

New Structural Economics

A Framework for Rethinking Development

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Abstract

As strategies for achieving sustainable growth in developing countries are re-examined in light of the financial crisis, it is critical to take into account structural change and its corollary, industrial upgrading. Economic literature has devoted a great deal of attention to the analysis of technological innovation, but not enough to these equally important issues. The new structural economics outlined in this paper suggests a framework to complement previous approaches in the search for sustainable growth strategies. It takes the following into consideration:

First, an economy's structure of factor endowments evolves from one stage of development to another. Therefore, the optimal industrial structure of a given economy will be different at different stages of development. Each industrial structure requires corresponding infrastructure (both "hard" and "soft") to facilitate its operations and transactions.

Second, each stage of economic development is a point along the continuum from a low-income agrarian economy to a high-income industrialized economy, not a dichotomy of two economic development stages ("poor" versus "rich" or "developing" versus "industrialized"). Industrial upgrading and infrastructure improvement targets in developing countries should not necessarily draw from those that exist in high-income countries.

Third, at each given stage of development, the market is the basic mechanism for effective resource allocation. However, economic development as a dynamic process requires industrial upgrading and corresponding improvements in "hard" and "soft" infrastructure at each stage. Such upgrading entails large externalities to firms' transaction costs and returns to capital investment. Thus, in addition to an effective market mechanism, the government should play an active role in facilitating industrial upgrading and infrastructure improvements.

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NEW STRUCTURAL ECONOMICS

A Framework for Rethinking Development¹

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1. INTRODUCTION

The global crisis that started in the U.S. financial sector in the fall of 2008 is the most serious one both in terms of magnitude and scope since the Great Depression. No country has been immune to the economic slowdown. World GDP contracted 2.2 percent in 2009, the first time after World War II (WWII), and world trade volumes fell by a staggering 14.4 percent, the largest in 80 years (World Bank 2010). Prior to the crisis, World Bank research estimated the number of people living below the poverty line worldwide at about 1.4 billion in 2005 (living on less than \$1.25 a day). It is now expected that the cumulative impact of the crisis will deprive some 64 million people the opportunity of getting out of poverty by 2010, most of them in countries that have already been riddled with poverty (Chen and Ravallion 2009). The experience of previous crises makes it seem likely that the impacts may even be more long-lasting than the crisis itself.²

However, several decades from now when economic historians look back on the story of the past hundred years, it is very likely that they will be more intrigued by the mystery of diverging performances by various countries, especially during the second half of the twentieth century. On the one hand, they will be amazed by the rapid growth path followed by a small number of countries such as Brazil, Chile, China, Indonesia, India, Korea, Malaysia, Mauritius, Singapore, Thailand and Vietnam, where the industrialization process quickly transformed their subsistence, agrarian economies and lifted several hundred million people out of poverty in the space of one generation. On the other hand, they will be puzzled by the apparent inability of many other countries, where more than one-sixth of humanity (the “bottom billion,” as Collier (2007) put it) remained trapped in poverty. They will also notice that with the exception of a few successful economies,³ there was little economic convergence between rich and poor countries before the 2008-09 global crisis in spite of the many efforts made by developing countries and despite the assistance of many multilateral development agencies.

The World Bank’s mandate is poverty reduction. Its dream is a world free of poverty. Long-term sustainable and inclusive growth is the driving force for poverty reduction. It is therefore crucial for economists at World Bank to understand the mechanics and determinants of economic growth. Development economics has provided us with some remarkable insights. But as a sub-discipline of economics, it has so far been unable to provide a convincing intellectual agenda for generating and distributing wealth in poor countries. The global crisis is an opportunity not only to identify new areas of research on how to help the developed and developing countries cope with the challenges of the crisis and prevent similar crises in the future, but also on how to achieve sustainable, inclusive growth to developing countries.

This paper focuses on the long-term development challenges. It discusses the evolution of development thinking since the end of WWII and suggests a framework to enable developing countries to achieve sustainable growth, eliminate poverty, and narrow the income gap with the developed countries. The proposed framework, called a neoclassical approach to structures and change in the process of economic development, or new structural economics, builds on some of the

² Empirical research on previous crises suggests that very young children seriously affected by poor nutrition may never catch up to their peers who were born in more fortunate times. In Indonesia, school enrollment fell after 1997 among the poorest; in rural areas the number of children 7-12 years old not enrolled in school doubled to 12 percent in a few years. The crisis also affected health outcomes; infant mortality increased by over 3 percentage points during the crisis.

³ See for example, those 13 economies studied in the Growth Report (World Bank 2008).

insights from the old school of structural economics. It emphasizes the idea that structural features need to be taken into account in the analysis of: (i) the economic development process; and (ii) the role of the state as a facilitator that helps a developing country convert its backward structure to a modern one. But this new framework also considers structural differences between developed and developing countries to be in large part endogenous to their endowment structures and determined by market forces, rather than resulting from the distribution of power or other exogenously determined rigidities as assumed by the old structural approach.

The main approach is organized around the following ideas:

- First, the economy's factor endowments and their structure (defined as the relative abundance of natural resources, labor, human capital and physical capital) are given at any specific stage of development and differ from one stage to another. Therefore, the optimal industrial structure of the economy will be different at different stages of development. In addition to differences in the capital intensity of industries, different industrial structures imply differences in optimal firm size, scale of production, market range, transaction complexity, and also different nature of risks. As a result, each industrial structure requires corresponding soft and hard infrastructure⁴ to facilitate its operations and transactions.⁵
- Second, each stage of economic development is a point in a wide spectrum from a low-income, subsistence agrarian economy to a high-income industrialized economy. Thus, the usual dichotomy between two economic development stages ("poor" versus "rich" or "developing countries" versus "industrialized countries") is not useful. Given the endogeneity of industrial structure at each stage of development, the targets of industrial upgrading and infrastructure improvement in a developing country should not necessarily refer to the industries and infrastructure that are in place in high-income countries.
- Third, at each given stage of development, the market is the fundamental mechanism for effective resource allocation. In addition, economic development as the dynamic process of moving from one stage to the next requires industrial diversification, upgrading, and corresponding improvements in hard and soft infrastructure. The process of industrial diversification and upgrading is a process of innovation. Pioneering firms in the diversification and upgrading process generate public (non-rival, non-excludable) knowledge to other firms in the economy, that is, consumption of the new knowledge by one firm does not reduce availability of that knowledge for others and no one can be effectively excluded from using it. In most cases, improvements in infrastructure cannot be internalized in an individual firm's investment decision. Yet they yield large externalities to other firms' transaction costs. Thus, in addition to an effective market mechanism, the government should play an active, facilitating role in the industrial diversification and upgrading process and in the improvement of infrastructure.

⁴ Examples of hard infrastructure are power, transport and telecommunication systems. Soft infrastructure includes the financial system and regulation, education system, the legal framework, social networks, values and other intangible structures in an economy.

⁵ The optimal industrial structure determines the economy's production frontier and whether or not the actual production will locate on the frontier depends on, among others, the adequacy of infrastructure.

The implications of this framework for research are challenging. One needs to better understand the roles of the market and the state and how they interact to strengthen the private sector in the process of economic development. This poses several important questions: How can a successful development approach be designed and implemented to facilitate the smooth diversification and upgrading from one industrial structure to another? Where distortions exist because of excessive or insufficient interventions by governments, how can countries move to a first-best, distortion-free world? How can policymakers ensure that transitions work smoothly?

The remainder of the paper is organized as follows: Section 2 examines the evolution of development thinking and offers a critical review of some of its main schools of thought. Section 3 outlines the basic principles and conceptual framework of the new structural economics, the function of the market, the four roles of a facilitating state, and the exit strategy from distortions. Section 4 highlights similarities and differences between old and new structural economics, and discusses some preliminary insights on major policy issues based on this new approach. Section 5 concludes with new structural economics' implications for World Bank research.

2. A SHORT REVIEW OF DEVELOPMENT THINKING AND EXPERIENCES⁶

The process of sustainable per capita income increase and economic growth, characterized by continuous technological innovation and industrial upgrading, is a modern phenomenon. Before the modern era, most countries were in the development stage of a relatively backward agrarian economy—disturbed from time to time by war and natural calamities, and afflicted by the Malthusian trap. Except for the ruling classes, craftsmen and merchants—who represented a minority of the population—most people worked in subsistence agriculture, animal husbandry, or fishery. Given the technologies and industries prevalent at the time, the allocation of resources, developed through generations of practice in such economies, was close to optimal. Therefore, the gains from improvement in the allocation of resources were small (Schultz 1964). Further economic development was feasible only with some technological innovations, as an exogenous shock or an improvement based on experience, to the system.⁷ In this pre-modern era, economic development was manifested mainly in the form of population increase and the aggregate size of the economy. There was extensive growth, but per capita income did not change much (Clark 2007; Kuznets 1966; Perkins 1969).

The income gap between areas that today would be considered developed and those that would be considered developing was relatively small from today's viewpoint—estimated to be at most 50 percent (Maddison 2006; Bairoch 1993). Indeed, some of today's developing countries—such as China and part of India—were believed to be richer than Europe at that time (Cipolla 1980; Pomeranz 2000; Smith 1776). Until the late eighteenth century, the overall performance of markets—in terms of integration—in China and Western Europe was comparable (Shiue and Keller 2007).

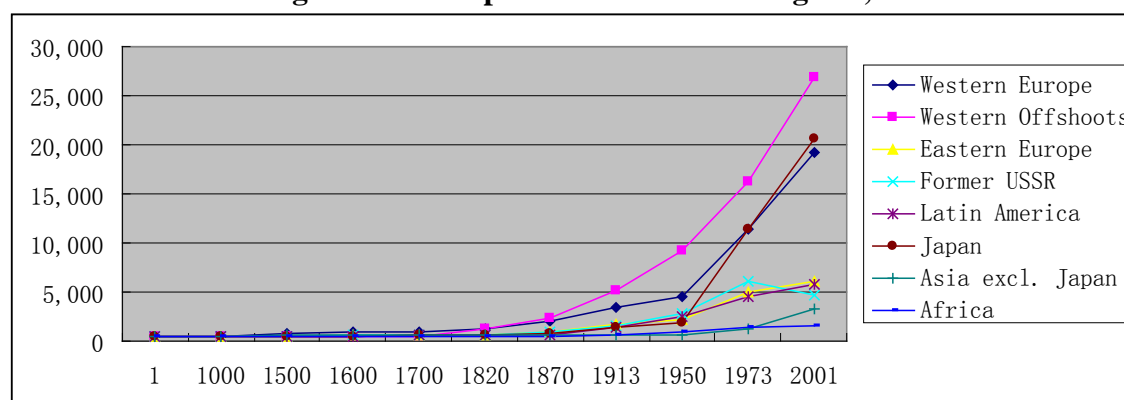
⁶ These first four paragraphs draw heavily on Lin (2009a).

⁷ A few technological innovations before the modern times, such as the introduction of corn and sweet potato from America to the rest of the world, which were byproducts of the discovery of the new continent, can be analyzed as exogenous technological shocks. Most other technological innovations before modern times were the by-products from the daily practices of craftsmen or farmers.

After the Industrial Revolution began in England in the mid-eighteenth century, experiments conducted in laboratories became the major source of technological invention and innovation (Lin 1995; Landes 1998). This was especially true for those macro-inventions that consisted of radical new ideas and involved large, discrete, novel changes, as defined by Mokyr (1990). For developed countries at the global technological frontier, such a transformation of the method of technological invention enabled them to accelerate technological advances through investment in research and development, and technological invention and innovation became endogenous (Romer 1986; Lucas 1988). With increasing investment in research and development, technology change accelerated, industrial structures upgraded continuously, and productivity increased. As a result, developed countries in the western hemisphere began to take off and the divergence between the North and the South appeared (Baumol 1994; Braudel 1984).

Since 1820, the total output of advanced capitalist countries has increased seventy-fold, with population rising nearly five-fold, per capita product fourteen-fold and real per capita consumption almost tenfold.⁸ Figure 1 shows the evolution of per capita income in various regions of the world from 1 to 2001 AD, based on the estimation of Maddison (2006, p. 642). From an insignificant difference at the beginning of the eighteenth century, per capita income in the developed countries of Western Europe and its offshoots increased to more than 20 times that of the developing countries by the end of the twentieth century.⁹

Figure 1: Per capita GDP of various regions, 1–2001 AD



Note: Gross domestic product (GDP) is calculated with 1990 international Geary-Khamis dollar. The Geary-Khamis dollar—also known as the international dollar—is a sophisticated aggregation method of calculating purchasing power parity (PPP). This facilitates comparing countries with one another. The statistical definition can be found at http://unstats.un.org/unsd/methods/icp/ipc7_h.htm

Source: Maddison, A. (2006). *The World Economy*. Paris: Organisation for Economic Cooperation and Development, 642.

From Adam Smith to the early twentieth century, most economists believed that *laissez faire* was the best vehicle for achieving sustainable growth in an economy. It was assumed that in thriving economies, all decisions about resource allocation are made by economic agents interacting in markets free of government intervention. The price system determines not only what is produced and how but also for whom. Households and firms pursuing their own interests would be led, “as if

⁸ See Maddison (1982).

⁹ One caveat: As Lucas (1988) reflected in his 1985 Marshall Lectures, ‘[S]uch diversity across countries in measured per capita income levels is literally too great to be believed.’

by an invisible hand,” to do things that are in the interests of others and of society as a whole. This thinking, made popular by Adam Smith, was based on economic experiences before the Industrial Revolution. It assumed that productivity increases in the agriculture and manufacturing sectors are due mainly to small, incremental refinement of old, traditional technologies for the purpose of exploiting widened markets and specialization and thus industries could be assumed as given in the analysis. It basically ignored the possibility of successive introduction of big innovations that create new industries or radically alter methods of production (Rostow 1990a).

Although the *laissez faire* approach was challenged by Marxist economists and others, it became the dominant intellectual framework for the study of growth in all countries and remained so for a long time. It certainly provided many good insights on the process of economic development, including on the “role of the sovereign,” i.e., the state.¹⁰ But it had a major flaw: it missed the importance of the process of continuous, fundamental technological changes and industrial upgrading, which distinguishes modern economic growth from pre-modern economic growth (Kuznets 1966). That process may not be as spontaneous for a successful economy as implied by Marxist economics.

Policymakers have always been obsessed with *economic development*, that is, the mechanics of organizing a country’s resources and institutions to produce and distribute more goods and services, and to sustain regular social progress and rising prosperity. Yet, what has come to be known as *development economics* is a relatively new sub-discipline of economics (Bell 1987). It took a paper by Rosenstein Rodan (1943) to bring development issues to the forefront of economics. The paper suggested that the virtuous circle of development depended essentially on the interaction between economies of scale at the level of individual firms and the size of the market. Specifically, it assumed that modern methods of production can be made more productive than traditional ones only if the market is large enough for their productivity edge to compensate for the necessity of paying higher wages. But the size of the market itself depends on the extent to which these modern techniques are adopted. Therefore, if the modernization process can be started on a very large scale, then the process of economic development will be self-reinforcing and self-sustaining. If not, countries will be indefinitely trapped in poverty.

Rosenstein Rodan’s framework sparked a wave of similar ideas (Chang 1949; Lewis 1954; Myrdal 1957; Hirschman 1958), which came to be known as the structuralist approach to economic development. Its starting point was the fight against poverty, and the recognition that, in their quest for growth, developing countries face structural challenges that are different from those of high-income countries. It emerged from a context marked by two historical events and a major intellectual force: The Great Depression, the successful industrialization in the Soviet Union, and the rise of Keynesian economics, which stressed the importance of market failures and the need for an active government role in the economy. It was argued that, due to structural rigidities and

¹⁰ While Adam Smith is often perceived as a thinker who saw a limited role for the state in economic life, the reality is that he envisioned an important economic role for the state. Just like many leading theorists of free market economics, he believed that the state should enforce contracts and grant patents and copyrights to encourage inventions and new ideas. He also recommended that the state provide public works such as roads, bridges and defense—all things that, he assumed, would not be worthwhile for individuals to provide. However, he wanted the users of such public works to pay in proportion to their use (see *The Wealth of Nations*, Book V). Adam Smith did not discuss the role of state in industrial upgrading and the structural change endogenous to that process probably because the impact of industrial revolution only became observable and significant after his passed away in 1790.

coordination problems in developing country markets, modern heavy industries were unable to develop spontaneously in a developing country.

The market-failure thesis became the core of “development economics,” which emerged after World War II.¹¹ Under the influence of Keynesianism and the belief in the economic success of the Soviet Union, mainstream theories in the early phase of development economics held that the market encompassed insurmountable defects and the state was a powerful supplementary means to accelerate the pace of economic development. Many development economists at that time advocated that the state should overcome market failures by playing a leading role in the industrialization push, directly allocating the resources for investment, and setting up public enterprises in the large heavy industries to control the “commanding heights” (Hirschman 1958; Nurkse 1953; Rosenstein-Rodan 1943).

The slump of international trade in the Great Depression led to export pessimism in the Post-War period. In Latin America, for instance, political leaders and social elites were influenced strongly by the deterioration in the terms of trade, the economic difficulty encountered during the Great Depression in the 1930s, and the thesis developed by Prebisch (1950) and Singer (1950). They believed that the decline in the terms of trade against the export of primary commodities was secular, which resulted in the transfer of income from resource-intensive developing countries to capital-intensive developed countries. They argued that the way for a developing country to avoid being exploited by developed countries was to develop domestic manufacturing industries through a process known as import substitution.

Moreover, the emergence of previous colonies or semi-colonies as newly independent states in Asia and the Middle East, and later in Africa, was accompanied by strong nationalist sentiments. Compared with developed countries, these developing countries had an extremely low economic growth rate and per capita gross national product, high birth and death rates, low average educational attainments, and very backward infrastructure. They were heavily specialized in the production and export of primary commodities and imported most of their manufactured goods. Thus, it was central to every developing country government’s national agenda to develop its economy independently so as to achieve a rapid economic take-off and eliminate poverty.

Although there was broad agreement on that diagnostic within the group of structuralist economists, there was divergence as to what specific policies to implement in order to break out of the trap and start the virtuous cycle. Rosenstein Rodan seemed to indicate that a *Big Push* (large and coordinated government investment program) was the solution. Nurkse (1953) also saw the main obstacles to development in the narrow market and suggested that only new investments realized simultaneously could create the needed demand. In his “balanced growth” theory, he identified the shortage of

¹¹ The new field of development economics was regarded as covering underdevelopment because ‘conventional economics’ did not apply (Hirschman, 1982). Early trade and development theories and policy prescriptions were based on some widely accepted stylized facts and premises about developing countries (Krueger, 1997); these included: 1) developing economies’ production structures were oriented heavily towards primary commodity production; 2) if developing countries adopted policies of free trade, their comparative advantage would forever lie in primary commodity production; 3) the global income elasticity and the price elasticity of demand for primary commodities were low; 4) capital accumulation was crucial for growth and, in the early stage of development, it could occur only with the importation of capital goods. Based on these stylized facts and premises, it was a straight step to believe that the process of development was industrialization, and industrialization consisted primarily of the substitution of domestic production of manufactured goods for imports (Chenery, 1958).

capital as the binding constraint to development, understood as an expansion of the market and an increase in production. Others, such as Hirschman, suggested that the problem was not the shortage of capital but the lack of entrepreneurial abilities, itself a reflection of institutional factors. They suggested an “unbalanced growth approach” in which investments would not be spread evenly in poor economies but concentrated in selected projects in key economic sectors with strong backward and forward linkages. In sum, many developing country governments regarded economic growth as their direct and prime responsibility. Eventually, many influential multilateral institutions, such as the World Bank, adopted the structuralist thinking in their approach to economic development.

Yet the results were disappointing in many cases. Instead of converging to the developed countries’ income levels, the income levels in developing countries stagnated or even deteriorated and the income gap with developed countries widened. In many developing countries, well-intended government interventions failed. This was the case across Latin American, African and South Asian countries in the 1960s and 1970s when import substitution and protection were essential features of the development strategy.

One of the main reasons for the failure of many former socialist and developing countries to achieve dynamic growth in their transitional processes was the fact that they attempted to defy the comparative advantage determined by their endowment structures and gave priority to development of capital-intensive heavy industries when capital in their economies was scarce.¹² In order to implement such strategies, developing-country governments had to protect numerous non-viable enterprises in their priority sectors. However, because the governments usually had limited tax-collection capacity, large-scale protections and subsidies could not be sustained with their limited fiscal resources. The governments had to resort to administrative measures—granting the non-viable enterprises in prioritized industries a market monopoly, suppressing interest rates, overvaluing domestic currency, and controlling prices for raw materials—to reduce the costs of investment and operation of the non-viable enterprises. Such interventions caused widespread shortages in funds, foreign exchange, and raw materials. The governments had to allocate resources directly to these enterprises through administrative channels, including national planning in the socialist countries and credit rationing, investment and entry licensing in non-socialist developing countries (Lin 2009a; Lin and Li 2009).¹³

By shielding unsustainable industries from import competition, developing countries also imposed various types of other costs on their economies. Protection typically led to: (i) an increase in the

¹² There were very respectable theories supporting the strategy of giving priority to the capital-goods industry, such as the economic development model created by famous Indian statistician, Parsanta Chandra Mahalanobis in 1953, which became the foundation for India’s second five-year plan (Bhagwati and Chakravarty, 1969), and Amartya Sen’s dissertation at Cambridge University, later published as a book (1960).

¹³ There are alternative hypotheses for the government interventions and distortions in developing countries, especially in Latin America countries. In the models of Olson (1982), Acemoglu et al. (2001, 2002, 2005), Grossman and Helpman (1996 and 2001) and Engerman and Sokoloff (1997), they argue that government intervention and institutional distortions arise from the capture of government by powerful vested-interest élites. Logically, their models can explain some observed interventions and distortions such as import quotas, tax subsidies, entry regulations and so on. Their theories cannot, however, explain the existence of other important interventions and distortions—for example, the pervasiveness of public-owned enterprises in developing countries, which are against the interests of the powerful élites and why most distortions to protect the industrial sectors were introduced in the 1940s and 50s when most power élites were landed class. However, once the government introduces a distortion, a group of vested interests will be created even if the distortion is created for noble purpose. The vested-interest argument could be appropriate for explaining the difficulty of removing distortions..

price of imports and import-substituting goods relative to the world price and distortions in incentives, pushing the economy to consume the wrong mix of goods from the point of view of economic efficiency; (ii) the fragmentation of markets, as the economy produced too many small-scale goods, which resulted again in loss of efficiency; (iii) it lessened competition from foreign firms and encouraged the monopoly power of domestic firms whose owners were politically well connected; and (iv) it created opportunities for rents and corruption, which raised input and transaction costs (Krueger 1974).¹⁴

As government-led economic development strategies based on the structuralist teachings failed in many countries, the free market approach appeared to triumph and to influence development thinking. This trend was reinforced by a new revolution in macroeconomics. The prevailing Keynesian macroeconomics was challenged by the emergence of stagflation in the 1970s, the Latin American debt crisis, and the collapse of the socialist planning system in the 1980s. In an attempt to reduce high inflation rates in the context of over-employment, the United States administration tightened fiscal and monetary policy in 1969—a policy move consistent with the conventional Keynesian wisdom. This led to a sharp increase in unemployment but virtually no reduction in inflation. That experience validated the rational expectations revolution in macroeconomics, proving that in market economies, sustained periods of inflation lead to more expected inflation that is built on wages and other payments fixed by contract. In the context of continuing nominal wage increases, restrictive monetary and fiscal policies mostly affect output and unemployment and have little effect on inflation. The rational expectations theory refuted the structuralist theoretical foundation for the state’s role in using fiscal policy and monetary policy for economic development.

The Latin American debt crisis began in 1982 when international financial markets realized that the collapse of the Bretton Woods system had put some countries with unlimited access to foreign capital in a situation where they could not pay back their loans. The crisis was precipitated by a number of inter-related exogenous shocks that toppled Mexico and several other Latin American economies, which were already overburdened with a substantial percentage of the world’s outstanding debt (Cardoso and Helwege 1995). It prompted multilateral lending institutions and bilateral lenders—especially the United States—to call for a comprehensive set of reforms of Latin American economies and to advocate a set of free-market policies that followed the canons of rational expectations macroeconomics, later known as the Washington Consensus (Williamson 1990).

Finally, the collapse of socialist economies in the latter half of the 1980s, which led Francis Fukuyama to proclaim “the end of History,” seemed to mark the complete victory of free market economics over proponents of structuralist state interventions and centrally-planned economic systems. Most mainstream economists explained at the time that government intervention in the economy was bound to fail because of the inevitable distortion of the allocation of resources, supply, and prices, and the absence of a viable incentive system for economic agents. They interpreted the economic collapse in Eastern and Central Europe and the Former Soviet Union and the stagnation and frequent crises in Latin America and other developing countries as evidence that the state should never try to play a leading role in initiating industrialization. These views fueled the sense of triumph of the free market approach and centered development thinking on the Washington Consensus policies.

¹⁴ See Krugman (1993) for a general exposition of these issues.

Although the Washington Consensus was originally presented as “a summary of what most people in Washington believed Latin America (not all countries) ought to be undertaking as of 1989 (not at all times),” it quickly came to be perceived as “a set of neoliberal policies that have been imposed on hapless countries by the Washington-based international financial institutions and have led them to crisis and misery” (Williamson 2002). It promoted economic liberalization, privatization, and the implementation of rigorous stabilization programs. The results of these policies in terms of growth and employment generation were at best controversial (Easterly, Loayza and Montiel 1996; Easterly 2001).

By the end of the 1980s and parallel to the dismissal of structuralism and the prevalence of the free market approach, the development economics research community was witnessing the end of an era dominated by cross-country regressions, which attempted to identify growth determinants. That approach had been to focus on the independent and marginal effects of a multitude of growth determinants. This led to the linearization of complex theoretical models. Yet, the general view was that growth determinants interact with each other. To be successful, some policy reforms must be implemented with other reforms. There was a general perception that the policy prescriptions stemming from such regressions did not produce tangible results.

An alternative perspective on non-linearities was the Growth Diagnostics or Decision Tree approach suggested by Hausmann, Rodrik, Velasco (2005). It recognized the central role of structural change in economic development and argued that there are “binding constraints” on growth in each country. This implies that failure to address the binding constraint in one key area of policy prevents growth even if reforms in other areas are satisfactory. These authors suggested that binding constraints can vary over time and across countries. They concluded that the identification of *the* binding constraint was therefore key in practice. This framework highlighted pragmatically the inability of governments to reform everything and stressed the need to prioritize reforms, which should be done through the information revealed by shadow prices.

The divergence in growth performance between developed and developing countries despite predictions of convergence from mainstream economic theory, has led to controversy. Some have concluded that the policy prescriptions and/or expectations about their effectiveness were wrong. Others have observed that growth researchers had paid limited attention to heterogeneity (the specific characteristics of each country). The suggestion that cross-country distribution may be multi-modal (with the existence of “convergence clubs”) did not settle the debate about which new directions were needed for growth research. Instead, many basic questions have come back on the agenda: Are development economists looking in the wrong place in their quest for the determinants of growth? Should the focus be on institutions [institutional *outcomes*], instead of or in addition to policies? And, assuming that they are not reflecting other factors, how can good institutional outcomes be generated?

These unanswered questions were on the agenda for a long time. Starting in the 1980s, many development economists tried to better understand the causality of relationships, and the various transmission channels through which policies, institutional changes or foreign aid affect growth. It was also the rationale for an increased focus of growth research on micro behavior issues at the household and firm levels, with two goals: (i) allowing for heterogeneity in the economy (across and within countries); and (ii) investigating how constraints to growth operate at the micro level.

The growing disappointment and disillusionment with aid effectiveness also led to the quest for rigorous impact evaluation of development projects and programs. This has generated a new approach to development led by economists at the MIT Poverty Lab, whose goal is “to reduce poverty by ensuring that policy is based on scientific evidence” through the use of randomized control trials (RCT) or social experiments. Although RCT are good tools for understanding the effectiveness of some specific micro projects, they often do not start from a clear strategic assessment of how a particular method would fit the knowledge gaps of highest priority (Ravallion 2009a). All too often, research looks for topics “under the light.” The positive outcomes for policy making are more often the occasional by-products of research than its objective from the outset.

Recent micro-empirical studies may have indeed shed light on some important problems, such as the impact of the investment climate on firm performance (World Bank 2005a) or household behavior on productivity (Rosenzweig and Wolpin 1985). But, “there is a risk the bulk of present-day research in development economics appears to be too narrowly focused and/or of too little generalizability to help much in the fight against poverty and to facilitate structural change and sustained growth.” (Ravallion 2009b)

Although the chronicle of economic development in the past half-century has often been one of disappointments, there are also a few success stories that deserve a closer look. The contrast in economic strategies and performance among Asian countries – both during the 1950s to the 1970s and during the transition of the 1980s and 1990s – has been intriguing to economists. On the one hand, countries in Latin America, Africa, Eastern Europe and Asia that followed the prevailing structuralist theories in formulating their policies often failed to change their economic structures and narrow the gap between them and the industrial countries. Import substitution policies that were intended to promote industrialization by protecting domestic producers from the competition of imports became the source of high tariffs, quotas or restrictions on foreign trade, and distortions, rent-seeking and economic inefficiencies.

On the other hand, newly industrialized economies, such as Japan and the four East Asian dragons (Korea, Singapore, Taiwan, Hong Kong), adopted export-oriented strategies, instead of an import-substitution strategy. Starting from a low agrarian foundation, they were able to climb quickly the industrial ladder and achieve convergence with respect to the structure and income level of advanced industrialized countries by the 1980s. Likewise, from an inward-looking, state administrated economy, China, Vietnam, and Mauritius achieved rapid and sustained growth by adopting a gradual transition approach to a market economy in the 1980s and 1990s, instead of the “shock therapy,” prescribed in the free market-Washington Consensus framework and followed by developing countries in Eastern Europe, the former Soviet Union, and many other developing countries. In all these successful cases, the market was the fundamental mechanism for resource allocation as predicted by *laissez faire*, rational expectations theories, and the Washington Consensus. However, the state also played an active role in the development and transition process as the Keynesian theories and structuralist approach to development had envisioned.

3. A NEOCLASSICAL APPROACH TO STRUCTURE AND CHANGE

The time has come to reexamine the state of development economics, to learn from past experiences and previous knowledge, and to offer new thinking and a new framework. Drawing lessons from past experience and from economic theories, this section presents the key principles of a new structural economics, which is a neoclassical approach to structures and their dynamics in the process of economic development.¹⁵

A. Key Principles and Basic Conceptual Framework

The starting point for the analysis of economic development is an economy's endowments. Endowments are given in an economy at any specific time and changeable over time. Following the tradition of classical economics, economists tend to think of a given country's endowments as consisting only of its land (or natural resources), labor, and capital (both physical and human). These are in fact factor endowments, which firms in an economy can use in production.¹⁶

Conceptually, it is useful to add infrastructure as one more component in an economy's endowments.¹⁷ Infrastructure includes hard (or tangible) infrastructure and soft (or intangible) infrastructure. Examples of hard infrastructure are highways, port facilities, airports, telecommunication systems, electricity grids and other public utilities. Soft infrastructure consists of institutions, regulations, social capital, value systems, and other social, economic arrangements. Infrastructure is critical to the viability of domestic firms: it affects the individual firm's transaction costs and the marginal rate of return on investment. Most hard infrastructure and almost all soft infrastructure is exogenously provided to individual firms and cannot be internalized in their production decision. Incidentally, Adam Smith discussed both factor endowments and infrastructure endowments (public works and institutions in Book V of his *Wealth of Nations*). But the role of infrastructure was often neglected by subsequent economists. For example, there is no discussion on infrastructure in Alfred Marshall's *Principles of Economics*.

¹⁵ I will refer the early contributions by structuralist economists such as Prebisch (1950) and Furtado (1964, 1970) and recent contributions by structuralist economists, such as Taylor (1983, 1991, 2004) and Justman and Ben Gurion (1991) as old structural economics. They believe that the neoclassical approach to economic analysis is not applicable to developing countries where there is structural rigidity caused by distribution of political power, or distorted price signals due to monopoly, perverse response by labor to price signals, or the immobility of factors. The new structural economics assumes differences in structure between developed and developing countries arise from differences in their endowment structures. But a developing country can change its industrial and economic structure by changing its endowment structure. See further discussions in Section 4.

¹⁶ In the analysis of a long term dynamic development process, it is useful to start from a parameter that is given, fundamental, and changeable. If the parameter is not given at a specific time, it cannot serve as a starting point for analysis; if it is not fundamental, the results of analysis will be trivial; and if it is not changeable, the analysis will not provide useful knowledge for facilitating desirable changes in the economy. The factor endowment has those three properties. The total factor endowment in an economy determines the total budget in the economy at a given time and its structure determines the relative factor prices of the economy at that given time. The total budget and relative prices are two of the most important parameters in economic analysis. The factor endowments and the structure of factor endowments in an economy can be changed through population growth and accumulation of capital in the economy.

¹⁷ The difference between factors of production and infrastructure is that the supply and demand of the former are determined individually by households and firms, whereas the latter are supplied by the community or governments in a form that cannot be internalized in the decisions of individual households or firms, as they require collective actions.

Countries at different stages of development tend to have different economic structures due to differences in their endowments. Factor endowments for countries at the early stages of development are typically characterized by a relative scarcity in capital and relative abundance in labor or resources. Their production activities tend to be labor-intensive or resource-intensive (mostly in subsistence agriculture, animal husbandry, fishery and the mining sector) and usually rely on conventional, mature technologies, and produce “mature,” well-established products. Except for mining and plantations, their production has limited economies of scale. Their firm sizes are usually relatively small, with market transactions often informal, limited to local markets with familiar people. The hard and soft infrastructure required for facilitating that type of production and market transactions are limited and relatively simple and rudimentary. In developing countries with abundant unskilled labor and resources but scarce human and physical capital, only the labor-intensive and resource-intensive industries will have comparative advantages in open, competitive markets (Heckscher and Ohlin 1991; Lin 2003).

At the other extreme of the development spectrum, high-income countries display a completely different endowment structure. Because they are industrialized, the relatively abundant factor in their endowments is typically capital, not natural resources or labor. They tend to have comparative advantage in capital intensive industries with economies of scale in production. Situated on the global technology and industrial frontier, these economies rely on creative destruction or the invention of new technology and products for achieving technological innovation and industrial upgrading (Schumpeter 1942; Aghion and Howitt 1992). Individual firms engaged in the upgrading process need to undertake risky R&D activities that generate non-rival, public knowledge, which benefits other firms in the economy (Jones and Romer 2009; Rodrik 2004; Harrison and Rodriguez-Clare 2009).

For this reason, governments in the developed countries subsidize R&D activities of individual firms by funding basic research in universities, granting patents for new inventions, and offering preferential taxes and defense and other government procurements. The soft and hard infrastructure needed in these countries is therefore likely to be quite different from what is necessary in low-income countries. For example, their appropriate financial arrangements are large banks and sophisticated equity markets, which can mobilize a large amount of capital and are capable of diversifying risks. The various types of hard infrastructure (power, telecommunication, roads and port facilities, etc.) and soft infrastructure (regulatory and legal frameworks, cultural value system, etc.) needed must comply with the necessities of national and global markets where business transactions are long distance, large in quantity and value, and no longer informal, but based on rigorously designed and implemented contracts.

For a developing country whose production is located within the global technology and industrial frontier, the structure of its factor endowment (relative abundance of factors) tends to determine its relative factor prices and optimal industrial structure, which in turn determine the distribution of firm size, and level and nature of risks for firms.¹⁸ This is due to the fact that the main force driving structural change in modern times is the change in endowment structure from a relatively low

¹⁸ The factor price equalization theorem in international trade will not hold in reality due to transportation cost, specialization, difference in technology across countries, and so on. Therefore, in a close economy as well as in an open economy their relative factor prices are determined largely by the structures of their factor endowments.

capital-labor ratio to a relatively high capital–labor ratio (Lin 2003, 2009b).¹⁹ Such change in endowment structure will simultaneously increase the economy’s total budget and change its relative factor prices, which are the two most important parameters for firms’ production choices. This can be explained with a model in which the aggregate output in an economy is composed of different goods, each of which is produced with technologies that differ in capital intensity. As capital becomes more abundant and hence relatively cheaper, the optimal production shifts to more capital-intensive goods. At the same time, the more labor-intensive goods are gradually displaced. This process generates an endless V-shaped industrial dynamics—the so-called “flying geese” pattern of economic development.²⁰ In addition, the financial structure evolves endogenously as the demand for capital and the need for risk reallocation in production increase (Lin, Sun, and Jiang 2009). Similarly, other economic and social structures will change accordingly.

Production is organized and operated within individual firms that need to hire labor, buy inputs, and sell outputs outside their boundaries. Hard infrastructure, such as highways, telecommunications, port facilities, and power supplies, will determine the transaction costs of obtaining inputs and selling outputs, as well as the range and size of the market (which in turn determine the extent of the division of labor in production, as noted by Smith 1776). Soft infrastructure will have a similar effect: financial regulation, for example, will affect the ease with which a firm can access external funding; the legal framework will determine the costs of writing and implementing a contract; and social networks will determine the firm’s access to information, finance, and markets. Therefore, infrastructure endowments determine firms’ transaction costs and how close the economy is to its production possibility frontier at any given time. Although firms generally can control some of their production costs, they have little latitude over most of the main components of their transaction costs, which are largely determined by the quality of soft and hard infrastructure provided mostly by the state.

Economic development is a process of sustained increase in per capita income, which requires continuous introduction of new and better technology to the existing industries and the upgrading of existing industries from labor (resource)-intensive industries to new, more capital-intensive industries—otherwise, per capita income will stagnate, as predicted by Solow’s neoclassical growth model.²¹ Because it is a gradual process from the lower end to the higher end of the spectrum, countries can move to many intermediate levels. Factor endowments, while changeable over time, must be taken as a given at any specific time in the economy.²² Developing countries have the advantage of backwardness and a whole spectrum of industries with different levels of capital

¹⁹ In pre-modern times the driving force for changes in structures and institutions was the increase in labor-land ratio (North, 1981).

²⁰ This pattern, which was documented in the literature by Akamatsu (1962) and Chenery (1960), is formalized in Ju, Lin and Wang (2009).

²¹ The continuous introduction of new and better technology in an existing industry is an important aspect of modern economic growth. Most people in low-income countries depend on agriculture for their livelihood. Improvements in agricultural technology are keys to increasing farmers’ income and reducing poverty. However, without diversifying and upgrading from existing industries to new, more capital-intensive industries, the scope for sustained increase in per capita income will be limited. Therefore, the discussion in the paper will focus more on industrial upgrading than technological innovation.

²² Cross-border labor mobility is still very limited in the world. Financial capital is more mobile than labor. However, due to the limitation of infrastructure endowment, the returns to large capital inflows to the industrial sectors in developing countries are likely to be low. Such capital inflows are unlikely to be large enough to change the nature of relative capital scarcity in developing countries. Therefore, in spite of the globalization of factor markets, the factor endowment in any developing country can be taken as a given at any time.

intensity available to them. For them to upgrade from low to high capital-intensity industries, they must first upgrade their factor endowments, which requires that their stock of capital grows more rapidly than the labor force (see Ju, Lin and Wang 2009).

When a developing country moves up the industrial ladder in the process of economic development, it also increases its scale of production. This is due to the indivisibility of capital equipment. The upgrading process moves its economy closer to the global industrial frontier. Firms become large and need a bigger market, which in turn necessitates correspondent changes in infrastructure. For example, the size of firms matters for their financing choices because there are economies of scale in financial transactions. Small firms usually raise smaller amounts of capital than large firms and thus are at a disadvantage in terms of the average transaction cost per unit of capital raised. Moreover, empirical evidence shows that economies of scale with different sources of financing are different: large companies enjoy some economies of scale when borrowing from banks but much less than in the case of public equity or bond financing. Small firms often lack the standard financial documents and longer financial history, which makes them more opaque than large companies, and more subject to severe informational asymmetry, and inhibits their ability to raise capital on financial markets.

The process of industrial upgrading also increases the level of risk faced by firms. As firms move closer to the global technology frontier, it becomes increasingly difficult for them to borrow mature technology from advanced countries. They increasingly need to invent new technologies and products by themselves. For risk-averse investors operating in a given macroeconomic environment, the idiosyncratic risk of a firm has three components based on risk sources: technological innovation, product innovation, and managerial capacity. In the early stage of development, firms tend to use mature technologies to produce mature products for mature markets. At that stage, the main source of risk for fund providers is the managerial ability of firms' owner-operators. At a higher stage of development, firms often invent new technologies to produce new products for new markets. In addition to managerial capacity, such firms face risks arising from the maturity of technology and markets. Therefore, while technological innovation, product innovation and managerial capacity all contribute to the overall level of risk associated with firms, their relative importance varies greatly from one industry to another and from one stage of economic development to another. This has important implications for the efficiency of alternative financial institutions in reducing informational asymmetry and risk sharing (Lin, Sun, Jiang 2009).

With changes in the size of firms, scope of the market, and nature of risk along the upgrading of the industrial structure, the requirements for infrastructure services, both hard and soft, also change. If the infrastructure is not improved simultaneously, the upgrading process in various industries alone may face the problem of x-inefficiency, a phenomenon discussed by Leibenstein (1957).

Because the industrial structure in an economy at a given time is endogenous to its relative abundance of labor, capital, and natural resources at that time, the speed of the process of industrial upgrading and development depends on the speed of its upgrading of factor endowments as well as the required corresponding improvement of infrastructure. At each particular stage of development, the production structure will be different, as well as the financial, legal, and other infrastructure. With capital accumulation or population growth, the economy's factor endowment will change, pushing its industrial structure to deviate from the optimal determined by its previous level. The change will require new types of infrastructure services to facilitate production and market

transactions and allow the economy to reach its production possibility frontier. To maintain optimality, the industrial structure and the infrastructure will need to be upgraded.

When firms choose to enter industries and adopt technologies that are consistent with the comparative advantage determined by the country's factor endowments, the economy is most competitive.²³ As competitive industries and firms grow, they claim larger market shares and create the greatest possible economic surplus in the form of profits and salaries. Reinvested surpluses earn the highest return possible as well, because the industrial structure is optimal for that endowment structure. Over time, this strategy allows the economy to accumulate physical and human capital, upgrading the factor endowment structure as well as the industrial structure and making domestic firms more competitive over time in more capital and skill-intensive products.²⁴

For firms to spontaneously enter industries and choose technologies consistent with the economy's comparative advantage, the price system must reflect the relative scarcity of factors in the country's endowment. This only happens in an economy with competitive markets (Lin 2009a; Lin and Chang 2009). Therefore, a competitive market should be the economy's fundamental mechanism for resource allocation at each stage of its development. That kind of *comparative advantage-following* approach in economic development may appear to be slow and frustrating in countries with major poverty challenges. In reality, it is the fastest way to accumulate capital and upgrade the endowment structure, and the upgrading of industrial structure can be accelerated by the availability of technology and industries already developed by and existing in more advanced countries. At each stage in their development, firms in developing countries can acquire the technologies (and enter into industries) that are appropriate for their endowment structure, rather than having to reinvent the wheel (Krugman 1979; Gerschenkron 1962). This possibility to use off-the-shelf technology and to enter into existing industries is what has allowed some of the East Asian newly industrialized economies to sustain annual GDP growth rates of 8 and even 10 percent.

As a country climbs up the industrial and technological ladder, many other changes take place: the technology used by its firms becomes more sophisticated, capital requirements increase, as well as the scale of production and the size of markets. Market transactions increasingly take place at arm's

²³ Porter (1990) made the term 'competitive advantage' popular. According to him, a nation will have competitive advantage in the global economy if the industries in the nation fulfill the following four conditions: 1, their industries intensively use the nation's abundant and relatively inexpensive factors of production; 2, their products have large domestic markets; 3, each industry forms a cluster, and 4, domestic market for each industry is competitive. The first condition in effect means that the industries should be the economy's comparative advantage determined by the nations' endowments. The third and the fourth conditions will hold only if the industries are consistent with the nation's competitive advantage. Therefore, the four conditions can be reduced to two independent conditions: the comparative advantage and domestic market size. Among these two independent conditions, the comparative advantage is the most important because if an industry corresponds to the country's comparative advantage, the industry's product will have a global market. That is why many of the richest countries of the world are very small (Lin and Ren 2007).

²⁴ The proposition that countries need to specialize in industries consistent with their comparative advantage at each stage of their development is just like the one that countries need to have free, competitive markets. It provides a theoretical framework for organizing an economy efficiently. In reality just like no country will have free, competitive market in the perfect sense in the real world, no country will follow its comparative advantage perfectly, especially given the fact that it changes over time and industrial change is not instantaneous. We know that a deviation too far away from free market is likely to reduce economic efficiency. Likewise, a large deviation from a country's comparative advantage is likely to create distortions, reduce the growth rate, increase macro instability, and worsen income distribution. For empirical testing regarding the impact of deviation from comparative advantage, see Lin (2009a).

length. A flexible and smooth industrial and technological upgrading process therefore requires simultaneous improvements in educational, financial, and legal institutions, and hard infrastructure so that firms in the newly upgraded industries can produce sufficient amounts to reach economies of scale and become the lowest cost producers (Harrison and Rodriguez-Clare 2009). Clearly, individual firms cannot internalize all these changes cost-effectively, and spontaneous coordination among many firms to meet these new challenges is often impossible. Change in infrastructure requires collective action or at least coordination between the provider of infrastructure services and industrial firms. For this reason, it falls to the government either to introduce such changes itself or to coordinate them proactively.²⁵

With the upgrade in factor endowment and industrial structure, infrastructure must be improved in parallel for the economy to achieve x-efficiency. This is not an easy process to design and implement. Governments often fail to play their role in the provision, coordination, and improvement of infrastructure. In such situations, infrastructure becomes a bottleneck to economic development. In fact, economic growth tends to render existing institutional arrangements obsolete, as it induces constant shifts in the demand for institutional services. Institutional services are by nature public goods. Changes in institutions require collective action, which often fails because they run into the free-rider problem (Lin 1989). Therefore, governments need to play a proactive role in the process of economic development so as to facilitate timely improvements in hard and soft infrastructure to meet the changing needs arising from industrial upgrading.

B. Exit Strategy from Distortions

Having outlined the functions of a facilitating state, it is important to emphasize that the governments in developing countries may do too little or too much in their interventions and end up creating more distortions and inefficiencies—this was the case even in East Asia (Noland and Pack 2003). In discussing the role of the state, it is crucial to focus on not only how to design policies to facilitate industrial upgrading, but also how to exit from distortions already present.

Governments often adopt and implement policies that reflect the dominant social thought because those are the outcomes of political developments, or prevailing intellectual trends (Lin 2009a). After the Industrial Revolution in the eighteenth century, heavy industries were the backbone of industrialized powers in the West. China, for instance, had been defeated repeatedly and had become a quasi-colony, with parts of its territory surrendered to Britain, Japan and Russia. It was therefore understandable that Mao Zedong would declare in 1945 that “without the establishment of heavy industries in China, there can be no solid national defense, no well-being for the people, no prosperity and strength for the nation.”

²⁵ Note that this is a different argument from the coordination role often proposed in the past for developing-country governments. That “big push” line of argument stressed the idea that if each potential firm’s viability depends on inputs from another firm that does not yet exist, none of the potential firms may emerge. In that case, the government can theoretically move the economy to a higher-welfare equilibrium with a big push that leads to the concurrent emergence of upstream and downstream firms (See Rosenstein-Rodan, 1961; Murphy, Shleifer, and Vishny, 1989). But changing global conditions have made the traditional big-push argument less compelling. The reduction in transportation and information costs in recent decades has led to global production networks in which many countries, including developed and developing, produce only certain parts of a final product according to each country’s comparative advantage.

Similar views were expressed elsewhere in the developing world after World War II. In 1946, Indian leader Jawaharlal Nehru said: “No country can be politically and economically independent, even within the framework of international interdependence, unless it is highly industrialized and has developed its power resources to the utmost.” In the 1950s and 1960s, this same line of thinking sustained the quest for freedom in Sub-Saharan Africa, the Middle East, and Latin America (see Frankel 1953; Prebisch 1959; Furtado 1970; Monga 2006). Unlike industrialized countries, these developing countries had massive poverty, high birth and death rates, low average educational attainments and very little infrastructure. Moreover, they were heavily specialized in the production and export of primary commodities and imported most of their manufactured goods. Thus, it was central to their policies to develop national economies so as to achieve a rapid economic take-off and eliminate poverty. Economic growth through the development of capital-intensive advanced industries (the basis of military strength) was seen by many leaders as the prime route to achieve that goal. In fact, countries in Western Europe pursued exactly the same goals in the nineteenth century in the wake of the contrast between the United Kingdom’s rising industrial power and the backwardness of their own predominantly agrarian economies (Gerschenkron 1962).²⁶

Government actions in managing economic policy can lead to failure when placed under the influence of dominant development thinking and/or interest group politics. Sometimes they fail because the government does too little than it should, and does not provide the level of support necessary to sustain progress toward industrialization. This was the case for instance in Latin America where states provided sub-optimal levels of hard infrastructure after the debt crisis (Calderon and Serven 2004). It is also the case when too little public support is provided to industrial upgrading, information collection and sharing, or promotion of new business ventures with foreign firms.

Governments can also fail because they entertain over-ambitious objectives about industrial upgrading, or are unable to identify what is best for the economy at a given point in time. A prominent example is the import-substitution strategy practiced by most developing countries after World War II. In its primary stage, it allowed the development of labor-intensive light industries and achieved substantial success (Ranis and Mahmood 1992). However, at later stages, that strategy attempted to develop capital-intensive industries that were often inconsistent with countries’ comparative advantage. As a result, firms operating in those industries were not viable in open, competitive markets. This led governments implementing import-substitution strategies to introduce various distortions in factor prices (such as the repression of interest rates and overvaluation of domestic currencies) so as to reduce the costs of investment and imports of technology and equipment for non-viable enterprises in the targeted industries. These distortions generally resulted in excess demand for those factors whose prices were suppressed. Governments had to resort to central planning and other administrative measures to guarantee allocation for those factors to the non-viable enterprises in the priority industries, and priority industries were often nationalized to minimize the incentives of managers to argue for more subsidies or to reallocate low-priced inputs to other sectors for arbitrage (Lin and Li 2009).

²⁶ As noted previously, the difference is that the gap between Western Europe and the United Kingdom was smaller in the nineteenth century, compared to the gap between developing countries and the advanced industrial powers in the twentieth century. While the strategy adopted by developing countries in the post WWII period appeared to be similar to that of the Western Europe in the nineteenth century, the results were completely different.

The “shock therapy” advocated in the Washington Consensus framework and suggesting that a set of stabilization, liberalization, and privatization policies be implemented simultaneously and immediately may not work. Exiting successfully from distortions requires a clear understanding of the first-best condition (which may be different at different stages of development) and a pragmatic approach to move to that stage. Because industrial structure in developing countries is different from that of industrialized countries, financial, legal, and other infrastructural needs there are likely to be different.²⁷ The right target for transition from one stage to another is therefore one that is realistic and consistent with the level of development. Furthermore, developing countries usually face many kinds of compounded distortions, as one inappropriate intervention causes a second round of distortions, which itself generates a third round of distortions, and so on. This negative spiral places them in, say, the *n*th best situation. Shock therapy may not be effective from the perspective of the *n*th best scenario. The example of the German reunification illustrates the point: in spite of the large amount of subsidies received from West Germany, shock therapy was very slow to produce good results and eventually did not work well (Hunt 2008).

What role should the state play to facilitate reform and help the economy transition back to the first-best, distortion-free situation? This important question is still one of the least studied areas in economics. The short answer is that it is desirable to adopt a pragmatic, gradual exit that provides transitory protection to the old priority sectors in order to maintain stability, and liberalizes sectors consistent with the economy’s comparative advantages so as to achieve dynamism simultaneously. This approach was adopted in China, Vietnam, Mauritius and other successful economies during their transition process. The reason for choosing a gradualist approach is that distortions are designed to protect non-viable firms in old priority sectors. Unless some measures are taken to strengthen the viability of those firms, or unless newly liberalized sectors can create enough jobs to absorb workers released from old priority sectors, the removal of existing protection measures may cause the collapse of those nonviable firms and generate serious social and economic problems. To avoid that consequence, political leaders are often tempted to introduce other protection measures to the already nonviable firms in old priority sectors. This makes matters even worse in terms of economic efficiency (Lin 2009a). It is therefore important to study (both theoretically and empirically) the generalization of the gradual, pragmatic approach followed by successful transition economies.

Summing up, the new structural economics suggested in this paper is built on three key propositions. First, optimal economic structures are different at various stages of development. This applies to a country’s industrial, technological, financial, legal, and other structures. Second, economic development is a continuous process, not one that can be divided into rigid or specific “stages” as suggested by Rostow (1990b), and certainly not a dichotomy between two groups (“low-income” countries versus “high-income” countries) as traditionally assumed in the economic literature. The spectrum of economic development in fact ranges from a low, traditional, subsistence agrarian stage, through various middle-income, industrialized stages to a high, modern, high-income, post-industrialization stage. Third, at any given stage of development, the market is the fundamental mechanism for efficient resource allocation; but the state needs to play a proactive, facilitating role in the move from a lower stage to a higher stage.

²⁷ One example is the attempt to develop modern equity market in many low-income countries where the appropriate financial arrangement should instead be small, local banks (Lin, Sun and Jiang 2009).

4. WHAT IS “NEW” ABOUT THE NEW STRUCTURAL ECONOMICS?

Like all learning ventures, economic development thinking is bound to be a continuous process of amalgamation and discovery, continuity and reinvention. The existing stock of knowledge has been the result of many decades of work by thinkers from various backgrounds and disciplines and has come to light through several waves of theoretical and empirical research. It is therefore only natural that the proposed new structural economics has some similarities and differences with previous strands in the development economics literature. Its main value-added should be assessed on the new policy insights it provides, and the pertinence of the research agenda ahead.

A. Similarities and Differences with Previous Approaches

In terms of similarities, the “new” and the “old” structural economics are both founded on the structural differences between developed and developing countries, and acknowledge the active role of the state in facilitating the movement of the economy from a lower stage of development to a higher stage of development. However, there are profound differences between these two approaches regarding their targets and the modalities of state intervention. The old structural economics advocates development policies that go against an economy’s comparative advantage and advise governments in developing countries to develop advanced capital-intensive industries through direct administrative measures and price distortions. By contrast, the new structural economics stresses the central role of the market in resource allocation and advises the state to play a facilitating role to assist firms in the process of industrial upgrading by addressing externality and coordination issues.

The differences between the two frameworks derive from their dissimilar views on the sources of structural rigidities: old structural economics assumes that the market failures that make the development of advanced capital-intensive industries difficult in developing countries are exogenously determined by incorrect price signals, which are themselves distorted by the existence of monopolies, or by labor’s perverse response to price signals, and/or the immobility of factors. By contrast, the new structural economics posits that the failure to develop advanced capital intensive industries in developing countries is endogenously determined by their endowments. The relative scarcity in their capital endowment and/or the low level of soft and hard infrastructure in developing countries make the reallocations from the existing industries to the advanced capital intensive industries unprofitable for the firms in the economy. Moreover, old structural economics assumes a dual and restrictive view of the world, with the binary classification of only two possible categories of countries: “low-income, periphery countries” versus “high-income, core countries.” As a result, it views the differences in the industrial structure between developed and developing countries as expressing a dichotomy. Contrary to that vision, new structural economics considers these differences as the reflection of a whole spectrum that includes many different stages and levels of development.

The new structural economics challenges the dichotomy between developing and developed countries, which led old structuralist thinkers to miss the fact that economic development is a continuous process that gives each country following its comparative advantage the opportunity to improve and adjust its optimal economic structure at each development stage. That process makes countries competitive and able to benefit from advantages of backwardness in technology and industrial innovations, and to upgrade their endowments and industrial structure in the fastest

possible way. While old structuralists too often viewed developing countries as resource-dependent victims of external, dominant political and economic forces that set a secular decline in commodity prices, the new structural economics rejects dependency theories. In an increasingly globalized world, it sees opportunities for developing countries to counter negative historical trends by diversifying their economy and building industries that are consistent with their comparative advantage so as to accelerate growth and achieve convergence.

Another major difference between the new and the old structural economics is the rationale for using key instruments of economic management. Old structural economics sees systematic government intervention in economic activities as the essential ingredient in the modernization objective. Among the key instruments used to move from “developing” countries to “industrialized” countries are generalized protectionism (such as government-imposed tariffs on imports to protect infant industries), rigid exchange-rate policies, and the creation of state-owned enterprises in most sectors.²⁸

By contrast, the new structural approach recognizes that import substitution is a natural phenomenon for a developing country climbing the industrial ladder in its development process, provided that it is consistent with the shift in comparative advantage that results from changes in endowment structure. But it rejects conventional import-substitution strategies that rely on the use of fiscal policy or other distortions in low-income, labor or resource-abundant economies to develop high cost, advanced capital-intensive industries, which are not consistent with the country’s comparative advantage. It also stresses the idea that the industrial upgrading process in a developing country should be consistent with the change in the country’s comparative advantage that reflects the accumulation of human and physical capital and the change in its factor endowment structure—this ensures the viability of firms in new industries. New structural economics concludes that the role of the state in industrial diversification and upgrading should be limited to the provision of information about the new industries, the coordination of related investments across different firms in the same industries, the compensation of information externalities for the pioneer firms, and the nurturing of new industries through incubation and encouragement of foreign direct investment (Lin 2009a; Lin and Chang 2009). The state also needs to effectively assume its leadership role in the improvement of hard and soft infrastructure in order to reduce transaction costs on individual firms, and facilitate the economy’s industrial development process.

B. New Structural Economics: Some Policy Insights

The ultimate goal of development thinking is to provide policy advice that facilitates the quest for sustainable and inclusive economic and social progress in poor countries. The new structural economics applies the neoclassical approach to the study of issues related to the nature and determinants of economic structures and their patterns of change in the process economic development. In addition to re-examining the role of the state in facilitating the industrial upgrading in the process of economic development discussed in the previous section, that framework brings structures into the core of development analysis. It can lead to many new policy insights that are different from what the old structural economics and conventional neoclassical theories yielded. While specific policy measures to be derived from the new structural economics

²⁸ Such interventions are due to the need to protect nonviable firms in priority industries identified in the government’s industrial policy in violation of comparative advantage (Lin and Li 2009).

approach will require further research and depend very much on country context and circumstances, one can conjecture a few preliminary insights on various topics:

Fiscal Policy

Until Britain's very high unemployment of the 1920s and the Great Depression, economists generally held that the appropriate stance for fiscal policy was for governments to maintain balanced budgets. The severity of the early twentieth-century crises gave rise to the Keynesian idea of counter-cyclical policy, which suggested that governments should use tax and expenditure policies to offset business cycles in the economy.

By contrast, proponents of the rational expectations theory (neoclassical economics) offer doubts about the implicit assumption behind the Keynesian model of a multiplier greater than one,²⁹ and its implication that governments are able to do something that the private sector has been unable to do: mobilize idle resources in the economy (unemployed labor and capital) at almost zero social cost, that is, with no corresponding decline in other parts of GDP (consumption, investment, and net exports). Instead, they warn against the possibility of the so-called Ricardian equivalence trap, and point to the fact that households tend to adjust their behavior for consumption or saving on the basis of expectations about the future. They suggest that expansionary fiscal policy (stimulus packages) is perceived as immediate spending or tax cuts that will need to be repaid in the future. They conclude that the multiplier could be less than 1 in situations where the GDP is given and an increase in government spending does not lead to an equal rise in other parts of GDP. The rational expectations theory even suggests the possibility of some rare instances where multipliers are negative, pointing to situations where fiscal contractions become expansionary (Francesco and Pagano 1991).

From the viewpoint of the new structural economics, countercyclical policy is the appropriate fiscal strategy for a developing country. Because governments there need to play a critical role in the industrial upgrading process by providing essential infrastructure, recessions are typically good times for making infrastructure investments, for three main reasons: first, such investments boost short-term demand and promote long-term growth; second, their cost is lower than in normal times; and third, the Ricardian equivalence trap can be avoided because the increase in future growth rates and fiscal revenues can compensate for the cost of these investments (Lin 2009b).

Moreover, if a developing country government follows the new structural economics approach of facilitating the development of industries according to the country's comparative advantage, its economy will be competitive and the fiscal position and the external account are likely to be sound, thanks to the likelihood of strong growth, good trade performance, and the lack of nonviable firms that the government has to subsidize. Under this scenario, the country will face fewer homegrown economic crises. If the economy is hit by external shocks such as the recent global crisis, the government will be in a good position to implement a counter-cyclical fiscal stimulus and invest in infrastructure and social projects. Such public investments can enhance the economy's growth potential, reduce transaction costs on the private sector, increase the rate of return on private investment, and generate enough tax revenues in the future to liquidate the initial costs.

²⁹ Barro (2009) calls active fiscal policy of Keynesian type "the extreme demand-side view" or the "new voodoo economics".

Public Revenue Management Policy in Resource-Rich Countries

According to old structural economics, certain strategic sectors generating large public revenue (such as the extractive industries) should be placed under government control. A number of other sectors deemed of national interest are also subjected to state aid and protection. These policy choices are generally implemented through the creation of state-owned enterprises under the justification that they represent natural monopolies. Public revenues collected through direct state ownership or taxes are used to fund investment programs or increased social spending, including health care, subsidized food and education. International trade is taken over almost entirely by the government and private capital inflows are often nonexistent, or strictly controlled.

Neoclassical economics tends to recommend that resource-rich countries adopt macroeconomic policies aiming at avoiding internal and external balance problems. This is usually done by securing external financing, adopting demand-restraint measures, and implementing structural reforms. In this regard, one of the main goals of fiscal policy is to save a substantial portion of public revenue (often deposited in a separate central bank account or trust fund for future generations), and only use a small fraction of resource revenue for current consumption. In the short and medium term, this helps smooth public expenditure in the face of commodity price fluctuations. In the long run, it raises total government savings and ensures that enough wealth from natural resources is accumulated for future generations.

The current neoclassical literature also highlights the importance of sound management of foreign reserves in resource-rich countries because it ensures a country's overall resilience to shocks. Foreign exchange reserve management should support a wide range of objectives, including to: maintain confidence in monetary and exchange rate policies; mitigate the risks of external vulnerability by maintaining foreign currency liquidity to absorb shocks during times of crisis; provide confidence to markets that a country can meet its external obligations; ensure the backing of domestic currency by external assets; and provide reserves in case of national disasters or emergencies (IMF 2001). Because sound reserve management policies and practices can support, but not substitute for, sound macroeconomic management, neoclassical economics recommends that portfolio management policies concerning the currency composition, choice of investment instruments, and acceptable duration of the reserves portfolio be consistent with a country's specific policy settings and circumstances, and serve to ensure that assets are safeguarded, readily available and support market confidence. It also stresses the need for a framework of transparency that ensures accountability and clarity of reserve management activities and results, sound institutional and governance structures, and prudent management of risks. However, such a resource revenue management policy may not be sufficient to facilitate the diversification and upgrading of industries in a resource-rich country, accelerate the growth rate, and enhance its inclusiveness and sustainability (Hausmann and Klinger 2006).

The new structural economics would recommend that an appropriate share of revenues from commodities be used to invest in human, infrastructural and social capital so as to facilitate the diversification and upgrading of industries. To accomplish this with the greatest effect, these resources should finance investment opportunities that remove binding constraints on growth, especially in the infrastructure and education sectors. Microeconomic analyses show that even when factory floor costs are comparable, inefficiencies in infrastructure can make it impossible for poor countries to compete on international markets. Freight and insurance costs in African countries are

250 percent of the global average,³⁰ with road freight delays 2-3 times as long as in Asia. Lacking financial resources and the appropriate policy frameworks, many of these countries are often unable to sustain much needed investment and maintenance expenditures.³¹ In such contexts, the effective fiscal strategy would not be to keep natural resource revenues in sovereign funds and invest in foreign equity markets or projects but, rather, to use a substantial portion of the revenues for financing domestic or regional projects that facilitate economic development and structural change—i.e., projects that stimulate the development of new manufacturing industries, diversify the economy, provide jobs and offer the potential of continuous upgrading.³²

Monetary Policy

Old structural economics suggested that monetary policy should be under government control (not independent central banks) and directed at influencing interest rates and even sector credit allocation. But it also acknowledged that many other factors that influence the investment demand-schedule in developing countries are too powerful for monetary policy alone to achieve sufficient levels of investment, channel resources in strategic sectors, and combat unemployment.

Building on lessons from the rational expectations revolution, neoclassical economists doubted the idea that monetary policy could be used to support industrial development. It recommended that its main goal be price stability, and advocated the use of short-term interest rates by independent central banks to maintain the general level of prices (or to control money supply growth), and not to stimulate economic activity and trigger inflation. Commenting on the substantial decline in macroeconomic volatility around the world in recent decades—at least prior to the 2007 global crisis—the so-called “Great moderation”), which he called “one of the most striking features of the economic landscape over the past twenty years,” Bernanke (2004) wrote: “Few disagree that monetary policy has played a large part in stabilizing inflation, and so the fact that output volatility has declined in parallel with inflation volatility, both in the United States and abroad, suggests that monetary policy may have helped moderate the variability of output as well.”

New structural economics envisions the possibility of using interest rate policy in developing countries as a counter-cyclical tool and as an instrument to encourage infrastructure and industrial

³⁰As percent of cost. Source: UNCTAD Statistical Database.

³¹ Recent research suggests that *economic* returns on investment projects in developing countries averages at 30–40 percent for telecommunications, over 40 percent for electricity generation, and more than 200 percent for roads. In Thailand, production loss due to power outages represents more than 50 percent of the total indirect costs of doing business in 2006. Firms often rely on their own generators to supplement the unreliable public electricity supply. In Pakistan, over 60 percent of firms surveyed in 2002 owned a generator. The cost of maintaining a power generator is often high and burdensome, especially for small and medium-size firms, which tend to be an important source of employment. Yet, while these costs must be privately borne, their benefits are felt across the economy.

³² The exploitation of natural resources can generate large amount of revenues but it is generally very capital-intensive and provides limited job opportunities. In a recent visit to Papua New Guinea, I observed that the Ok Tedi copper and gold mine in Tabubil, Papua New Guinea generates almost 80 percent of the country’s export and 40 percent of government revenues but provides only 2000 jobs. A proposed liquefied natural gas project will double Papua New Guinea’s national income after its completion in 2012, but the project will only provide 8,000 jobs. The majority of Papua New Guinea’s 6.5 million populations still live on subsistence agriculture. The contrast between the living of a few elite workers in modern mining and that of subsistence farmers is becoming a source of social tensions. A similar observation can be made about Botswana: the failure to diversify the economy from the diamond mining and to generate employment opportunities may explain the widening of disparity and deterioration of various human and social indicators, despite the diamond industry’s great success in sustaining Botswana’s growth miracle in the past 40 years.

upgrading investments during recessions—measures that may contribute to productivity growth in the future. Monetary policy is often ineffective for stimulating investment and consumption in recessions and excess capacity situations in developed countries, especially when nominal interest rates hit the zero bound in a context of limited profitable investment opportunities, pessimistic expectations, low confidence about the future, and the likelihood of liquidity traps.³³ It should be noted, however, that developing countries are less likely to encounter such liquidity traps. Even when faced with excess capacity in existing domestic industries, their scope for industrial upgrading is large. Their firms have incentives to undertake productivity-enhancing, industrial upgrading investments during recessions if interest rates are sufficiently low. Furthermore, they tend to have many infrastructure bottlenecks. Lowering interest rates in such contexts would also encourage investments in infrastructure.

Financial Development

There is ample consensus that financial system development is essential to sustaining economic growth. There is however much less agreement on the specific role it plays in that process. Starting with the observation that one of the major constraints facing developing countries was limited capital accumulation (Rosenstein-Rodan 1943; Hirschman 1958), old structural economics regarded the problems of the financial sector in underdeveloped economies as resulting from widespread market failures that could not be overcome by market forces alone.³⁴ They recommended that governments adopt a hands-on approach in that process, mobilize savings and allocate credit to support the development of advanced capital-intensive industries. Analyzing the effects of such policies throughout the developing world, especially in the 1960s and 1970s, economists observed that price inflation combined with numerous government interventions in the credit mechanism to set interest rates and direct the flow of credit (with politicians directing the flow of credit to suit their own ends) had shrunk the deposit base for domestic bank lending. This very often led to financial repression (McKinnon 1973; Shaw 1973). In some countries, especially in Sub-Saharan Africa, the belief in soft-budget constraints led governments to accumulate deficits in state-owned financial institutions, and created a pervasive business culture of self-repression, not only for banks but also for private enterprises (Monga 1997). Drawing consequences from such analyses, neoclassical economists advocated financial liberalization. They contended that bureaucrats generally do not have the incentives or expertise to intervene effectively in credit allocation and pricing, and that a well-defined system of property rights, good contractual institutions, and competition would create the conditions for the emergence of a sound financial system. They recommended that government exit from bank ownership and lift restrictions on the allocation of credit and the determination of interest rates (Caprio and Honohan 2001).

While agreeing with the need to address the deleterious effects of financial repression, new structural economics would emphasize the fact that those distortions are often designed to protect

³³ The likely mechanism of a liquidity trap in a developed country confronting an excess capacity situation is as follows: many firms will have poor performance and some may go bankrupt or reduce employment. This will aggravate the slack in the labor market, reduce wage rates and job security. As long as job security is poor, consumption is likely to remain low, even if interest rates are reduced. In fact, the reduction of interest rates may not stimulate investment for two reasons: the lack of profitable opportunities for investing in the existing industries with excess capacity, and the uncertainty of upgrading from the existing global technological frontier to new industries.

³⁴ Gerscherkron (1962) made a similar point, arguing that the private sector alone cannot effectively address the problems of access to finance in weak institutional environments.

non-viable firms in priority sectors in developing countries. It would then stress the importance of an appropriate sequencing of liberalization policies in domestic finance and foreign trade so as to achieve stability and dynamic growth simultaneously during transition. New structural economics also posits that the optimal financial structure at a given stage of development may be determined by the prevailing industrial structure, the average size of firms, and the typical type of risk they face, all factors that are in turn endogenous to the economy's factor endowments at that stage. Observing that national policies frequently favor large banks and the equity market regardless of the structure of the economy, it would suggest that low-income countries choose small, local banks as the backbone of their financial systems, instead of trying to replicate the financial structure of advanced industrialized countries. This would allow small-scale firms in agriculture, industry and the service sector to gain adequate financial services. As industrial upgrading takes place and the economy relies increasingly on more capital intensive industries, the financial structure will change to give greater weight to large banks and sophisticated equity markets (Lin, Sun and Jiang 2009).

Foreign Capital

In a world that they thought was characterized by the core-periphery relationship, old structural economists tended to view foreign capital mainly as a tool in the hands of industrialized countries and their multinational firms to maintain harmful control over developing countries. They rejected the idea that free capital movements among countries could deliver an efficient allocation of resources, and considered foreign direct investment flows to poor countries as an instrument for foreign ownership and domination. They advocated tight restrictions on virtually all forms of international financial flows.

Neoclassical economic theory argues that international capital mobility serves several purposes: it allows countries with limited savings to attract financing for productive domestic investment projects; it enables investors to diversify their portfolios; it spreads investment risk more broadly; and it promotes inter-temporal trade—the trading of goods today for goods in the future (Eichengreen et al. 1999). Therefore, the theory generally favors open or liberalized capital markets, with the expectation of more efficient allocation of savings, increased possibilities for diversification of investment risk, faster growth, and the dampening of business cycles. It should be noted, however, that some neoclassical economists also argue that liberalized financial markets in developing countries can be distorted by incomplete information, large and volatile movements in and out the system, and many other problems leading to sub-optimal consequences that are damaging for general welfare.

The new structural economics approach considers foreign direct investment to be a more favorable source of foreign capital for developing countries than other capital flows because it is usually targeted toward industries consistent with a country's comparative advantage. It is less prone to sudden reversals during panics than bank loans, debt financing and portfolio investment, and does not generate the same acute problems of financial crises as do sharp reversals of debt and portfolio flows. In addition, direct investment generally brings technology, management, access to markets, and social networking, which are often lacking in developing countries and are yet crucial for industrial upgrading. Thus, liberalizing inward direct investment should generally be an attractive component of a broader development strategy. By contrast, portfolio investment that may move in and out quickly, in a large quantity, tends to target speculative activities (mostly in equity markets

or the housing sector) and create bubbles and fluctuations. It should not be favored.³⁵ The new structural economics approach may also shed new light on the puzzle raised by Lucas (1990) about the flow of capital from capital scarce developing countries to capital abundant developed countries. Without improvement of infrastructure and upgrading to new comparative advantage industries, the accumulation of capital in a developing country may encounter diminishing returns, causing lower returns to capital in the developing countries, and justifying the subsequent outflow of capital to developed countries.

Trade Policy

There have been various old structuralist approaches to external trade. But one constant feature is the belief that integration into the global economy is bound to maintain the existing world power structure, with Western countries and their multinational corporations dominating poorer countries and exploiting their economies. In order to break the dependency trap, old structuralist thinkers have suggested that priority be given to import-substitution strategies, with developing economies closed and protected until they can compete with advanced industrialized countries in world markets.

A radically different view was adopted by economists in the 1980s. Observing that macroeconomic crises in developing countries almost always have an external dimension, they considered that their immediate cause was the lack of foreign exchange to service debts and purchase imports. They recommended trade liberalization and export promotion as a solution to generate foreign exchange through export earnings. This was also consistent with the view that in the long term, outward oriented development strategies are more effective than inward looking policies. This view was bolstered further by the argument that such a strategy would increase demand for unskilled labor and hence unskilled wages, as had happened in successful East Asian countries (Kanbur 2009).

The analysis from new structural economics would be consistent with the view from neoclassical economics that exports and imports are endogenous to the comparative advantage determined by a country's endowment structure (they are essential features of the industrial upgrading process and reflect changes in comparative advantage). Globalization offers a way for the developing countries to exploit the advantages of backwardness and achieve a faster rate of innovation than is possible for countries already on the global technology frontier. It is an essential channel for convergence. The new structural economics approach recognizes, however, that many developing countries start climbing the industrial ladder with the legacy of distortions from old structuralist-type import-substitution strategies. It would therefore suggest a gradualist approach to trade liberalization. During transition, the state may consider providing some temporary protection to industries that are not consistent with a country's comparative advantage, while liberalizing at the same time entry to other more competitive sectors that were controlled and repressed in the past.

Human Development

Old structural economics generally said little about the role of human development in economic growth. By contrast, neoclassical economics has shown that the continuing growth in per capita

³⁵ A sudden large inflow of portfolio capital is most likely to be invested in speculative sectors rather than in productive sectors. The reason are two-fold: a large increase in investment in existing industries may encounter diminishing returns to capital, and the potential for quick and large industrial upgrading is limited by infrastructure constraints.

incomes of many countries during the nineteenth and twentieth centuries was partly due to the expansion of scientific and technical knowledge that raised the productivity of labor and other inputs in production. Economic theory has demonstrated that growth is the result of synergies between new knowledge and human capital, which is why large increases in education and training have accompanied major advances in technological knowledge in all countries that have achieved significant economic growth. Education, training, and health, which are the most important investments in human capital, are considered to be the most important driving force for economic development (Becker 1975; Jones and Romer 2009).

New structural economics considers human capital to be one component of a country's endowment. For economic agents, risks and uncertainty arise during the process of industrial upgrading and technological innovation that accompanies economic development. As various firms move up the industrial ladder to new, higher capital-intensity industries and get closer to the global industrial frontier, they face higher levels of risks. Human capital increases workers' ability to cope with risk and uncertainty (Schultz 1961) but its formation requires a long time. A person who loses the opportunity to receive education at young age may not be able to compensate for that loss at a later age. In a dynamic growing economy, it is important to plan ahead and make human capital investment before the economy requires the set of skills associated with new industries and technologies. However, improvements in human capital should be commensurable with the accumulation of physical capital and the upgrading of industry in the economy. Otherwise, human capital will either become a binding constraint for economic development if it is under supplied because of insufficient investment, or the country will have many frustrated highly-educated workers who cannot find adequate jobs if investment in training, knowledge and learning is not consistent with the speed of industrial upgrading in the economy.

A well-designed policy on human capital development should be an integral part of any country's overall development strategy. The new structural economics goes beyond the neoclassical generic prescription for education and suggests that development strategies include measures to invest in human capital that facilitate the upgrading of industries and to prepare the economy to make full use of its resources.

5. IMPLICATIONS FOR WORLD BANK RESEARCH

The new structural economics approach highlights the importance of endowments and differences in industrial structures at various stages of development, and the implications of distortions stemming from past, misguided, interventions by policymakers whose belief in old structural economics led them to over-estimate governments' ability to correct market failures. It also points out the fact that policies advocated under the Washington Consensus often failed to take into consideration the structural differences between developed and developing countries, and ignored the sources of various types of distortions in developing countries.

The main criterion for assessing applied research in development economics is its relevance to the most pressing policy issues at hand. Many of the countries that have achieved some degree of convergence with industrialized countries in the past 50 years have often not followed the orthodox prescriptions advocated in the most influential policy circles. Development economists must learn from the experiences of these countries that have not followed conventional wisdom, yet have done better at reducing poverty than others. Moreover, the recent global economic crisis has challenged

the economics profession to reexamine the validity of some of its existing knowledge, including on development thinking. The new structural economics approach also stresses the need to update the research agenda on key issues and questions about development paradigms.

In the past decade, the World Bank has initiated a number of research projects to draw lessons from successful economies' experiences. These projects, which include the *East Asian Miracle* (World Bank 1993), *Growth in the 1990s* (World Bank 2005b), and *Growth Report* (World Bank 2008), have produced many useful stylized facts for determining the success or failure of economic development. The proposed new structural economics is a continuation of that effort and attempts to develop a general framework for understanding the causality behind the observed stylized facts.³⁶ Specifically, the new structural economics proposes to: (i) develop an analytical framework that takes into account factor and infrastructure endowments, the stages of development, and the corresponding industrial, social, and economic structures of developing countries; (ii) analyze the roles of the state and the market at each development stage, and the mechanics of the transition from one stage to another; and (iii) focus on the causes of economic distortions and the government's strategies for exit from the distortions.

The proposed new approach is not an attempt to substitute another ideologically-based policy framework for those that have dominated development thinking in past decades, yet showing little connection to the empirical realities of individual countries. Rather, it is an approach that brings attention to the endowment structure and stage of development of each country, and suggests a path toward country-based research that is rigorous, innovative and relevant to development policy. This framework stresses the need to better understand the implications of structural differences at various stages of a country's development—especially in terms of the appropriate institutions and policies, and the constraints and incentives for the private sector in the process of structural change. It also raises several questions for researchers in academia and international and national development agencies: What are the institutions and policies appropriate for countries at different stages of development? How can the market and the state play their respective roles to facilitate the efficient allocation of resources and smooth transition from one type of industrial structure to another? What advice should be given to developing countries trying to move from an environment characterized by distortions to a first-best world determined by the country's stage of development? How do we ensure that such transitions work well?

As one of the largest and most productive development research teams in the world, the World Bank's Research Department is a major producer of development thinking, cross-country data, analytic tools and policy advice that are directly applicable to operational issues and in high demand by governments, development partners and civil society. Its research has developed a heavily sector-based approach because it responds to concrete questions and specific gaps in the understanding of the development process. This is also due to the fact that the World Bank today

³⁶ The *Growth Report* presents lessons from 13 cases of high and sustained growth in the post-war period. It observes the following five stylized facts about all of them: (i) They fully exploited the world economy; (ii) They maintained macroeconomic stability; (iii) They mustered high rates of saving and investment; (iv) They let markets allocate resources; and (v), They had committed, credible, and capable governments. From the perspective of new structural economics, the first three stylized facts are the results of the adoption of a strategy that is consistent with comparative-advantage. The fourth one is a necessary condition to be fulfilled by a country following its comparative advantage. The last one is characteristic of a facilitating state and also a condition for an economy to adopt a comparative-advantage following strategy in its development process. See further discussions in Lin (2009a).

has a largely sector orientation and is country-specific in both lending and policy advice. Efforts are being made to undertake similar research in comparator countries to enrich the understanding of what other factors affect the results and thus the policy recommendations. The gaps in knowledge that are addressed emerge in large part from interactions with operations, donors and client countries. The proposed new structural economics is complementary to the existing sector-oriented research at the World Bank.

The current state of development economics and the severe impact of the global crisis on the economies of developing countries have generated strong demand for a new framework for development thinking. As the most important multilateral development institution and the premier knowledge bank in the world, the World Bank must play a leading role in the global community in the search for new thinking based on continuous examination of developing countries' experiences of successes and failures. We hope that the research agenda of the new structural economics will enrich the World Bank's research and enhance the understanding of the nature of economic development. This would help assist low and middle-income countries in achieving dynamic, sustainable and inclusive growth, and eliminating poverty.

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