

A pervasive duality in economic systems: implications for development planning

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Key words

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Glossary of Key Terms

Marxist economic theory	A theory highlighting exploitative mechanisms in an economic system and advocating central governance
Neoclassical economic theory	A theory highlighting constructive market forces in an economic system and advocating consumer sovereignty and a price system as invisible sources of governance
Revisionist economic models	Models recognizing both constructive and exploitative forces and advocating government intervention against exploitation
Institutionalist economic models	Models attributing performance of economies to institutional relationships and advocating selective government intervention to change behavior creating dysfunctions
Economic dualism	Side by side existence of multiple subeconomies
North-South trade	Exchange between more developed countries (North) and less developed countries (South)
Economic sector	A collection of production units with common characteristics
Rent	The share of production going to the absentee owners of productive resources
Model	A abstract representation of relationships in a real system
Capital	Machinery and equipment employed for production of goods and services
Labor	Economically active persons in an economy
Output elasticity	Change in output caused by addition of one unit of a production factor
Production factor	A resource input like land, labor or capital contributing to production of output
Opportunity cost	Real value of resources used in most desirable alternative or the amount of one commodity foregone when more of another is consumed
Unearned income	Income received as rents
Path dependence	A system property in which initial condition or random events determine a pattern of change
Behavioral relations	Causal factors influencing a decision
Capitalist system	An economic system in which all resources are privately owned and their allocation is exclusively done by a price system
Feedback loops	Circular information paths created when decisions change information that affects future decisions
Wage employment	Work for a defined wage
Self employment	Work for a self-owned production unit without a defined wage
Governance	Delivery of a government's functions

Censure
Dissidence
Insurgence

Legal criticism of a government
Suppressed opposition to a government
Illegal acts of violent against a government

Summary

This section recognizes the existence of a pervasive duality in economic systems at the sectoral, national, and global levels. Using a generic system dynamics model of a dual economic system developed earlier by the author, it attempts to search for an operational policy framework to achieve sustainability through instruments that are feasible to implement within this reality and within the existing institutional framework. The critical policy to change income distribution in a dual economy is taxation of rent income that penalizes absentee ownership. The policies to facilitate economic development include financial, institutional and technological development instruments that are relatively well known, but ineffective when implemented without the critical policy. These instruments are interpreted at the sectoral, national and global levels and the appropriate institutional arrangements for implementing them are outlined.

1. Introduction

As the world moves towards economic globalization, the intellectual perspectives on economic development have come to fall into two broad groups, which respectively advocate free market and fairness. The proponents of free market often seek an illusive perfect market system both at the global and the local levels, with proposals to intervene into the pricing mechanisms that should correct distortions in resource use and improve economic efficiency. Those for fairness often dwell on the issues of responsibility for past performance and justice at the global level while striving to promote formal industrial production locally. Both sides unfortunately fail to see that the policy recommendations they make might be irrelevant to the economic systems actually in place, both at the global and the local levels. Many of these recommendations also lie outside of the scope of the existing policy institutions operating mostly at the local levels and call for global measures which are often impossible to implement. There evidently is a need to re-examine the question of sustainability in the light of the economic systems actually in place.

This paper suggests that there exists a pervasive duality in the economic systems at the sectoral, national, and global levels, which makes most of the policy instruments suggest by both groups irrelevant, while their implementation leads to unexpected results. A generic system dynamics model of resource allocation and income distribution processes in a dual economic system developed by the author is used in this paper to outline taxation, expenditure, technological and international trade policies to achieve sustainable economic development.

2. Past development effort and its performance

Development planning has been driven by aggregate percepts of economic growth rather than by a comprehensive understanding of the complex information relationships formed through the interaction of multiple sub-economies existing at the local and global levels. As a result of this, the performance of the development policies has varied widely from

country to country.

2.1. Development policy waves

1960s were a period of indiscriminate expansion in capital that exacerbated an already polarized income distribution pattern in most countries, fueling conflict between economic classes. 1970s advocated public sector development, which not only created largely inefficient organizations, it also stymied entrepreneurship in the private sector. 1980s sanctioned export-based development, with disregard to the terms of trade, which drained many developing economies and devastated their natural endowments. 1990s are witnessing the advocacy of free enterprise, free world trade and free capital movements with disregard to the structure of the global economy. This is accompanied by a drive to privatize public finance, with the question of sustaining welfare often swept under the rug. The 90s have also seen an emphasis on environmental issues and global accords, but these remain somewhat disconnected from the other policies.

2.2. Unforeseen problems created by development policy

This progression of policy waves continues to create unforeseen problems, which seem to be becoming worse. Foreign assistance over these waves led to staggering debt burdens whose management is a nightmare. Technology transfers affected created a vulnerable rather than a sustainable production organization that has been unable to find solutions to the problems faced in the course of its operations. The so called comparative advantage in labor cost, actually created stagnation in the local demand in many instances, leading to increased dependence on exports to the industrialized countries. The drive to privatize public finance with disregard of the long-term welfare of the population is creating an infrastructure whose burden is regressive and that encourages the development of a centralized economic base. The new free trade and capital movement paradigm appears to be exacerbating the distinction between the poor and rich countries through transferring value from the former to the later.

2.3. Need to link policies to specific problems

There apparently is a need to re-examine the development process with respect to the economic systems that are actually in place rather than basing it on hypothetical aggregate percepts of economic growth. It seems that economic systems we are dealing with are pervasively dual at all levels rather than being undifferentiated and uniform. Policy frameworks appropriate for this dual structure differ widely from those appropriate for a uniform structure.

3. Existing models of economic development

The economic models used as bases for designing development policies over the past several decades have ascended largely from time- and geography- specific experiences rather than from a careful study of the variety of behavioral patterns occurring over various time periods and across several geographic locations. Among these, the socialist and the capitalist models are most at odds. They differ in their assumptions about

ownership and income distribution patterns, the basis for wage determination, the influence of technology on income growth and the functions of entrepreneurship and innovation.

3.1. The Marxist model

Marxist economic theory, which underpins the socialist model, assumes that ownership of capital resources is concentrated in a minority excluding the workers and that the majority of households receive no part of the profits. Thus, wage payments have a strong effect on household income. The Marxist theory views private ownership as a source of exploitation and postulates labor-wage rates determined by the consumption necessary for a worker to support production. The labor-wage rate is, thus, based on the real value of the commodities needed for a worker to subsist, which is more or less fixed, irrespective of the contribution of labor to the production process. Technological choices, which increase labor productivity, may only serve to increase the share of the surplus of product per unit of labor appropriated by the capitalist. Entrepreneurship is viewed as an asocial activity and innovation seen to originate from the need to boost the falling returns on capital. Based on these assumptions, the socialist system assigns control of the economy to the government.

3.2. The Neoclassical model

The neo-classical economic theory, which is the basis for the capitalist model, is on the other hand silent on the ownership of capital resources, in default assuming it to be widely distributed. Thus, the labor-wage rate may bear little relationship to the income of households, who are also recipients of profits. It is assumed that private ownership of productive resources is a means for market entry, which creates unlimited potential for economic growth, although private investment is not subject to self-finance due to the presence of a perfect financial market. The neo-classical economic theory also postulates that short-run labor-wage rates depend on worker availability while they are determined in the long run by the marginal revenue product of labor. Neo-classical models of economic growth, however, often make the simplifying assumption that an equilibrium continues to prevail in both factor and product markets over the course of growth. Thus, only minor fluctuations may occur in wages, profits and prices in the short run, and these can be ignored. The belief in the existence of such an equilibrium is further strengthened by the Keynesian argument for the ineffectiveness of the market mechanisms due to the dependence of prices on long-term wage contracts and production plans which may not respond easily to short-run changes of the market. These mechanisms of wage determination imply that technological choices that increase labor productivity would have a positive effect on wage rates and household income, because they increase the marginal revenue product of labor. Furthermore, entrepreneurship is important for new entry into economic activity and innovation is supposed to benefit society through increased productivity. With these assumptions, the capitalist system advocates minimal government intervention in the economy.

3.3. The revisionist models

There also exist a number of revisionist models of political economy that attempt to

understand the nature of interdependence of the multiple sub-economies observed to co-exist in many developing countries in violation of the theoretical premises of the neo-classical model according to which all production factors must eventually move to the most efficient sector. These models often attribute the development of disparities between the various sub-economies to exploitative mechanisms that tend to maintain an upper hand of the stronger influence groups. The revisionist analyses have largely led to making moral appeals for the government policy to target the poor and the disadvantaged in its development effort.

3.4. The Institutional models

Last, but not least, there are Institutional (sometimes also labeled as Post- Keynesian) economic models that advocate understanding behavioral relationships that actually exist and drive economic patterns actually experienced, albeit, these models are largely qualitative and descriptive.

3.5. Limitations of existing models

Indeed, each economic system can often be endorsed with the help of selected historical evidence, and this has been fully exploited to fuel the traditional debate between the neo-classical and Marxist economic schools. Interesting artifacts of this debate include the normative theories of value suggested by each system to provide moral justifications for the various wage systems, which have little practical significance for development policy. This is unfortunate, since contradictions of evidence should clearly indicate the existence of fundamental organizational arrangements in the economic system, which are capable of creating the multiple behavior patterns on which the various economic models are based. Once identified, such arrangements may also serve as entry points for the design of evolutionary changes in an existing pattern. To quote a notable Institutional economist Professor Joan Robinson:

“Each point of view bears the stamp of the period when it was conceived. Marx formed his ideas in the grim poverty of the forties. Marshal saw capitalism blossoming in peace and prosperities in the sixties. Keynes had to find an explanation for the morbid condition of ‘poverty in the midst of plenty’ in the period between the wars. But each has significance for other times, for in so far as each theory is valid, it throws light upon essential characteristics of the system which have always been present in it and still have to be reckoned with.”

4. A model of resource allocation and income disbursement in a dual economic system

Present day developing economies are characterized by their duality. In each stage of their development, there often exist two sub-economies side by side. In the agricultural stage, large-scale commercial farms co-exist with the small self-employed peasant sector. In the industrial stage, large formal industrial firms co-exist with the self-employed entrepreneurs in the self-employed sector. In the transition stage, this duality becomes more complex. The rural economy, in which large-scale commercial farmers co-exist

with the small self-employed peasant sector, also coexists with the urban economy, in which large formal industrial firms co-exist with the self-employed entrepreneurs in the self-employed sector. An aggregate formal sector, including the commercial farms in the rural sector and capitalist firms in the urban sector, attempts to maximize profit. On the other hand, an aggregate informal sector, including small peasant farms in the rural sector and informal family work units in the urban sector, attempts to maximize consumption. This classification has been referred to variously in the literature, for example, as formal and self-employed or commercial and peasant sectors, capitalist and worker sectors, capitalist and subsistence sectors, modern and traditional sub-economies, but all those contexts recognize the existence of an economic duality. Due to this duality, economic growth may not necessarily signal a general improvement in welfare, when the distribution of income in the dual economy and the transfer of value between the formal and self-employed sectors are also taken into consideration. Any policies implemented in the face of this duality would cause a reallocation of resources between the formal and the self-employed sectors. Neglecting this duality will give unexpected results as has been borne out by experience.

4.1. Duality as a conceptual framework for a policy model

The concept of economic dualism has existed for almost half a century, although ignored in formal models, perhaps due to modeling complexity it entails. It manifests in the side-by-side existence of a modern capitalist economy and a traditional informal economy in the developing countries. Its various forms include commercial and peasant farming in agricultural economies, formal and informal firms in industrial economies and a modern industrial sector and a traditional agricultural sector in a national economy. More recently, it has been suggested that the side-by-side existence of advanced industrial economies and the developing economies is yet another manifestation of dualism at a global level. Well-meaning developmental instruments based on aggregate models of economic growth have been implemented in the face of this pervasive duality.

Although the concept of duality is now recognized in the economic literature, it has rarely been translated into a holistic model that should serve as an apparatus for a policy search for development. Such a model must incorporate the behavioral relations concerning saving, consumption, investment, wage determination and disbursement of income recognized in the pioneering works on economic duality, although in a rather fragmented way. A system dynamics model developed by the author of this section integrates these various behavioral relations.

4.2. Structure of the proposed model

This model incorporates the broad decision rules that underlie resource allocation, production, and income disbursement processes in a dual economic system consisting of a formal capitalist sector and an informal self-employed sector. Capital, labor and land (which may be assumed as a proxy for natural resources or natural capital) are used as production factors. The decisions of the formal sector are driven by the profit motive while the informal sector strives to maximize consumption for its members.

Figure 1 shows how production factors are allocated to the various economic activities in

this model and Figure 2 how the income of the economy is disbursed.

The changes in the quantities of the production factors owned or employed by each sector are governed by the decisions of the producers and the consumers of output and by the suppliers of the production factors. Both producers and consumers act rationally according to their respective motivations within the roles defined for them by the system. The value of production is shared by households on basis of the quantity of the production factors they contribute and the factor prices they can bargain for.

The wage rate depends in the first instance on the consumption per worker, averaged over the whole workforce, including wage- and self-employed workers, which can be interpreted as the opportunity cost of supplying a unit of labor to the formal sector. Since this opportunity cost varies with the amount of capital resources supporting self-employment owned by the workers, the wage rate is strongly affected by the distribution of ownership of land and capital assets. The basic wage rate so determined is further modulated by the labor market conditions. It is assumed that while ownership is legally protected, land and capital assets can be freely bought, sold and rented by their owners. Each buying and selling transaction between the two sectors must be accompanied by a corresponding transfer of the cash value of assets determined by the going market prices.

Figure 1 here

Figure 2 here

The financial markets are segmented by sectors and the investment decisions of a sector are not independent of its liquidity position given by the unspent balance of its savings. The saving propensity of the two sectors is also not uniform. Since capitalist households receive incomes that are much above subsistence, the saving propensity of the formal sector is stable. On the other hand, the saving propensity of the self-employed sector depends on its need to save to maintain investment for supporting unemployed labor and also on the absolute level of consumption available to its members.

Crowding of workers in this sector can easily erode its ability to save. The model also permits the appearance of technological differences between the formal and informal sectors when two types of capital (traditional and modern) are made available since the two sectors cannot employ the preferred type with equal ease given their financial, organizational and infrastructure-related differences.

This model can endogenously create a whole spectrum of growth patterns — medieval, classical, neo-classical, revisionist, dualist — that the various growth theories have taken as given. A perennial debate in economics concerns the theory of value, how the real prices of commodities are affected by the costs of the factors used in their production, which has been seen differently by the different theorists. However, circularity exists between commodity prices and factor costs. While commodity prices will depend to some degree on factor costs, these costs cannot be independent of the claims-to-income their suppliers are able to make. Those claims depend on the commodity prices they have to pay to maintain the factors as well as on the opportunity cost of the inputs they supply.

Since these claims may be different from true factor contributions to the production process, it is not surprising that a variety of value patterns will be experienced, depending on the bargaining power enjoyed by the various cross-sections of the households providing inputs to the production process. In fact, the bargaining position of the various cross-sections of the households and the degree of polarization in the control of factor inputs will really determine who can file a larger claim to the value created in production, the owners of capital and resources or the suppliers of labor. The real problem, therefore, is to understand how ownership of productive assets might become polarized.

4.3. Model behavior showing the emergence of a feudal economy

When ownership of resources is legally protected whether they are productively employed or owned in absentia, many renting and leasing arrangements will appear which will allow a household to own resources without having to employ them on a commercial basis. This is borne out in the simulation of Figures 3, in which resources are divided by the capitalist sector between commercial and renting activities depending on the rates of return in each. Rents depend on long-term averages of the marginal revenue products of the respective factors and on the demand for renting as compared with the supply of rentable assets. Wage rate depends on average consumption available to all workers under existing employment distribution modified by the labor market conditions while each sector must self finance its investment. These assumptions are activated at the start of the simulation where the model is initially in equilibrium with the theoretical assumptions of a perfect market system. The activation of these assumptions creates a dynamic path to a new equilibrium.

Figure 3 here

In the new equilibrium reached by the model, the commercial mode of production and wage-employment gradually disappear while capitalist sector comes to own the majority of the resources, but it rents these out to the self-employed sector. Such a pattern develops because of the combined effect of wage, tenure and self-finance assumptions incorporated into the model. When workers are laid off by the capitalist sector in response to a high wage rate, the marginal revenue products of land and capital for commercially employing these resources in this sector fall. However, as the laid-off workers crowd the self-employed sector, the marginal revenue products of land and capital and hence their respective demands in this sector, rise. Therefore, rents are pushed up and the capitalist sector is able to get enough return from renting land and capital to justify its investment in them.

The renting mechanism allows the self-employed sector to adjust its factor proportions quickly when workers released from wage-employment crowd it. When the economy reaches a new equilibrium, the marginal rates of return of the production factors in the self-employed sector are the same as those at the beginning of the simulation. But, the wage demanded equilibrates at a level lower than in an exclusively self-owned self-employed economy, because a part of the income of the economy is now accrued to the absentee owners in the capitalist sector as rents. The distribution of ownership in the new

equilibrium is further worsened since the capitalist sector, with a better saving facility, is able to continue to bid for ownership of resources. At the same time, the self-employed sector, with an increasing rent burden and a rising consumption pressure due to crowding of workers, experiences a deteriorating saving ability and a pressure to sell out its resources. Hence, the concentration of resource ownership in the capitalist sector is further facilitated by the requirement to self-finance investment often seen as a financial distortion.

4.4. Model behavior showing the emergence of a dual economy

When a technological differentiation is also created between the capitalist and self-employed sectors, the former sector is able to employ a part of its resources in production because of the possibility of higher productivity. At the same time, however, the latter sector bids rents up because of its need for resources. Hence the capitalist sector does not transfer all its resources into production. Thus, both capitalist and self-employed sectors exist side by side, with the capitalist sector characterized by capital-intensive technology, financial muscle and pursuit of profit both through production and renting activities and the self-employed sector by labor-intensive technology, low level of savings and consumption considerations. This case is illustrated in the simulation of Figure 4, which is also borne out by the experience of the developing countries when they attempted to modernize their economies through technology imports and industrialization.

Dualist patterns appeared in the developing countries, both in the agricultural and industrial sectors, only after modern capital inputs became available in limited quantities. Labor-intensive peasant agriculture and small-scale industry and services carried out by the self-employed came to exist side by side with the commercially run farms and large-scale industry employing wage labor and modern technologies. However, worker income, both in wage-employment and self-employment, remained low.

Technological differentiation between the two sectors appears when a fixed supply of modern capital is introduced into the economy. The scale of the self-employed producers does not allow them to adopt modern technologies requiring indivisible capital inputs. The capitalist sector starts meeting its additional and replacement capital needs by acquiring a mixture of modern and traditional capital while the self-employed sector can use only traditional capital. However, the capital demand of the capitalist sector is met by modern capital as much as the fixed supply permits. The balance of its demand is met by acquiring traditional capital.

The output elasticity of modern capital is assumed to be higher than that of the traditional capital while the use of the former also allows an autonomous increase in output. The output elasticity of land is assumed to remain constant. The assumption of uniform returns to scale is maintained. Thus, the output elasticity of workers decreases when modern capital is introduced. These assumptions serve to represent the high productivity and labor saving characteristics of the modern capital.

As its capital becomes gradually more modern and potentially more productive, the capitalist sector is able to employ its productive resources with advantage in the commercial mode of production, instead of renting these out, and to employ wage-workers at the going wage rate. The increased productivity and income derived from this

make it both economically and financially viable for the capitalist sector to invest more. Thus, its share of resources is further increased when a new equilibrium is reached.

Figure 4 here

Since the output elasticity of workers falls with the increase in the fraction of modern capital, the marginal revenue product of workers in the commercial mode may not rise much with the increase in its output. At the same time, since resources are being transferred away by the capitalist sector from renting to commercial employment, the labor intensity and the demand for renting rises in the self-employed sector. Hence rents are bid up and it again becomes profitable for the capitalist sector to allocate resources to renting. The amount of resources rented out, however, will depend on the degree of technological differentiation that may be created between the two sectors.

The wage rate reaches equilibrium at a lower level and the rents at higher levels than without technological differentiation. Rents, however, equal marginal revenue products of land and capital, which rise in the capitalist sector because of employing superior technology and in the self-employed sector due to increased labor intensity.

The simulations of Figures 3 and 4 clearly demonstrate that when, economic efficiency determines who should carry out production, and financial efficiency determines who should control resources, whether or the technology is homogeneous, the ownership of resources becomes concentrated in the formal sector. At the same time, the informal sector carries out all production while it controls a small part of the resources. This distribution of ownership entitles the formal sector to a large share of the economy's revenue in the form of profits and rents while its wage burden remains small. The informal sector, on the other hand, receives a small part of the economy's revenue as wages while it must sustain a heavy rent burden. Indeed as observed by Kalecki, an economist at Cambridge University, workers spend what they get, capitalists get what they spend. The results of simulations of Figures 3 and 4 are also borne out in reality by the experience of the post-colonial agricultural and industrial economies in the developing countries.

5. Understanding dualism and designing policies for change with the model

The internal goal of a dynamic system represented in a model by a set of non-linear ordinary differential equations is created by the circular information paths or feedback loops, which are formed by the causal relations between its variables implicit in the model structure. These causal relations exist in the state space independently of time (unless time also represents a state of the system). The existence of such feedback loops is widely recognized in engineering and they are often graphically represented in the so-called block and signal flow diagrams.

5.1. Feedback loops degenerating a capitalist system

While many feedback loops may be implicit in the differential equations describing the structure of a system, only a few of these would actively control the system behavior at any time. The nonlinearities existing in the relationships between the state variables determine which of the feedback loops would actively control the system behavior. A change may occur in the internal goals of a system if its existing controlling feedback loops become inactive, while simultaneously other feedback loops present in its structure become active. Such a shift in the controlling feedback loops of a system is sometimes called a structural change in the social sciences and it can arise both from the dynamic changes occurring over time in the states of the system and from policy intervention. The realization of a specific wage and income distribution pattern depends not on assumptions about initial conditions but on legal and social norms concerning ownership, renting, financing of investment and the state of technology, determining which feedback loops would be dominant. The adoption of specific legal and social norms can, however, be a path dependent process.

Figure 5 describes the feedback loops, formed by causal relations implicit in the model that appear to govern the peculiar behavior shown in Figures 3 and 4. An arrow connecting two variables indicates the direction of the causality while a positive or a negative sign shows the slope of the function relating cause to effect. For clarity, only key variables located along each feedback path are shown.

Figure 5 here

When productive resources can potentially be engaged in wage- or self- employment modes by owners and renters, any autonomous increase in the wage rate would not only decrease the desired capitalist owned resources for wage-employment, it would also concomitantly decrease the utility of investing in resources for self-employment. Thus, while the ownership of resources freed from wage-employment is not transferred to the self-employed sector, the surplus labor released by the capitalist sector has to be absorbed in self-employment. As a result, worker income is depressed while the demand for renting rises. Thus, it not only becomes profitable again for the capitalist sector to hold its investments in land and capital, it also gives this sector a financial edge over the self-employed sector, whose savings continue to decline as its rent burden rises. These actions spiral into an expansion of ownership of resources by the capitalist sector even though the wage-employed mode of production is eliminated due to the high cost of wage labor. This also precipitates a very low wage rate when equilibrium is reached since a low claim to income of the economy creates low opportunity costs for the self-employed workers for accepting wage-employment.

5.2. What drives the creation of a dysfunctional dualist pattern?

The fine distinction between the corporate, artisan and absentee types of ownership is not recognized in the political systems based on the competing neoclassical and Marxist economic paradigms. The former paradigm protects all types of ownership while the

latter prohibits all. None creates a feasible environment in which a functional form of ownership may help to capture the entrepreneurial energy of the enterprise.

The fundamental mechanism, which creates the patterns of Figures 3 and 4, appears to be renting, which allows the accrual of unearned income that is claimed by the formal sector whether or not it engages in production. The financial muscle so created for the formal sector allows it to expand further its ownership of land and capital assets, while the concentration of control of resources in this sector creates a valuation process that under-rates the contribution of the worker households. The financial fragmentation of households and the differences in their saving patterns further facilitate the expansion of renting practice. Technological differences between the capitalist and self-employed sectors not only make possible the side-by-side existence of the two modes of production, but also exacerbate the dichotomy between ownership of resources and workership by enhancing profit opportunities for the formal sector.

5.3. Policies for change

Exploratory experimentation with the model lead to two kinds of instruments for changing dysfunctional valuation patterns: those creating fundamental forces of change and those facilitating change. To influence income distribution, wage rate and asset ownership, the fundamental instrument of change is to tax the various forms of unearned income, which would price out the renting option in due course of time. The related facilitators include the well-known technological and financial development policies and community assistance programs which have been the main fare of the past development effort in the developing countries. Additionally, the maintenance of low interest rates seems to accelerate growth through increasing capital formation. The facilitators are found also be ineffective without the fundamental instrument. This is demonstrated in the simulations of Figures 6 and 7, Figure 6 incorporating both fundamental and facilitating policies, Figure 7 incorporating only the facilitating policies. Policy implementation in both cases is introduced at a time the economic system has settled in a dual mode as in Figure 4.

Figure 6 here

Figure 7 here

6. Implications for sectoral, national and global interventions

Various interpretations of experimental results obtained from the above model can be employed to develop operational policies for sustainable development in sectoral, national and global contexts. These levels include agricultural and industrial sectors of the economy, the national economy and the global economy. Policies considered include remedial taxation and expenditure instruments, financial instruments, institutional development and technological development. Policy implications concerning those contexts are summarized in Table 1.

Table 1 here

6.1. Sector economy context

The key remedial action at the sectoral level is taxation of all forms of unearned income that should reduce incentives for absentee ownership. The transfer of ownership to the self-employed would increase income accrued to that sector, which would also increase wage demanded for wage-employment based on the opportunity cost of transfer of a worker from self-employment. Additionally, expenditure on social services and infrastructure targeted to self-employed would facilitate growth in that sector improving its competitiveness. These services include health, education, clean water, fuel, and transportation facilities serving the self-employed and low-income groups.

Provision of finance to small start-up ventures and formation of cooperative organizations for them should further help them to compete better in the market place, while financial and technical assistance to technological ventures of the self-employed should unleash their innovative potential that would improve productivity. Needless to add, that the formal/monopolist sector with its resource advantage would respond to the improved competition from the self-employed by paying greater attention to improving its productivity and efficiency. Thus, growth and income distribution agenda are simultaneously supported through the proposed actions.

It should be added that the facilitating policies targeting the poor suggested above are not new and that the past experience with implementing them is not positive in terms of their impact, both on growth and income distribution, which is also supported by the model simulations. However, when these are tied to the self-employed and the penalty on absentee ownership, the symbiosis can create radically different results, as also borne out by the model simulations.

6.2. National economy context

When a national economy has an uneven distribution of economic activity, both in terms of its economic sectors and regions, a tax advantage in its lagging regions and sectors has traditionally been used to redistribute economic base. This is especially helpful for income redistribution if the leading regions and sectors contain monopolistic capitalist firms and the lagging regions and sectors competitive self-employed firms, which might often be the case. In the past, such an advantage has often been extended to monopolist capitalist ventures created in the lagging sectors and located in the lagging regions, which has displaced self-employment in lagging areas without improving income distribution. It is, therefore, important that the nature of this advantage is changed to a higher taxation of formal firm profits in the propulsive regions and sectors and concessions to the self-employed in the lagging regions and sectors. The taxes collected must also be invested in social services and infrastructure targeted to the lagging regions and sectors, in particular for supporting self-employed economic activity. Furthermore, financial support of small-scale ventures in the lagging regions and sectors and development of regional partnerships and cooperative commerce ventures would improve competitiveness in

them. Last, but not least, support of indigenous technology and investment into indigenous research and development would improve the national economy's technological advantage in the global market place.

6.3. Global economy context

Arthur Lewis likened the global economic system to an escalator on which the ascending rates of riders were intimately linked together due to the interdependence created by the trade flows and the terms of trade, although their respective elevations could vary widely. In this system, it would be impossible to close the gap between the rich and the poor countries unless the former were willing to allow the later a greater share of their markets and to change the terms of trade in favor of the later. Professor Lewis also observed that what has actually happened is the opposite of this. While the developed countries have attempted to dismantle trade barriers among themselves, their barriers to a fair trade with the low-income countries have progressively increased. There are yet repeated calls from the industrialized countries reiterating the benefits of a free global market, while the terms of trade for the developing countries have continued to become worse.

When the global economy has a dual structure, the valuation of inputs and outputs as well as the responsibility for environmental damage will accrue according to the bargaining power of the nations. With the industrialized countries grouped as predominantly monopolist profit maximizing firms controlling a large part of the natural capital and the developing countries as predominantly competitive establishments striving to maximize consumption for their members under conditions of resource shortage and labor surplus, this valuation process will consistently work against the later. It would progressively transfer value from the later to the former when no barriers exist on trade between them.

A re-interpretation in the global context of the policies posited for changing the resource ownership pattern in my dual economy model would imply creating trade relations between the industrialized and the developing countries that tax factor payments to the industrialized countries from abroad as well as their exports. This must be accompanied by protecting factor income of the developing countries from abroad and also their exports. These recommendations, albeit, appears to be against the grain of the current free trade doctrine. These are appropriate, however, for creating a sustainable and conflict free future given the structure of the global economy actually in place. The proposed discriminatory taxes would make it uneconomical to invest in capital assets and in acquisition of control of natural endowments abroad, which would facilitate the transfer of their control to developing countries who can gainfully employ them while increasing at the same time their claims to income. A concomitant attempt to nurture indigenous technological development in the developing countries would assure that technological differentiation does not concentrate production in the industrialized countries. Perhaps the income from the discriminatory taxation can be channeled by the developed countries to support developing country infrastructure building, debt relief, development of global public policy networks and to development of indigenous knowledge networks that would make the developing country economies more competitive in the global market place. These actions, however, mostly concern the industrialized block and there is currently little commitment for them.

7. Role of governance

Development plans, however innovative and cognizant of the social, technical, and physical factors affecting the system for which they are prepared, cannot be successfully implemented without the continued support of government. However, whether or not a government pays lip service to economic development agenda, its commitment to promoting public welfare will depend on the role pressures it experiences in conducting its day-to-day business.

An economic policy aimed at improving public welfare can only be implemented through a governance system accountable to public. Unfortunately, most developing country governance systems fail to meet that criterion. Remedial taxation policies proposed above will lead to a scenario when no remedial taxes can be collected. However, if taxes must be used to support unproductive government expenditure instead of further remedial activity, remedial taxation will take low priority. Also channeling taxes into unproductive expenditure portfolios will create negative multiplier effects while maintaining a high level of demand that is often inflationary. Last, but not least, a government that is unaccountable to public will always need to give priority to maintaining power over delivering public welfare. An authoritarian government, whether compassionate or otherwise will, therefore, be unable to provide continued support to developmental agenda since its need to increase control will eventually take priority over the need to increase public welfare. The availability of highly productive technologies, abundant resources, foreign economic assistance, and foreign support for or against indigenous dissidence will make little if any difference to above pattern of behavior.

7.1. Feedback loops driving an unstable governance system

Figure 8 shows the important feedback loops formed by the relationships of a system dynamics model of an authoritarian governance system the author has developed. According to these relationships, an increase in the total resources of the system caused by economic growth also raises the need for expanding control, as some of the resources must be used to upgrade the system organization. Thus, some increase in control is inevitable when economic growth occurs. However, the proportion of the resources allocated to the economic sector depends not only on total available resources but also on the government's commitment to delivering social goods and its perception of the need for control. The former is kept alive by adversarial activity originating from censure of the government by the public, which can surface only when civil rights are maintained. The latter is determined by insurgency, which is fueled by dissidence.

Figure 8 here

Unfortunately, civil rights are progressively reduced as control rises. In the absence of civil rights, adversarial activity creating pressure for welfare wanes while un-vented censure breeds dissidence. The insurgency resulting from dissidence calls for allocating even more resources to the control sector. This allocation process continues until insurgency has risen to a level where it cannot be contained by the existing level of

control. At the same time, so few resources are left in the economic sector that their rate of growth is less than the amount of control resources being consumed, despite the increased management efficiency, which is made possible by an increase in the scope of the government.

At this point, control begins to decay. As control decays, civil rights can no more be curtailed, which causes potential censure to be freely vented. This creates adversarial pressure for stepping up resource allocations to the economic sector although total resources continue to decrease. A change of regime may occur during this phase and the new regime may even take the credit for increasing support of the economic sector, although it may be responding only to the pressures of the roles vacated by the old regime. Albeit, as soon as the economic trends turn around and positive growth is reinstated, the need to increase control is felt again and the stage is set for repeating the above cycle of events.

7.2. Policies for arresting instability of governance systems

The dynamic pattern of behavior exhibited by this model is shown in Figure 9, which closely resembles the patterns of economic and political changes experienced in many developing countries. The distinguishing features of this pattern are the occurrence of rapid economic growth when government control is rising and the unsustainable nature of this growth, which leads to cyclical changes in all variables. The cyclical pattern generated by the model also shows an association between economic condition represented by perceived goods adequacy and control intensity over some parts of the cycle. Over other parts, it negates such an association. This rationalizes the conflicting evidence obtained from cross-national studies.

Figure 9 here

The implication of the unstable behavior of the model which is based on plausible micro-structure is that a government acting rationally under day-to-day pressures to deliver welfare as well as to maintain control, and without willful *malafide* designs but with freedom to suppress civil rights when its span of control expands, will be unable to support development agenda on a sustained basis. The government may expand its scope under pressures of its role rather than deliberately. The design problem concerning the role of government in the development process, therefore, is to identify organizational factors which may assure that this role continues be supportive of public welfare on a sustained basis.

The alternative to authoritarianism is a democratic system in which the expansion in control does not affect civil rights. As a result, censure of the government, which is mandated by civil rights, creates a corrective information stream that maintains support to the economic sector, both in terms of resource allocation and institutional commitment. Thus, contrary to a strong current advocating the presence of an authoritarian government for facilitating economic development, limiting the power of the government so that it is unable to suppress civil rights appears to be the key organizational factor necessary for

creating accountability that sustains government support of the development agenda. Accountability at the national level will also help to arrive at global accords that are in line with welfare of large cross-sections of populations and not driven by power considerations.

The drawing of global accords requires dealing with complex information relationships that would create unforeseen future behavior if one relies only on the often diverse mental models of policy makers to commit concerned parties to their respective roles. Bargaining based on an existing power structure would often deliver terms that would be unfair and that would create unresolvable conflicts in the future. Experimentation with a system dynamics model, on the other hand, allows all parties to share a common perception of the problem and recognize future implications of the decision process created by an impending agreement. Thus, the use of formal models should help to design robust accords with reliable performance.

8. Conclusion

The variety of development patterns experienced in the low income countries over time and geography is quite staggering. These have sometimes led to controversial theories of economic development. A system dynamics model subsuming this variety of behavior modes helps to create a unified theory with which one can interpret reality and explore policy options for system improvement. The dual economy model discussed in this paper can endogenously create a whole spectrum of growth patterns — medieval, classical, neo-classical, revisionist, dualist — that the various growth theories have viewed as given. Exploratory policy experimentation with this model returns two types of instruments for changing dysfunctional patterns — those creating fundamental forces of change and those facilitating change. These can be interpreted in all, regional national and global, contexts.

At the regional level, a penalty on income from absentee ownership together with instruments to facilitate the self-employed sector of the economy seems to facilitate growth with redistribution of income. At the national level, similar attention given to the peripheral regions, with emphasis on the promotion of the self-employed in those regions seems to help stimulate growth as well as equalize income. At the global level, a penalty on transfer of profits from the overseas investments of industrialized country firms together with an effort to facilitate the developing country firms appears to help facilitate economic development in the poor countries.

Last, but not least, without the presence of a governance system that is accountable to public, no welfare agenda can be realized and the power considerations of an unaccountable government will always take precedence over its welfare concerns. Hence, the creation of an accountable governance system at the regional, national and global levels is critical to any developmental agenda.

As the world becomes highly integrated in terms of its economic relations and a shared common environment, questions concerning economic value and the claims of the various cross-sections of the population to it must also become global. If a political and intellectual divide on these issues is to be avoided, we must learn to resolve them by

taking a holistic view of the logic underlying them and creating operational means to implement the solutions so found. System dynamics modeling offers also an important means for achieving this.

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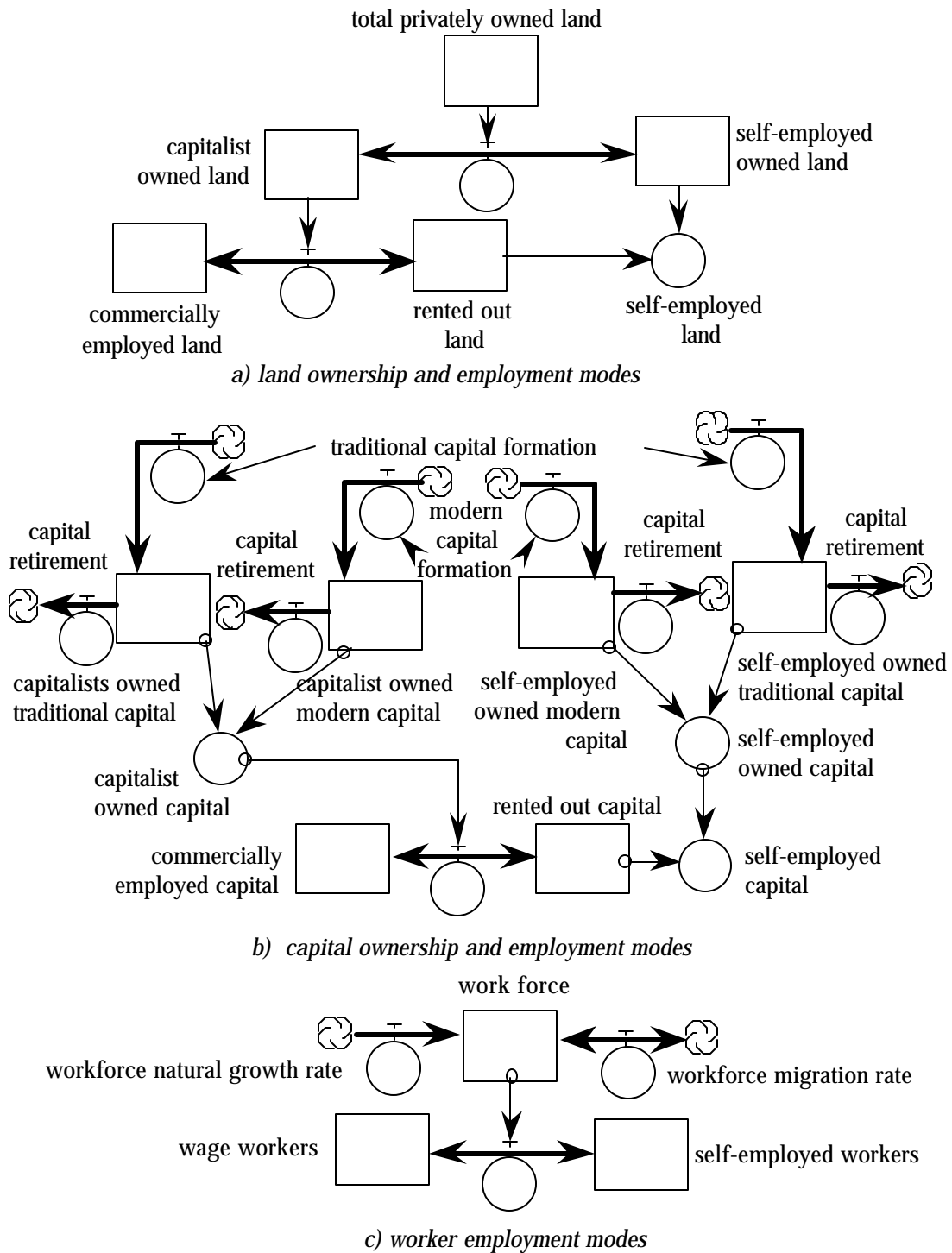


Figure 1 Allocation of production factors in a system dynamics model of a dual economy

Source: Saeed (1994)

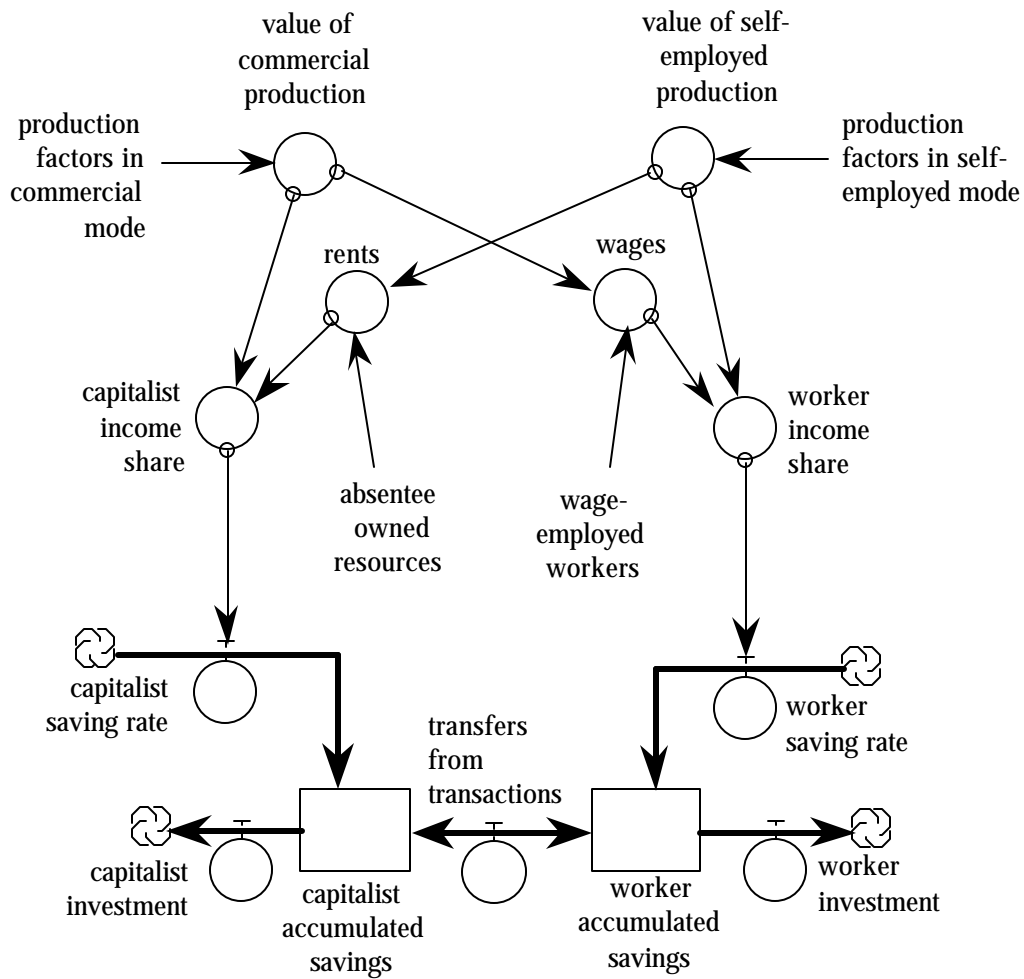


Figure 2 Disbursement of income in a system dynamics model of a dual economy

Source: Saeed (1994)

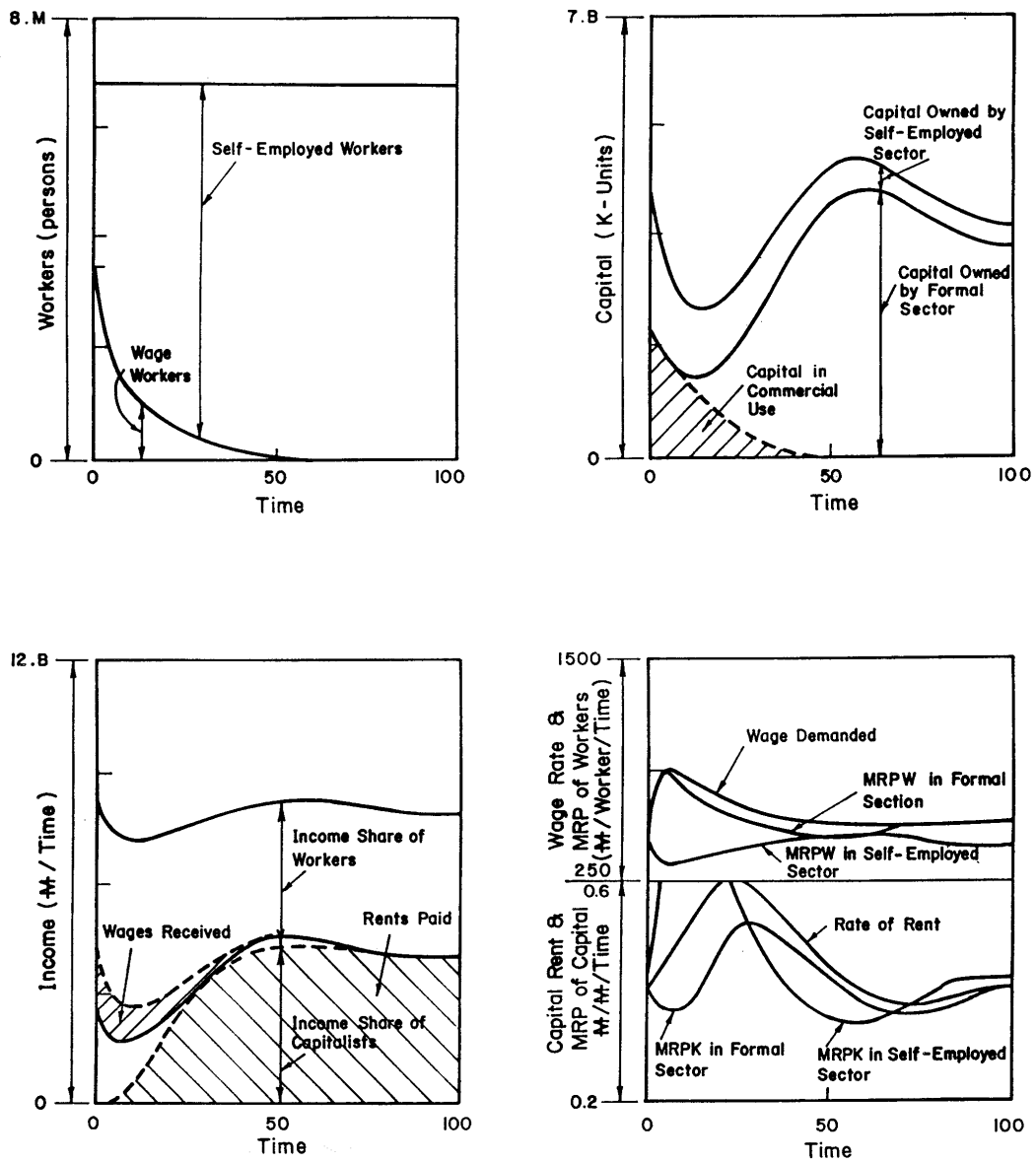


Figure 3 Model behavior showing internal trends for resource ownership and income distribution with undifferentiated technology

Source: Saeed (1994)

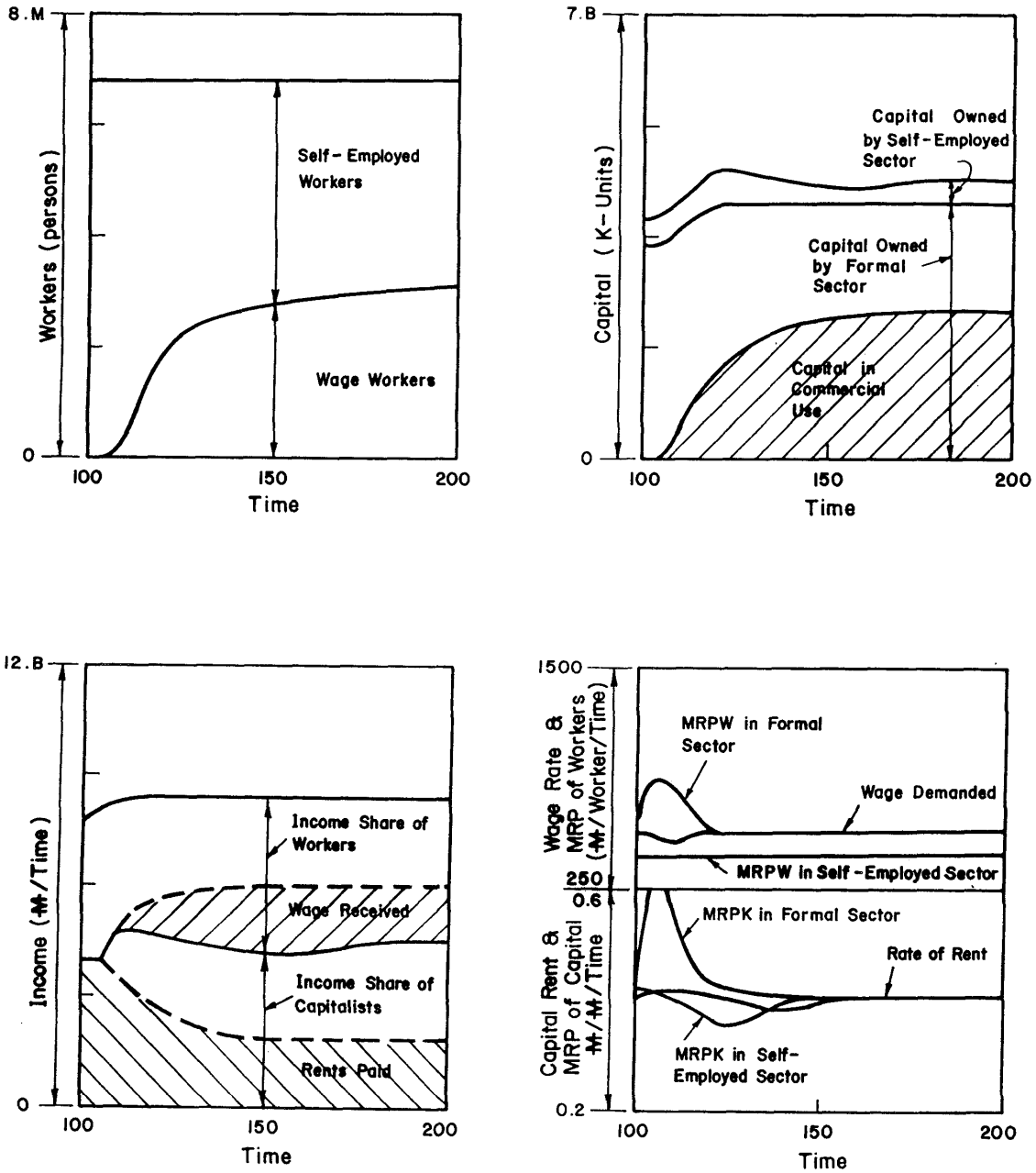


Figure 4 Model behavior showing trends of resource ownership and employment in the presence of technological differentiation

Source: Saeed (1994)

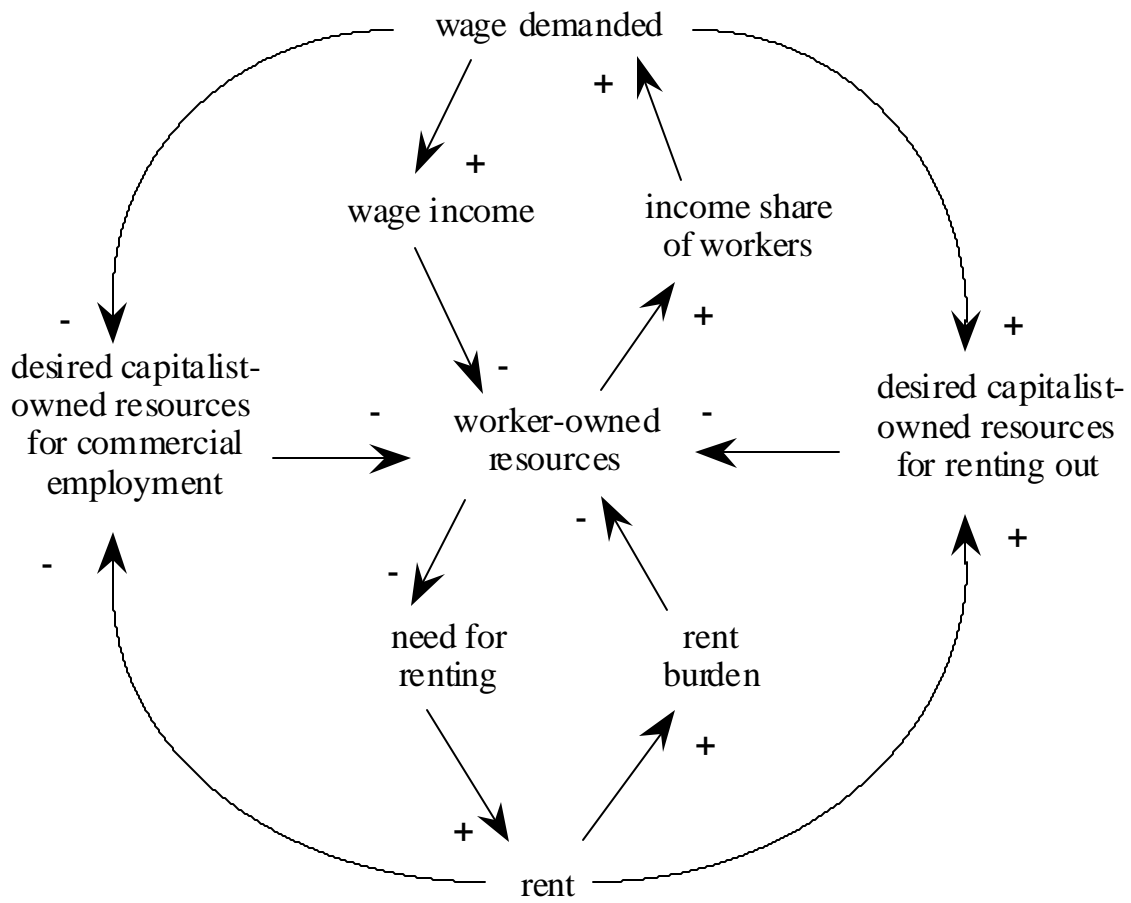


Figure 5 Feedback loops, formed by causal relations between the variables of the model implicit in its structure, which maintain separation of ownership of resources from workers

Source: Saeed (1994)

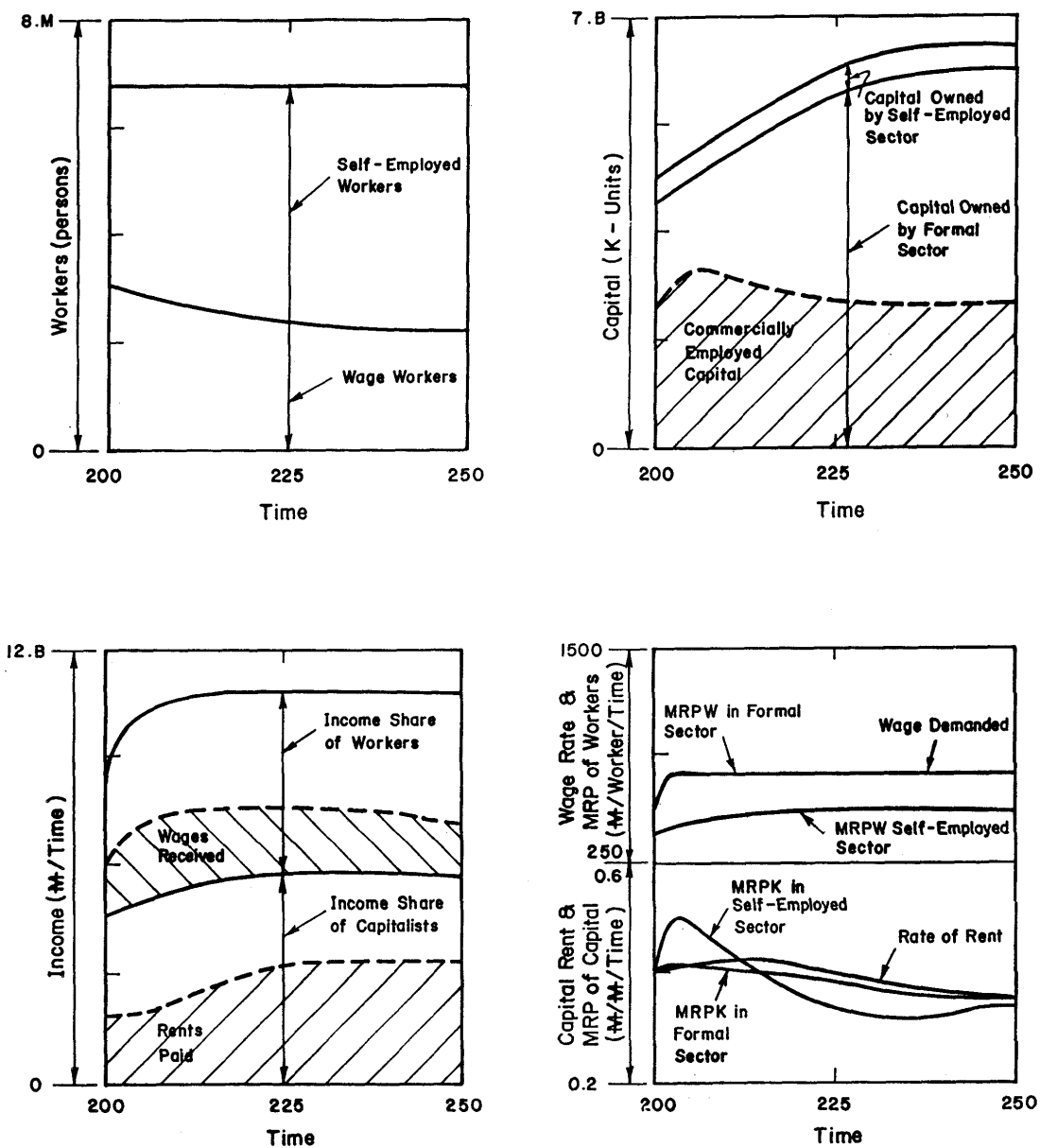


Figure 6

Impact of growth facilitation (productivity improvement, financial institutions and community development) in a dual economy

Source: Saeed (1994)

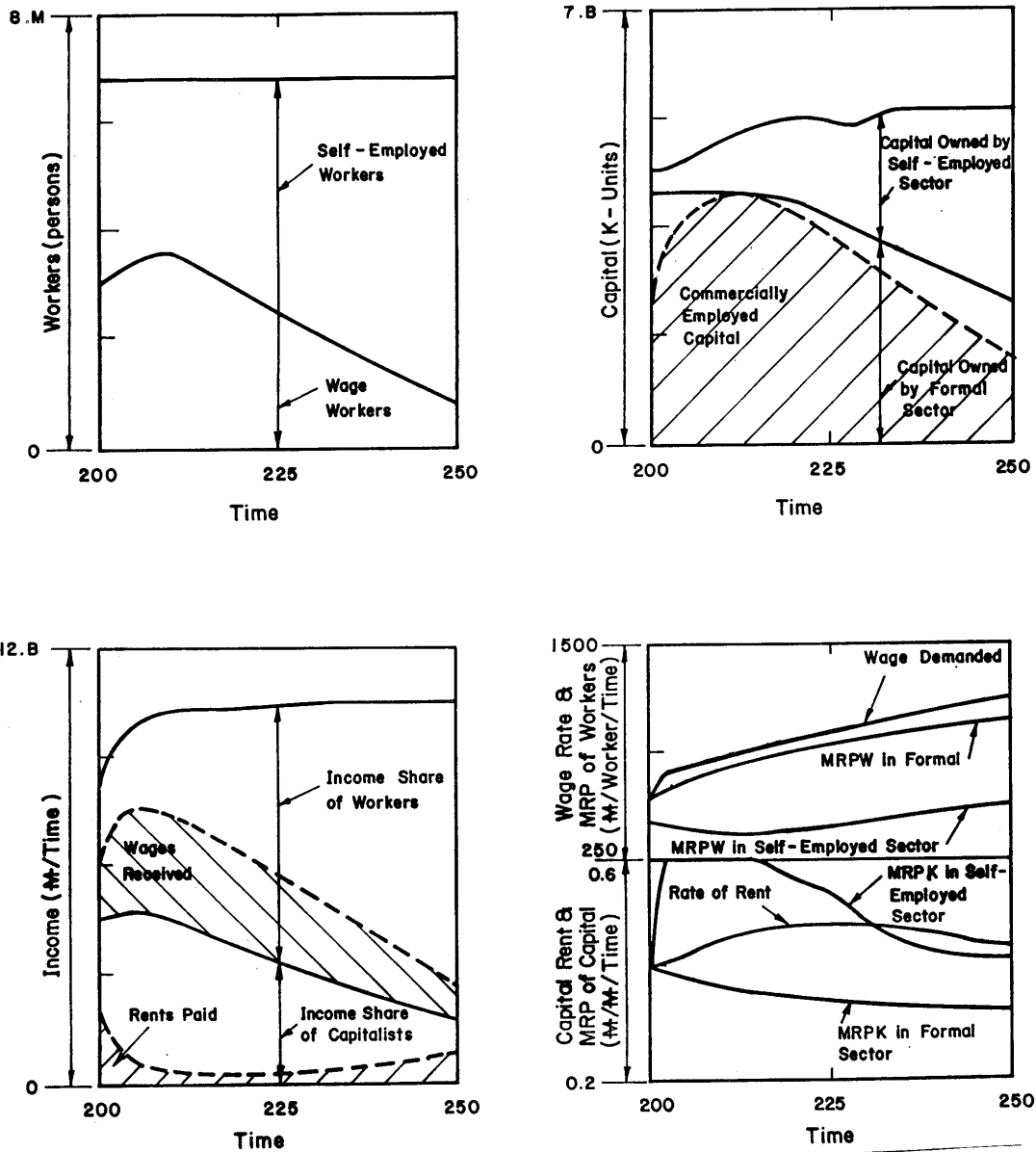


Figure 7 Impact of rent taxation introduced together with growth facilitation in a dual economy

Source: Saeed (1994)

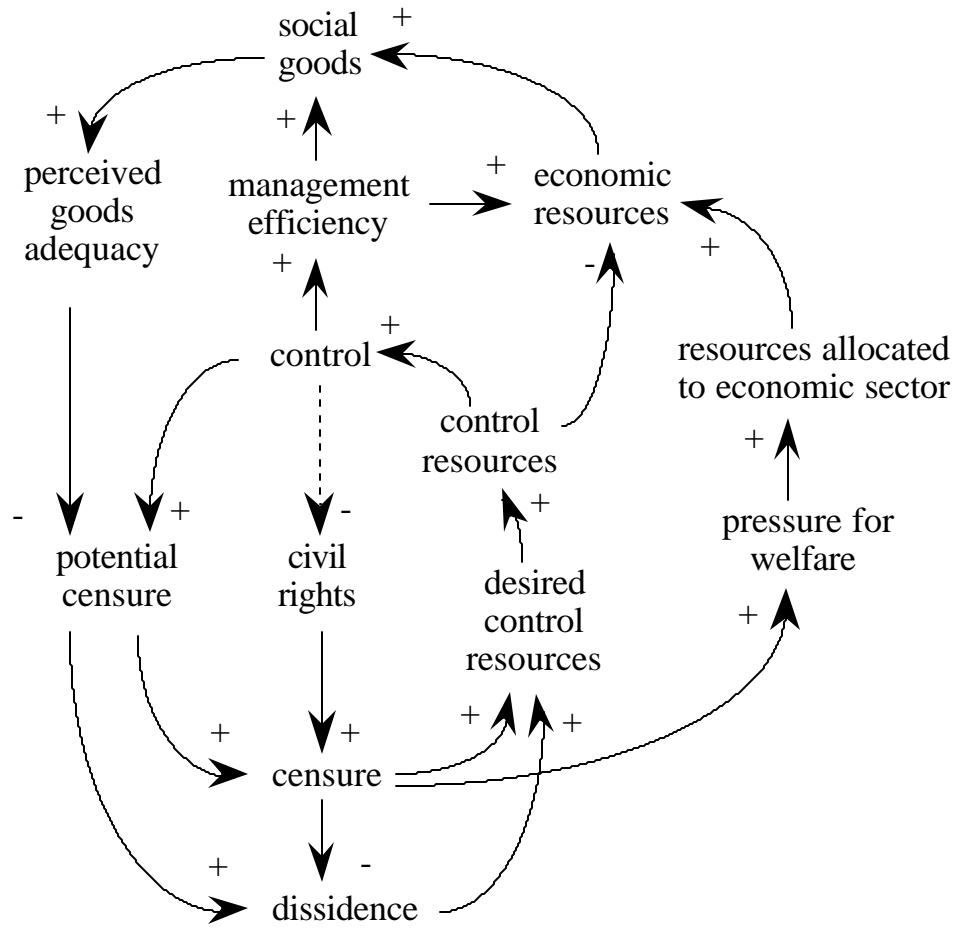


Figure 8 Important feedback loops implicit in the hypothesized behavioral relationships of the model

Source: Saeed (1994)

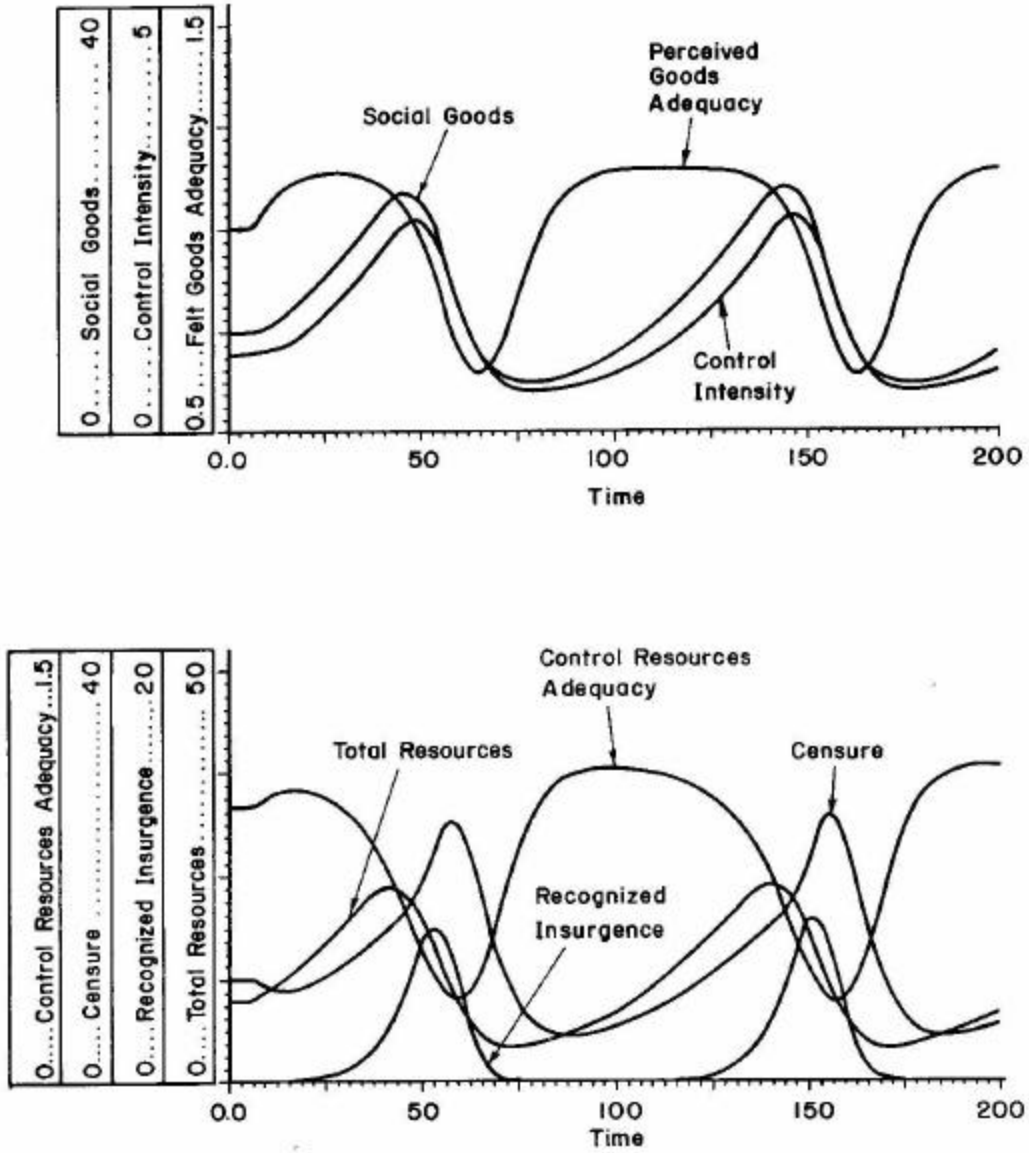


Figure 9 Model behavior showing the dynamics of an authoritarian governance system

Source: Saeed (1994)

Table 1: Various interpretations of policy experimentation with the model pertaining to sectoral, national and global contexts

	Remedial taxation	Remedial expenditure	Financial instruments	Institutional development	Technological development
Sector economy	Taxation of various forms of rent income	Social services/Infrastructure targeted to self-employed	Self-employed/small firm finance, low interest rates	Cooperatives	Financial and technical assistance for self-employed technological ventures
National economy	Taxation of profits in propulsive regions and sectors	Social services/Infrastructure targeted to lagging regions and economic sectors	Financial support of ventures and preferential interest rates for lagging regions and sectors	Regional trade partnerships and cooperative commerce organizations	R&D investment into indigenous technology
Global economy:	Taxation of profits transferred from developing to industrialized countries	Grants and aid for developing country infrastructure building	Debt relief for developing countries	Global public policy networks	Development of indigenous knowledge networks

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