

Structural change and poverty elimination

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Abstract

Purpose – The United Nations adopted 17 goals for sustainable development, which has been known as the 17 SDGs. Knowing how to achieve these goals will be very important for many countries. The first of the 17 is no poverty. The purpose of this paper is to analyze how to realize no poverty in UN's SDGs by focusing on structural changes based on the New Structural Economics.

Design/methodology/approach – This paper explains the relationship between structural changes and people's income in both rural and urban areas, and then introduces how to eliminate poverty from a New Structural Economics' perspective. Finally, it discusses what to do to make these changes a reality.

Findings – To reduce and eventually eliminate poverty, increasing personal income becomes the first step. From national perspective, structural changes are related to an income increase. In rural and urban areas alike, the structural changes will usually be accompanied by new technologies and job opportunities, which will help people improve their incomes.

Originality/value – This paper explains relationship between structural changes and poverty elimination. How to increase people's income is also discussed according to New Structural Economics. This paper's findings may well be valuable for research on poverty elimination in the future.

Keywords Development economics, Sustainable development goals, New Structural Economics, Poverty elimination, Structural changes

Paper type General review

1. Introduction: the relationship between structural change and poverty elimination

The UN adopted 17 goals for sustainable development in 2015, hoping all countries would achieve them by 2030. The first goal is no poverty, which holds that position for good reason, given that the second is zero hunger, and the third is good health and well-being. People who rid themselves of poverty through having higher incomes certainly will not suffer from hunger, and will have better nutritional intake, thus having greater ability to take care of themselves. Under that situation, their health and well-being will also improve. Obviously, we cannot achieve the first goal by printing money and giving it to the poor. Improving the labor productivity is a better choice. In order to do so, we need to have technology innovation in the existing industries so that the labor can produce more or better quality outputs or have new higher value-added industries so that the labor can be relocated to new industries.

The UN's SDG pertaining to poverty elimination mainly considers individuals. But it can also be approached from a national level – how to turn a country plagued by poverty to one abounding with prosperity. Certainly, the two concepts are related. If everyone in a country becomes relatively rich, then country as a whole will be rich. Most poor countries are agrarian. Their people work on agriculture in rural areas. So, trying to think about these issues, we need to consider how to improve the income of the people in rural areas first. However, technological innovation and structural changes in rural areas alone are insufficient. All countries in the world were poor and agrarian at the beginning of their modernization. For those few countries successfully transformed from poverty to prosperity, they all converted from rural agrarian economies to urban industrialized economies.



2. The New Structural Economics

The “New Structural Economics” is a framework for rethinking development. It uses the neoclassical approach to study the determinants and impacts of structure and structural changes in the process of economic development, including the structure of technology, industry, institutions, infrastructure and so forth in a country. By convention, this type of research is referred to as “structural economics,” just like it would be if we had used the neoclassical approach to study agriculture, we would refer that field as agricultural economics, or to study finance, as financial economics. Hence, by using the neoclassical approach to study structure, the field should be referred as structural economics. The first edition of developmental economics, which appeared after the Second World War, was structuralism. In order to distinguish this approach from structuralism, we call it the “New Structural Economics.” This is also the practice used by Douglass North when he proposed the use of neoclassical approach to study institutions and institutional changes. He should have referred his research as simply “institutional economics.” Yet, because in the USA, there was an institutional school at the turn of the twentieth century, he distinguished his own approach by calling it the new institutional economics. The “new” in New Structural Economics has the same spirit as the “new” in new institutional economics.

For the New Structural Economics, the entry point for analysis is that the structures – regardless of its technological, industrial or institutional structure – are endogenous to the endowment structure of an economy at any specific time. The availability of land or natural resources, labor force as well as capital (both human capital and physical capital) are endowments. For any country, the endowments at any specific time are given, but they are changeable over time. Also, for the country at a different level of development, the endowments have different structure. Some countries are relatively abundant in natural resources and/or labor force; others are relatively abundant in capital and skills.

Those kinds of endowment structure will determine the technological structure and industrial structure. Different technology and industry will not only require a different infrastructure, but also different institutional arrangements to facilitate its investment, production as well as sale. The New Structural Economics proposes the use of endowment structure, which is given at any specific time, even though it is changeable over time, as a starting point for the study of structure and structural change in an economy.

3. Transformation and new technology in agriculture

A poor country’s endowment is often relatively abundant in natural resources and labor force. Many types of agricultural production are land-intensive and, to some extent, are labor-intensive also – not requiring much capital inputs to begin with. All countries start with an agrarian stage and use traditional technologies for production with low labor productivity. Low labor productivity leaves people poor. If people want to improve their income, they need to use new technologies that can improve productivity and introduce new higher value-added cash crops and/or animal husbandry[1]. Once they have been provided with modern technology, compared to traditional agriculture, the country may start the transformation process, and the farmers can turn sand into gold. They can increase their incomes.

Nevertheless, this kind of new (especially modern) technology is not available spontaneously. Newer technologies, unlike traditional ones that are mainly derived from the experience of farmers, are the result of intentional research and development. The development of modern technology requires large-capital inputs and entails high risk, and is, therefore, beyond the capacity of individual agricultural households. Consequently, it is essential to have institutional arrangements to provide it to farmers. Both public research institutions and commercially orientated companies may engage in agricultural

research, thus providing new technologies to farmers. However, we know that agricultural technologies have certain characteristics. Except for hybrid seeds that must be bought every season, farmers only need to buy new higher-yielding seeds for use once; then they can produce seeds for sowing by themselves. Therefore, commercial firms have no incentive to do research in new higher-yield varieties and provide them to farmers. Thus, public research institutions must support the generation of new seeds, mainly new varieties with higher yields, which will help farmers increase their productivity. Indeed, public support will be essential.

Agricultural production has another key characteristic: its technology is location-specific, especially in cropping. It requires soil and water availability as well as adequate weather and climate conditions. There are different soil types and climates in different locations. Under these circumstances, unlike industries, one agricultural technology that is suitable for a given location may not be suitable for another. The state should thus be responsible for providing agricultural technologies with a decentralized national agricultural research system for innovating and testing different technologies that are suitable for different locations. Otherwise, even higher-yielding varieties may not help farmers attain higher incomes.

The farmers (especially poorer ones) will not be able to take much risk. If they use the new technologies, they will face many new challenges and uncertainties in using new technologies. They may not be able to cope with those kinds of uncertainties because they are poor. The state will have to step in and extend those available technologies, and perhaps do some demonstrations, showing farmers how to use new technologies and to know which ones are suitable for their locations. Once the demonstrations succeed, other farmers will have the incentive to adopt a new technology.

What is more, besides the availability of new technology, once traditional agriculture has been displaced by a modern variety, the infrastructure must also be improved, e.g. irrigation. In general, traditional crops have low yields but weather proof. Modern varieties must have irrigation, otherwise the new varieties may not produce higher yields. Hence, improving such infrastructure is essential for adopting new technologies.

Upgraded infrastructure is also needed because moving to modern varieties not only requires high-yield seeds, but also necessitates other purchases, like fertilizers that enhance potential yields for the new varieties. Traditional agriculture uses organic fertilizers and farmers can produce them by themselves. Once the move to modern agriculture is made, chemical fertilizers will be required, which farmers cannot produce, but instead must purchase on the market. However, such acquisitions depend on whether a market exists to provide them. With higher yield and larger output, the market needs to be expanded, which also depends on infrastructure, such as roads: without improvement in road, the market's scope will be very small and farmer may not increase income with increase in outputs. This is because for most agricultural products, the elasticity of demand is small, so if the market size is limited, the price will drop quickly when output increases. Under that situation, farmers may not benefit from improved productivity. To overcome that problem, the market size must be increased so as to permitting farmers to cope with diminishing-demand elasticity and increase their income.

In poorer countries, most farmers subsist from the crops they produce. Yet, because of low-demand elasticity, once they have modern agricultural technology to start modernizing, they will transform their efforts from traditional to modern agriculture. Technological improvement will bring output increases along with it, but even after the market's size increases – from village to the region, then to the nation – the low-demand elasticity will still constrain their incomes. Under those circumstances, it would be desirable to diversify away from subsistence agriculture to a non-subsistence variety that helps them cope with the low-demand elasticity. This kind of diversification is also important for farmers working in subsistence farming with crops like grains, which require limited labor inputs.

In China, if farmers produce grains, such as rice, wheat or corn, they only require working for about 20 days annually. To utilize their labor force fully, they must plant other labor-intensive crops like vegetables. To diversify to new crops like vegetables requires new technology, which is also location-specific. Once again, a better infrastructure for irrigation and road must be provided along with the required inputs in order to reach larger markets. At the same time, institutions should be improved. In traditional agriculture, farmers do not have much need for financial services. They produce what they need for themselves. After moving to modern agriculture, they need to partake of financial services so that they can purchase seeds, fertilizers and so forth. They need the support of financial institutions to undertake such investment.

Other institutional changes are also needed. If the traditional farmers trade at all, it will only take place in some periodic village markets usually, where people know each other and there is no need for written contracts or enforcement. Once they produce for regional, national market or international markets, some legal arrangements and enforcement will be required. Accordingly, the transition from traditional agriculture not only transforms farming due to technological changes, but also crop types, infrastructure and institutions.

Improving farmers' human capital makes this possible because with traditional agriculture, most farmers rely on experience, learning from older farmers how to plant crops. However, once they move to modern agriculture, they must frequently learn something new, whether in terms of a new technology or a new type of farm management or marketing activity. Thus, adopting new technology to widen their opportunities will compel them to face many new challenges and uncertainties. To be successful, educational improvement of human capital will be essential. This method stands to help a poorer country at an early stage to improve its farmers' incomes and to reduce poverty in rural areas.

4. Industrialization and urbanization

Transformation is insufficient if only happens in the agricultural sector. In the beginning, all the countries in the world are poor, at least relative to today's standards. Poverty is, of course a relative term, and one nation with even the slightest bit more can be said to be "richer" than others. According to Angus Maddison's historical data, the per capita GDP measured in \$1,990 for different countries in 1700 AD was: UK, \$1,250; USA, \$527; Japan, \$570; China, \$600; and the average across Africa, \$421. In 2008, Africa was considered to be the poorest continent, with its average per capita GDP at 1,780. Note that even though this figure is higher than the UK's at the beginning of the eighteenth century, African countries are considered to be poor by today's standards. Indeed, by today's standard, every country was "poor" prior to the eighteenth century, and certainly prior to the Industrial Revolution that began at the end of that century.

On the one hand, making poorer countries richer requires improving their agricultural productivity. On the other hand, if a country does move from poverty to prosperity, not only its agriculture productivity improved, their agriculture share also declines. Even today, some countries are still famous for exporting agricultural products, like the USA, Australia, Denmark and France; their rural population all be around 5 percent of their total current population. Moreover, their agriculture labor force contributes about 2~3 percent of their total labor force.

Changing a country from being poor to rich, and removing poverty, requires that people move from rural areas to urban areas in location, and from agriculture to non-agricultural production through industrialization.

When people move from rural areas to urban ones without jobs, they simply change from rural poor to urban poor. Poverty will remain. Therefore, when people move from rural areas

to urban ones, they need to have jobs to increase their income. There are two main types of jobs in urban areas: one is in the services, and the other is in manufacturing.

From the start, almost every economy engages in agricultural production and handicraft-type manufacture. At that stage, low productivity determines that their incomes must remain low, even though some people are working in urban, non-agriculture fields. Similarly, new technology in handicraft manufacturing increases their income. They also need to have new higher value-added sectors to emerge to further increase income. Then it will allow workers move from low value-added sectors to high value-added ones. This kind of transformation through industrialization has long been recognized by development economists. After the Second World War, newly independent countries started to pursue modernization and industrialization. In response to that need, development economics appeared as a new sub-discipline of modern economics.

The first wave of development economics, structuralism, had the goal of making developing countries enjoy similar income levels as high-income countries. That was the chief aim of modernization: how to reach income levels that approximate those found in high-income countries, which would also require similar labor productivity. That level of labor productivity demands advanced large-scale, capital-intensive industries. However, in developing countries, modern, large-scale, capital-intensive industries have not emerged spontaneously in the market. Therefore, many development economists concluded that there exists market failure and they attribute it to culture, behavior patterns of farmers and so forth. They advocate that government overcome such market failures by adopting a heavy industry-oriented development strategy or an input substitution strategy to do so. The intention is good, aiming to develop large modern industries. But after building those industries, they become white elephants. They are not competitive in market and rely on government subsidies and protection for their survival. Those kind of industries in a way go against the competitive advantages determined by their endowment structure.

From a New Structural Economics point of view, economic structure is endogenous to the endowment structure. Low-income countries lack a comparative advantage in capital-intensive industries. Firms in priority sectors, which go against the comparative advantages determined by their factor endowment structure, are not viable in competitive markets, but their states still want to build them up, thus requiring that the state provides them with subsidies and protection. Such subsidies and protectionism cause intervention and distortion. Such strategies cause not only misallocation of resources, but also rent and rent-seeking, lowering economic performance. Moreover, developing capital-intensive industries will generate relatively few jobs to accommodate the needs of outmigration of labor from agriculture to urban areas.

In China, the government controlled migration tightly during the implementation of heavy industries-oriented development strategy before the reform and opening up at the end of 1978. At that time, 81 percent of the population resided in rural areas and relied on agriculture for living. In Latin America and Africa, many farmers migrated to urban areas but they do not have jobs. They become the urban poor living in very desperate situations. The poverty issue remains.

To create productive jobs in urban areas, labor-intensive industries must develop. New Structural Economics provides a rationale for doing so.

In earlier stages of development, many countries have abundant supply of labor force, and labor-intensive industries are their comparative advantage. At that stage, wage is low, making their factor cost of production in those industries low internationally.

For developing countries starting with labor-intensive industries that are mature from a global perspective, they can enjoy latecomer advantages: they can imitate, borrow and learn from higher-income countries, and since those technologies are not protected by patents anymore, they can adopt them freely. Their cost and risk for innovation are low.

To be able to make this kind of industrialization continuous, entrepreneurs are required who will identify the sector where comparative advantages lie.

Nevertheless, entrepreneurship alone is insufficient to make such industrialization happen. Improvements to infrastructure, such as electricity supply, are needed when people move from handicraft to the modern labor-intensive industries. Individual entrepreneurs will not be able to improve the infrastructure by themselves. They also need to reach larger markets. If they just produce for their local markets, where markets are not big enough, the producers will not be able to use modern equipment, which has large economies of scale. Therefore, a road will be needed to expand market size. They also need better access to financial institutions to make large capital investments feasible. Larger markets necessitate improving the legal system, contracting and their legal enforcement in particular. Human capital is also essential. Workers need training to be able to work in new industries. Basically, they need an efficient market to help identify what sectors they have comparative advantages. They also need the state to play a facilitating role by improving a needed hard and soft infrastructure for new industries. Development according to comparative advantages will lead to the competitive industry only with the government's help in improving infrastructure and the institutions to reduce transaction costs. They can accumulate capital, changing their endowment structure once they can be competitive, then change their comparative advantage and climb up industrial ladders gradually. Again, this process requires an organic collaboration between the market and the state. In this process, starting from industrialization, urbanization must follow.

Urbanization is endogenous in some sense because in industrial production, the economies of scale are large, making concentration of work in one location important. While improving industries' logistical and divisional levels in terms of clustering or agglomeration, reinforcing the concentration of workforce and people in certain location can lead to urbanization, which may help them to avoid unemployment. To some extent, under the transformation starting in 1978, China's urbanization followed this kind of process. Industrialization is first, and then urbanization, meaning that there were little urban unemployment issues in China. But in other countries, urbanization occurs without industrialization, leading to urban unemployment and poverty; they just replace rural poverty with urban poverty.

5. Structural changes and job opportunities creation

There is some debate about service-oriented business development in an urbanization process and manufacturing-industrialization-oriented development in the urbanization process. If a service is needed, the demand for it will increase. In the process of industrialization, income rises. Working hours will decline. Once workers reduce their working hours, they are likely to have more entertainment, which requires more services. From another perspective, labor cost and opportunity costs of working will increase, then people will like to have more conveniences, which also require more services. At the same time, in the industrialization process, production will also require services, like financial, logistic and professional services. The service development will accompany industrialization. But in the 1980s and 1990s, there were some new types of services, which were high value-added, and especially the internet makes information processing services very profitable. India is famous for providing back-office processing services for high-income countries, and exporting those kinds of services. Traditionally, a country will gradually transform from an agrarian economy to manufacturing economy and finally a service-oriented economy. The development of manufacturing requires services. However, only informational types of services would not be able to help the country to transform from poverty to prosperity, because the information service will not generate many jobs. In 1978, China's per capita GDP was about 25 percent lower than India's. The populations in both

countries are about the same. Today, China has 1.4bn, while India has about 1.3bn. India follows a service-oriented modernization, while China follows manufacturing-oriented modernization. Today, India's per capita GDP is only 20 percent of China's today (US\$8,600 for China vs US\$1,600 for India). There are certainly many reasons for this disparity, but one main reason is job availability. The service sector in India generated only 2m jobs, whereas the manufacturing sectors in China generated 124m. As a result, the likelihood of migrating low-income farmers from the rural to urban areas for higher-income jobs was better in China. This kind of industrialization and urbanization process will also generate feedback for better rural development. Even if farmers migrate, land cannot migrate. Hence, there will be opportunities for land consolidation to increase farmers' income in rural areas.

Urbanization and industrialization also lead to more job opportunities in rural areas. Farmers do not use all of their labor inputs, and may have some spare time, allowing them to work part-time in nonfarm jobs to increase their incomes, and to increase their budgets for purchasing modern technology and inputs to further increasing their income.

6. Conclusion

Elimination of poverty is a desirable goal for any nation, and especially considering the UN's SDGs. The elimination of poverty requires increasing the income of poor people with a decent job. The jobs can be in rural areas or urban areas. In either case, technological innovation and structural change are essential. Industrialization, innovation and infrastructure improvement are essential in this transformation. These are goals numbered 8 and 9 in the SDGs.

Some SDGs are goals and others are the means for goals. From a New Structural Economics point of view, it is very important to understand the comparable advantages of each country in agriculture, industries and services, and in rural and urban areas. Only if a country follows the comparative advantages, determined by its factor endowments, in the development of agriculture, industries and services will the factor costs of their production be low. The market is essential for guiding a country's development according to its comparative advantages.

To make a country's economy competitive in the market, infrastructure and institutions that reduce transaction costs must also be appropriate. The state is responsible for the improvement of infrastructure and institutions. Hence, a market economy with a facilitating state is required for a country to grow dynamically. The New Structural Economics provides a framework for us to organize our thinking around this transformation and identify the areas for research to reduce poverty and achieve prosperity.

Note

1. Professor Theodore Schultz (University of Chicago) has extensively studied this type of transformation process. He published an influential book called *Transforming Traditional Agriculture* (1964). In this book, he provided convincing arguments and evidence.

Further reading

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