality. The model also provides a rigorous framework that allows one to derive important policy implications, and it provides a basis for measuring empirically the phenomena discussed. Finally, the model developed is, in a sense, richer than Myrdal's and other closely related models since it can depict stable and unstable equilibria and also the conditions under which each is more likely to occur.

The Model

A model reflecting the economic choices of a farm household is presented. Farm income is taken as a function of a number of exogenous variables (e.g., output prices and variable input prices) as well as the wealth of the household. Wealth includes land and other forms of capital owned by the household. Unless an extreme and unrealistic version of perfect capital markets is assumed, one can reasonably postulate that farm income depends on the level of wealth. Not only is wealth mostly embodied in productive farm capital, but also the borrowing capacity of the household is closely dependent on its wealth or equity situation. Thus, farm income, π, is represented as:

$$(1)\quad \pi = \pi(K,v)\,,$$

where K is household's wealth and v is a vector of exogenous factors affecting farm income (e.g., prices and technological level).

The ability of a household to expand its stock of wealth (i.e., savings) depends on its farm income, off-farm income, and its consumption level:

$$(2)\ K^{\bullet}(t) = \pi[K(t),v] + wL(t) - c(t)\,,$$

where $K^{\bullet}(t)$ is wealth accumulation at time t, $L(t)$ is on-farm plus off-farm work, w is the wage rate and $c(t)$ is the household's consumption at time t. The farm household knows that its future farm income depends on its current accumulation decisions, and it is aware of the trade-off between present and future consumption. Based on this and their intertemporal preferences, households are assumed to allocate current income between consumption, leisure, and wealth accumulation, subject to minimum subsistence consumption and leisure levels that must be satisfied to guarantee economic and physical survival:

$$(3)\ c(t) \geq c^{-} \ and\ l(t) \geq l^{-}\,,$$

where c^{-} is the minimum subsistence consumption level and l^{-} is the minimum subsistence leisure level.

The household must also satisfy a time constraint in its allocation of labour and leisure:

$$(4)\ L(t) + l(t) = H\,.$$

Here H is the total time available. At the beginning of the planning time, the household has as a result of previous decisions or bequests inherited a given stock of wealth:

$$(5)\ K(o) = K_o\,.$$

Finally, the household is assumed to maximize a discounted stream of utility accruing in the future. Moreover, utility at time t depends on consumption and leisure at time t. Therefore, the intertemporal utility maximization problem is:

$$(6)\ max_{c,l}\ {}_{o}\int^{\infty} e^{-\delta t}\,\mu[c(t), l(t)]\,dt\,,$$

subject to equations (2), (3), (4), and (5), where δ is the time discount rate (i.e., the household maximizes the discounted stream of utility from 0 to far away in time).[2] We also assume that $\mu(c,l)$ is increasing and concave in both its arguments and that $\pi(\bullet)$ is increasing and concave in K.

The current-value Hamiltonian is:

$$(7)\ L = \mu(c,l) + q[\pi(v,K)+w(H-l)-c] - \lambda_1(c-c^{-}) - \lambda_2(l-l^{-})\,,$$

where q is the costate variable, and λ_1 and λ_2 are the Lagrangean multipliers associated with the subsistence constraints. Maximization requires:

$$(8i)\ \mu_c(c,l) - q - \lambda_1 = 0\,;\ (c-c^{-})\lambda_1 = 0\,;\ c \geq c^{-}\,,\ \lambda_1 \geq 0\,,$$

$$(8ii)\ \mu_l - qw - \lambda_2 = 0\,;\ (l-l^{-})\lambda_2 = 0\,;\ 1 \geq 1\,,\ \lambda_2 \geq 0\,,$$

$$(8iii)\ q^{\bullet} = \delta q - \partial H/\partial K = [\delta-\pi_K(v,K)]q\,,\ \text{and}$$

$$(8iv)\ K^{\bullet} = \pi(v,K) + w(H-l) - c\,,$$

where $\mu_c \equiv \partial\mu/\partial_c$, $\mu_l \equiv \partial\mu/\partial_l$, and so forth. From $(8i)$ and $(8ii)$, if $c > c^{-}$ and $l > l^{-}$, then $\lambda_1 = \lambda_2 = 0$, and, in this case, at each point of time, c, and l are both decreasing functions of q. If the subsistence constraints (3) are binding, then $c = c^{-}$ and $l^{-} = l$, and consumption and leisure thus become independent of q. Using $(8iii)$ and $(8iv)$ evaluated at the levels of c and l satisfying $(8i)$ and $(8ii)$, one can derive the phase diagram in Figure 1, which is vital to our analysis. (See Chambers and Lopez, 1983, for details.)

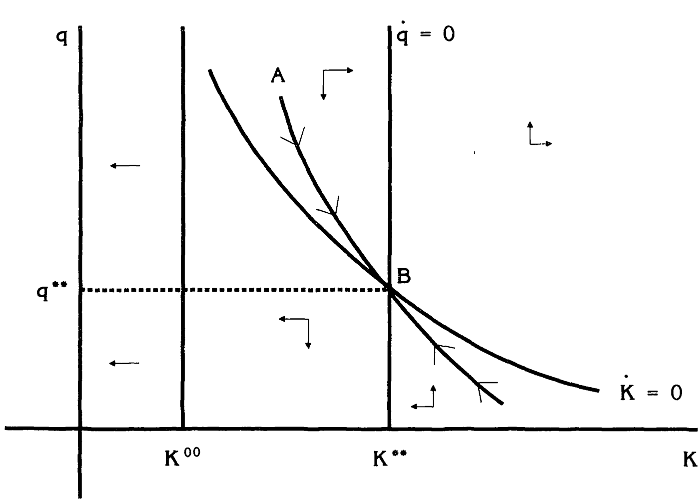
In Figure 1, the vertical line $\dot{q} = 0$ indicates that q is constant (and hence, c and l are constant) only if $K(t) = K^{**}$. The locus labelled $\dot{K} = 0$ represents the combinations of K and q yielding zero wealth accumulation. The short arrows indicate the motion of the system, and the line of arrows represents the stable path converging to the steady state (q^{**}, K^{**}). At (q^{**}, K^{**}), the system is in long-run equilibrium with the household achieving its long-run goals for wealth, stable consumption, and leisure. K^{oo} represents the wealth consistent with an income level that just permits the household to subsist (i.e., $c = \bar{c}$ and $l = \bar{l}$). K^{oo} is defined implicitly by:

$$(9)\quad \pi(K^{oo},v) + w(H-\bar{l}) = \bar{c}\,.$$

Using equation (2), at K^{oo}, $\dot{K} = 0$ for all q. Thus, K^{oo} can be defined as the subsistence level of wealth. If a household owns a stock of wealth greater than K^{oo}, it is above subsistence and can therefore save and eventually proceed towards its steady-state wealth K^{**}. If a household's wealth level is less than or equal to K^{oo}, it is in a "poverty trap" because it does not have any saving capacity. Since it cannot expand its wealth, it cannot expand its income-generating capacity, which would permit it to move beyond subsistence. When $K < K^{oo}$, wealth continually decreases because, in this region, the current income does not cover the household's minimum subsistence requirements. Hence, the household must continually erode its wealth to subsist. This is the stage where, for example, households resort to consuming livestock capital, allowing their soil base to deteriorate, or letting their health and education levels deteriorate to ensure physical survival.

The analysis clearly suggests the possible existence of two types of equilibria; i.e., a subsistence equilibrium at $K = K^{oo}$ $(c = \bar{c}, l = \bar{l})$ and a steady-state equilibrium at $K = K^{**}$ and $q = q^{**}$ $[c^{**} = c(q^{**}); l^{**} = l(q^{**})]$. Both are equilibria in the sense that the system is motionless at these points. However, their properties are distinctly peculiar. The subsistence one is an equilibrium *à la* Myrdal; i.e., unstable and coincidental since no economic process will lead one to K^{oo}. One is either there initially or not. If not, ones optimal accumulation pattern will never lead one there. Since it is a chance equilibrium, one is therefore not surprised that it is inherently unstable. Any exogenous shock moves the household away from it, while the steady-state equilibrium is stable in the sense that if (locally) disturbed there will be forces moving the system back to it. Consider, for example, a national disaster, a new tax, or a drop in prices of the products being produced by the farm household. If the household is initially at a subsistence equilibrium, then, after the shock, it will not

Figure 1—Phase Diagram



be able to satisfy its subsistence needs unless it consumes part of its wealth, thus causing a further deterioration of its wealth. This drop in wealth causes income to fall again, and hence, the household will need to consume an even greater amount of wealth in the ensuing period and so forth. Thus, the household is thrown into increasing levels of poverty at an accelerating speed, where the decaying factors reproduce and reinforce themselves; i.e., it is in a downward cumulative circular causation process. Unless another exogenous counterbalancing force (e.g., an explicit wealth transfer) comes into play, the household eventually ceases to exist as a viable economic entity (and perhaps also physically).

Such a process fits very closely into Myrdal's view of socioeconomic systems: "... the system is by itself not moving toward any sort of balance between forces but is constantly on the move away from such a situation. ...in the normal case a change does not call forth counterbalancing changes but instead supporting changes which move the system in the same direction as the first change but much further." We believe that showing the existence of a rigorous microeconomic foundation for Myrdal's analysis considerably supports its viability as a theory of socioeconomic change.

Consider now a household initially in equilibrium at K^{**} and q^{**}. If wealth, for one reason or another, drops by less than $K^{**} - K^{oo}$, the household will follow the stable path AB in Figure 1. This requires a temporary increase in q above q^{**}; i.e., to decrease consumption and leisure to allow the level of wealth to increase so as to return to the same steady-state equilibrium K^{**}. Although consumption and leisure must fall in the short run, as the system moves along the stable path AB, their levels are progressively increased until they reach the former steady-state levels. Thus, the steady state is a stable equilibrium at least for shocks that are not large enough to bring the system to subsistence levels.

What are the implications of the previous analysis for the evaluation of Myrdal's cumulative circular causation theory? The unstable equilibrium *à la* Myrdal is more relevant for poor households than for wealthier ones. Wealthier households are usually far above the subsistence equilibrium and are more likely to be able to regain the stable path towards long-run stable equilibrium after a shock. In contrast, poor households, even if above the subsistence equilibrium, are more prone to fall into the unstable sub-subsistence zone after an exogenous shock. This suggests that circular causation theory may be more suitable for analyzing poor sectors of society (although not necessarily at subsistence levels), while conventional stable equilibrium analysis is more appropriate to the study of social groups far away from subsistence levels.

Underdevelopment and Inequality

An interesting dichotomy between developed and underdeveloped societies is that economic inequalities are more pronounced in the latter than in the former. Moreover, less developed countries typically exhibit greater economic instability than more developed countries. The present analysis provides a consistent microeconomic explanation of these phenomena.

In poor countries, a much larger proportion of the population is likely to be near subsistence levels (or even below subsistence) than in richer countries. Thus, negative exogenous shocks may cause a greater proportion of the population to fall in the subsistence region. Since those individuals thrown into the "poverty trap" become poorer at an increasing rate (and those remaining in the stable zone are able to grow and eventually recover), the ultimate consequence of the shock is a deepening of economic inequalities. In contrast, in rich countries (where most individuals are far beyond subsistence levels), the effect of the shock is likely to be only a mostly temporary depression of income and consumption. In that case, the shock does not have any clear implications for income distribution.

Finally, consider two individuals with wealth levels above K^{oo} in Figure 1, but with one closer to K^{oo} and the other closer to K^{**}. Suppose a regressive wealth redistribution policy is instituted that takes wealth away from the former individual and gives it to the latter. Suppose the extent of the redistribution is large enough to throw the first individual into the region below K^{oo}. This individual will now consistently dissave and, unless the process is checked, will eventually not be able to survive economically. On the other hand, the individual to whom resources were transferred will still proceed to the same steady-state equilibrium. In comparing steady-state outcomes, one therefore concludes that steady-state wealth for this two-person economy declines as a result of the redistribution policy. Suppose further that several individuals are similarly expropriated so as to permit the richer individual to move to a $K > K^{**}$. In the absence of other changes, the individuals who are expropriated will be pushed deeper into the subsistence trap while the richer individual will consistently *dissave* until reaching K^{**}. In the preceding analysis, regressive income distribution diminishes savings, while successively impoverishing the overall economy by encouraging a high consumption and leisure level on the part of the transfer recipients. The major conclusion here is that "economic efficiency" reasons exist to reject regressive policies. Politicians and economists who advocate regressive economic policies in the name of economic efficiency are, therefore, rather inept in apologizing for purely exploitative policies.

Notes

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[2]One can equivalently specify the intertemporal objective function between 0 and T rather than between 0 and ∞, where T is the expected life span of the household.

References

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