

Industrial Upgrading and Labour Force Matching

Jidong He

School of Economics and Management, Shangqiu Normal University, Shangqiu 476000, China

hejidong2005@126.com

Abstract

The matching of corresponding elements is needed in the process of industrial upgrading. The differences based on labor factor knowledge and skills cause effective mobility to be difficult in the process of industrial upgrading, and income increase brought about by the increase of wage level enhances the demand elasticity of labor income, increases the purchase of industrial upgrading products, reduces the demand for the original commodity and cause industry to reduce for demand, meanwhile, because workers cannot transfer to stay in low-level industries, which excess of low-level industries.

Keywords

Industrial upgrading, labor matching, excess capacity.

1. Introduction

Industrial upgrading is a very important process in the evolution of industry and industrial structure; industrial upgrading can not only improve the quality and production efficiency of enterprises, but also promote the rationality and optimization of regional or national industrial structure. On the other hand, the chronic disease of excess capacity has been arisen in many industries in the process of economic development in China, so that the industries are repetitive construction and competition at a low level, resulting in a lot of waste of resources. The industrial upgrading as an important response measure, it have been valued by government departments in the response program of solving excess capacity [1]. However, in the process of promoting industrial upgrading, one side is the problem of excess industry has not been resolved, on the other hand, the new excess capacity then appears, and industrial upgrading has not become an effective way to effectively solve the excess capacity. Is the industrial upgrading ineffective or excess capacity cannot be removed radically? It has become a problem that must be further studied in China's industrial development process.

2. Theoretical Reviews

There are many literatures on industrial upgrading; it can be found that the industrial upgrading is studied basically based on the upgrading and restructuring of industrial structure and the vertical upgrading of industrial value chain two aspects on the basis of literature combing. In the law research of industrial structure, Huffman (1931), Kuznets (1966), Qian Nali (1969, 1979) and others made a systematic research on the industrial upgrading in the structural changes in early stage [2]. Because after founding of the country and the reform and opening up China's economic development has been mainly driven by investment-driven form to promote economic growth, there has been contradiction of unreasonable proportion in the industrial structure proportion, so the industrial upgrading research is more concerned about the rationalization and high level of inter-industry structure, theoretical research are more concerned about the existing problems and their internal reasons in China's industrial structure (Zheng Xinli, 1999; Zhe Ru, 2003; Li Peiyu, 2003; Gao Bo, Chen Jian, Zou Linhua, 2012 etc.); and study the effect and path of upgrading from the perspective of specific industries (Li Gang, Liao Jianhui, Xiang Yini, 2011; Tian Hongchuan, Shi Meiya, 2013, Zhang Qizai, Li Hao, 2013, etc.). For the vertical upgrading of the industrial value chain, after Dieter Ernst first formally put forward "industry upgrading", on the one hand, the academia enter into the dispute and application differentiation stage for connotation of industrial upgrading, on the other hand, begin to

study the connotation factors, patterns and effects of industrial value chain upgrading, (Gerrifi, 1999; Kaplinsky, 2000; Pan Yue, 2002; Jiang Jing, 2007; Zhang Qizai, 2008, etc.). However, when studying industrial upgrading path, whether it is based on the cost path of investment factors or the potential advantages of production capacity, domestic scholars are more concerned about the policy and local government factors for industrial upgrading constraint factors, pay little attention to mobility obstacles of elements for the upgrading constraints in the industry and value chain link on the, as if when the industry upgrade element supply, meanwhile follow it. However, elements, especially labor force element in differences of learning, having knowledge and skills aspects, and the insufficiency of regional mobility of labor force, which make certain restrictions on industrial upgrading in specific space. It can be seen from it that the industrial upgrading of developed countries is fast, industrial upgrading of developing countries is slow, industrial upgrading of China's eastern region is fast, China's industrial upgrading central and western regions is slow, even the industrial structure is solidified and in low link of the industrial chain for a long period, industrial upgrading in the same policy and environment and the target that local government pursue economic growth similarly, the speed differences of industrial upgrading in different regions besides the factors mentioned above, there are still other factors which need to be analyzed in depth, while the factors are still important aspects to be analyzed. The capital and labor are the two main input elements in the industrial development, heterogeneity and rigidity that capital has make the capital generally use technical transformation or complete scrapped to buy new equipment to match the industrial upgrading, theoretical research this aspect mostly reflected through technological innovation. On the other hand, the renewal and transformation of the capital belongs to the category of industrial upgrading, and they are achieved by the exercise of labor force' knowledge and skills, which is innovation, therefore, the labor force is more important in factor matching in the industrial upgrading. Considering there is relatively little research on the labor factors for industry matching currently, this paper focuses on the matching effect of labor factor for industrial upgrading [3].

3. Factors Dependence in the Process of Industrial Upgrading

According to the classical economic theory, the elements within the industry are homogeneous, the mobility of labor elements in different industries is no obstacle, namely, the evolution of the industry is not subject to the constraints of labor itself, industry and industrial structure develop to next higher level, the corresponding labor elements can also be fully matched by supply and mobility, there will be no knowledge and skills barriers formed by human capital differences in the mobility of labor elements in the industry. However, the actual process of economic growth in the world shows that industrial evolution is closely related to the factors supply. It can be seen from industrial evolution process and law in nations across the world that industrial upgrading is basically carried out along the two paths, one is the transformation and evolution of product quality and production efficiency; the other one is to adjust and evolve along the industrial structure. These two evolutionary paths are carried out simultaneously in the process of industrial development regardless of primary and secondary. The power of industrial upgrading comes from market driving force of the demand side, the self-drive of the supply side and government policy thrust, but because the government much too focus on the industrial higher grade and scale in China's industrial development process, think that the industry's industrial higher grade and scale can promote the rationalization of the structure, but also can make our industry has a dominant position in the international competition. Therefore, in the process of promoting the rationalization of the industry, stimulus of policy aspects promotes the China's industrial development to form evolution path which take structural change and centralization the principal thing, but the quality improvement of product is not to achieve equivalent concern as industrial progress in the policy aspects. No matter what product quality and improvement of production efficiency, or adjustment industrial structure, they are inseparable from adjustment of the corresponding supply factor. The "new growth theory" proposed by Paul Romer and Robert Lucas shows that the reason for persistence differences of economic growth among various countries and regions is decisive role of technological progress since the 1980s, and the endogenous nature of

technological progress lies in the differences in human capital. Robert. Barro (19) verifies that there is a significant positive correlation between economic growth and the years men receive secondary education and higher education in human capital. Without the difference in human capital, the growth of countries or regions will form absolute convergence along the neoclassical economic growth theory reduction under the conditions that capital marginal revenue decline progressively. And the contribution effect of economic growth differences of these human capital in region and nation is derived through the evolution of related industries, that is to say, the upgrading and evolution of the industry are because the matching elements also make corresponding adjustments and upgrading, there is no corresponding structural adjustment of human capital structure, then the elements input of relevant industrial upgrading is difficult to meet, then only develop industry in a low level.

The dependences on labor elements are reflected in the following aspects in the process of industrial upgrading: First, the improvement of product quality requires laborers to continuously improve through learning in the production process, new production efficiency promotion and the emergence of new products within the industry need workers to continually improve by progressive invention. For example, after smart phones emerges, which gradually improve from push-button to the direction of touch screen, meanwhile the performance of mobile phone also evolve from a single communication function to electronic terminal product that integrate communications, games, shooting, navigation, shopping under the innovation of software staff. On the one hand, market competition forces enterprises to improve product quality, and enhances consumer' acceptance and trust of the enterprise products, so that they has a cognitive differentiation in brand aspects. On the other hand, competition forces enterprises to continually improve efficiency as well, or diversify and develop new products, improve the market competitiveness and profitability of enterprises. No matter what form of the upgrading requires the knowledge and skills of the work elements to improve and adjust, otherwise it is difficult for enterprise to innovate, and it is difficult to develop into diversification direction and even transform. Second, industrial competition enable enterprises to extend to both ends of the industrial value chain, or in the industrial structure, transform from labor-intensive and capital-intensive industries to knowledge and technology-intensive industries, it more requires a lot of human capital investment, need a large number of product development, design and technical services of technical personnel and so on, or the industrial upgrading is just empty talk.

4. Effect of Industrial Upgrades for of Labor Element Structure

In order to analyze the factors dependence of industrial upgrading, the influences that the change condition of the factor structure for the industrial upgrading are analyzed. Assuming that there are two enterprises that produce different products at the both ends of the unit space, respectively, the efficiency of the enterprise 1 and the enterprise 2 is β and δ , respectively, the ratio of the labor force of the enterprise 1 is α , the ratio of the labor force of the enterprise 2 is $1-\alpha$, and $\alpha > 1-\alpha$, the requirements and the output of enterprises produce two Q^d and Q^s , the transportation of labor force in the mobility of enterprise is t . Without technological progress (that is when in industry is upgraded), the efficiency of the two enterprises is equal, assuming that there is no depreciation and investment of fixed capital, the matching amount of labor and capital meet the minimum requirements, and there is no capital replaced by labor in upgrading, production upgrade enhances the demand flexibility for product. When market is equal, $w_1=w_2=w=\beta=\delta$, $Q_1^d=Q_1^s$, $Q_2^d=Q_2^s$. The result of market equilibrium means that even if there are obstacles in the mobility in enterprises, the proportion of the labor force in the two enterprises remains relatively unchanged due to the equal wage efficiency. The supply and demand of output of the two enterprises is equal under the equilibrium state; there is no supply and demand gap in supply and demand aspects of market.

Assuming that due to technological progress, products of enterprise 2 are upgraded, product quality is improved, demand elasticity of product revenue of enterprise 2 increases, and leads to $\beta < \delta$, and thus makes $w_1 < w_2$. The income inequality of factor market will lead to labor mobility in the absence of mobility barriers, the mobility result is is balanced factor market, and further adjustments make the product market also adjusted to a new equilibrium. However, the existence of the cost of labor

mobility will constrain its mobility efficiency. Assuming that the workers are in space position x in firm 1 are, when the wage is different, the conditions that should be met is $w_1 = w_2 - t(1-x)$. It can be found that the more distant, the higher the mobility cost paid by the laborer, the lower the income they receives, and thus hinder the mobility. Because of industrial upgrading brought about by technological upgrading, market imbalances caused by labor mobility barriers will only exist in the factor market, and because of the constraints of the mobility, the commodity market still remain balanced, there is no supply and demand gap. The above is only the result of the market mechanism role. The labor' wage of enterprise is determined by its efficiency, and when there are external shocks, such as raising wages, there is another effect for the factor market. Assuming when the wage of the firm 2 increases, the wage level of the firm 1 rises, and the demand change of consumers have new effect for the equilibrium of the commodity market in the case of raising wages. As follows:

Before the salary is raised

$$w = p_1 Q_1^d + p_2 Q_2^d \quad (1)$$

$$Q_i^d = Q_i^s \quad (i=1,2) \quad (2)$$

It can be gotten that from the formula (1), $k_1 + k_2 = 1$ ($k_1 = p_1 Q_1^d / w$ and $k_2 = p_2 Q_2^d / w$, they are proportion of the two commodities in the income, respectively, I is the income).

$$k_1 E_1 + k_2 E_2 = 1 \quad (3)$$

After product upgrade and wage rise in the enterprise 2, formula (3) is still true, because of the upgrades of enterprise product, the demand income elasticity of product increases, so after the product upgrade formula (3) becomes:

$$k'_1 E_1 + k'_2 E'_2 = 1 \quad (4)$$

Because product of the enterprise 1 has not changed in formula (4), so its demand elasticity is unchanged.

Product of Enterprise 2 upgrades, the income demand elasticity of product increase, therefore, $E'_2 > E_2$, $k'_2 > k_2$

It can be seen from formula (3) and formula (4),

$$k'_2 E'_2 - k_2 E_2 = (k_1 - k'_1) E_1 > 0$$

It can be seen from $k = pQ^d / w$ and $w_1 = w_2 = w = \beta = \delta$

$$Q_1^d > Q_1^d \quad (5)$$

It can be seen from formula (5) that in the case of income increase, consumers will choose the products with high high income demand elasticity on the original basis, that is the product of enterprise 2, which makes $Q_2^d > Q_2^s$, the consumption demand for enterprise 2 is increased and therefore reduced the consumption demand for products of enterprise 1. Under the condition that there are barriers and rising wages in labor mobility, cause shock for the original balance of the commodity market, make product and production capacity of enterprise 1 excessive. Under the condition that there are products and excess capacity in enterprise 1, the adjustment process of the market is naturally to reduce production capacity, and thus reduce the employment of labor, the unemployment appeared in market. When there exit barrier exist in labor market, the market imbalance will continue to use the distorted excess capacity and continue to use the excess product supply and appear, which cause enterprise which have upgraded product because factors supply can not meet the output, and can not quickly improve to meet the market.

5. Conclusion

When products are upgraded, the influence of the mobility barriers of labor element in the representative enterprises shows that if there are obstacle in labor mobility among industries, industrial upgrading has an impact on commodity markets and factor markets. On the one hand, if the mobility barrier, that is the factors that labor work in the low-level industry due to their learning ability and owned skills problem, whose situation will exist for a long time, Low-level industries are likely to suffer losses in vicious competition, high-level industry can not get enough resource allocation, and

can not obtain rapid development. On the other hand, when there are labor mobility barriers and policy intervention, if maintenance of employment did not solve the barriers among the industrial mobility, the low-level industries form vicious competition at the same time, but also a large number of inefficient enterprises in low-level industry exist as zombie enterprises and other forms through the governmental support; if promote industrial upgrading individually and not take measures to reduce the mobility costs, the upgraded industry will also be in the low end of the industrial value chain, the scale of excessive competition from an industry to low-end link of many industries.

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