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FROM KEYNESIAN OVER NEOCLASSICAL TO NEW GROWTH THEORY AND AFTER

Summary

The modern growth began as Keynesian theory with articles of Harrod and Domar. Later neoclassical theory began with article of Solow. The differences between two models are fundamentals and can not be reduced to technicals of properties of production functon. In time the neoclassical growth theory crowded out keynesian approach and now prevails. The revival of growth theory in late eighties in form of new growth theory is based on neoclassical theory. The aggregate growth theory has to extended with development theory and with industrial economics.

1.   EVOLUTION OF GROWTH THEORY

1.1.   Keynesian growth theory

Roy F. Harrod (1939) published a famous article "An Essay on Dynamic Theory". Evsey Domar (1946) published the article "Capital Expansion, Rate of Growth and Employment". Both articles mean beginning of the modern growth theory. By the theoretical foundations these are keynesian growth models. In the literature it is frequently talked about as the Harrod-Domar model what is not correct. Harrod's and Domar's are two distinct models. Domar's model is more in tradition of orthodox keynesian theory of comparative static. Domar begins the analysis with levels of output and income and derives the rates of growth, which maintain the equilibrium. Harrod's model is more advanced and dynamic in nature. Harrod works from the start with rates of growth and analyses the relations between the growth rates.

Robert M. Solow (1956) published the article "A Contribution to the Theory of Economic Growth". He starts his article with the critique of

keynesian model of growth and offers as alternative the neoclassical model of growth. Solow reproaches keynesian model, which he calls Harrod-Domar model, for having a production function with fixed coefficient which does not allow for factor substitution among labour and capital

In the neoclasical growth theory the factorial approach to growth prevails. Inputs and output are major concepts. Output is related to inputs with the concept of the production function:

(1)Q = F(K,L;A).

Q is output, measured by gross domestic product (GDP), K is capital, L is labour, A is technological development. The production function F() is a very general concept and is a "black box". It's advantage is that it can be extened with additional factors in production function. For example, human capital (H) can be easily incorporated.

1.2. The differences between keynesian and neoclassical growth theory

The reduction of the differences between keynesian and neoclassical growth model to technical coefficients of the production function is wrong. The differences are fundamental.

1.2.1. Steady state, actual and natural growth rate and the role of aggregate demand

The neoclassical model assumes the aggregate equilibrium or, if economy is not in equilibrium, it will tend toward equilibrium. The dynamics of neoclassical model in transition from one to another steady state. Neoclassical model does not use the concept of aggregate demand. The idea is that economic growth refers to long run, and in the long run the factors on supply side prevail over factors on demand side. The keynesian model, on the other hand, allows the appearance of lasting aggregate disequilibrium and active role for aggregate demand. The government has got the role to play. For this reason Harrod introduced two rates of growth: a natural rate of growth (r_n) and actual rate of growth (r). Natural rate of growth is potential rate of growth and is determined by rate of growth of labour and rate of growth of technological development. He does not explain natural rate of growth, he only defines it. This is an obvious deficiency of the model. The actual rate of growth is determined by aggregate demand (r = s/v, s is investment rate, I/Y, and v is incremental capital output ratio, I/DY). The problem which Harrod poses is: how to bring actual rate of growth, which is lower, closer to natural or potential rate of growth.

1.2.2. Perfect and imperfect market competition

The second difference between keynesian and neoclassical model of growth is in assumption about working of the market competition. Neoclassical model assumes perfect competition on all markets. Prices are flexible and factors of production are mobile. The economy equilibrates itself if disturbances come from outside. Keynesian model assumes imperfect working of market mechanism. Especially for labour market is characteristic imperfect competition and inflexible prices of labour. Real wages are not flexible downwards after they have achieved a certain low level. The prices are sticky and are relactunt to change. This changes the equilibrating mechanism of the economy. The market does not equilibrate economy automatically; and if it does then it incurs great economic cost, reflected in unemployment and/or inflation. Keynesian model allows the possibility that the economy is by the nature unstable and that it moves to even greater stability. The economy might be inherently unstable.

A firm, which is small, seeks maximum profit and works in the environment of perfect competition, a concept which prevails in the traditional microeconomics and in neoclassical growth model, is a too general concept for a more disaggregate analysis of economic development. An average firm should be differentiated in order to enable the analysis of more special problems of economic growth. For example, the problem of structural change in the transitional economy is such a task which cannot be dealt with the traditional concept of an average perfect competitive firm.

1.2.3. The investment function in the growth model

Harrod introduces an investment function into the growth model. Domar points to the fact that investment have dual role by affecting so aggregate demand as well as aggregate supply. Neoclassical model, even in latest versions, does not contain explicit investment function. Neoclassical model works with production function, the keynesian model works with investment function. Behind this is fundamental difference about the concept of aggregate capital. Keynesians think that the concept of aggregate capital is disputable.

Harrod uses the acceleration model of investment, which could be regarded as reduced form of neoclassical investment function. The neoclassical investment function (Jorgenson 1963) does not originate in neoclassical growth theory and it is not part of it.

1.2.4. Expectations in growth model

Harrod introduced expectations in growth model. Expectations are reflected on investment behaviour of economic agents. He enables the

analysis of expectations by introducing an additional growth rate, which he called a "warranted rate of growth", r_w . Warranted rate of growth is an analytical category and is not empirical like actual and natural growth rate. Out of difference between actual and warranted rate of growth the expectations on investment demand are formed. So induced investment demand influences the actual rate of growth in the next period.

Harrod's expectations could be today described as "naive" dynamic expectations. If the actual growth rate is higher from expected, e.g. warranted, the entrepreneurs become optimistic and they increase investment orders, demand increases, and so the actual growth rate will increase. The difference or gap between actual and expected growth rate will increase as well. This increased difference will further affect the increased expectations and have expansionary effects. The economy drives into expansion, which ends in inflation. The mechanism of expectation creation works other way as well. If actual rate of growth is lower from warranted, the entrepreneurs are affected by pessimism, they reduce investment orders, actual growth rate will decrease. The economy drives into recession and into general unemployment.

This form of expectations and growth process can be written in the following way (Sen 1970, p. 13):

$$(2) \quad r_t = r_{t-1} + ß_1 (r_{t-1} - r^e_{t-1}).$$

r is actual growth rate, r^e is expected or warranted growth rate. ß is reaction coefficient.

From present point of view one could maintain that Harrod's expectations are simple and naive, however, one has to admit the fact that Harrod had introduced expectations in the growth model.

1.3. New growth theory

The development of keynesian growth theory has come to the end after it promising evolution in 50th and 60th. In seventies the interest for growth theory disappeared. In second half of eighties the revival of growth theory reappeared. However, the revival was based on the neoclassical growth theory. Now it was labelled as "new growth theory". The keynesian growth theory was not present in this revival. The fundamental idea of new growth theory is an attempt to endogenise the growth factors. An important role in this new setting has human capital.

2.   THE CONVERGENCE OF NATIONAL PRODUCTIVITY LEVELS

In the growth literature of the last decade an interesting theme has appeared about the convergence of national productivity levels (Baumol 1986). This topic is relevant to transition economies as well. These countries compare their national levels of GDP per capita with average GDP per capita for member countries of the European Union (EU). They are wondering whether their standard of living will converge to the European level and whether the rate of convergence could be accelerated by joining the integration processes in EU. Most of them believe that joining EU would speed up the convergence in their level of development.

The convergence model is part of the neo-classical growth theory. According to the model, income converges to its steady-state level as follows (Mankiw 1995, p. 285):

$$(3) \quad dy/dt = -\lambda \ (y - y^*).$$

y is actual income per the employed or productivity, y^* is steady state level of productivity, dy/dt is a change in the level of productivity, λ is the rate of convergence toward steady state.

The idea of this model is that the change in the productivity level is a function of the gap toward a steady state and the rate of convergence.

According to the neo-classical theory the rate of convergence is the following function:

$$(4) \quad \lambda = \lambda(s, \ p, \ n, \ g, \ d).$$

Where s is savings (or investment) rate, p is production function parameters, n is the rate of growth of labour, g is the rate of growth of technological development, d is the depreciation rate.

Out of the list of factors determining the convergence rate the investment rate (s) and the rate of technological development (g) could be selected as the most important ones. The rate of convergence is not explained in the neoclassical growth model. This deficiency tries to eliminate the new growth theory.

We could reinterpret above equation in such a way as to say that y^* is an average level of productivity in EU, y is the productivity level of an individual country in transition. A developmental question then would be, first, what is the difference in productivity level of particular country in comparison to the EU average, and second, what is the rate of convergence of a particular country, λ_i .

3.   THE DEVELOPMENT POTENTIALS OUTSIDE THE COUNTRY

3.1.   Imitation and transfer as factor of development

The development problem of countries in transition is not only how to exploit unused potentials inside the country, but also how to share in use of development possibilities which have originated in other countries. The less developed country (LDC) can use it's own development possibilities and development possibilities which have originated on other more developed countries (DC). This gives a possibility to grow faster and to catch up with the development level of developed countries.

This concept could be used in the case of transition countries (TC). Potential developmental possibilities of these countries are created by these countries alone and by the most developed countries outside of these countries. TC could, to a certain degree, and not fully, use these possibilities and therefore grow faster in catch up with the developed countries.

Neoclassical growth model has set up a problem of convergence. It has, though, no good explanation what determines the rate of convergence. The reason for this is in the fact that neoclassical model does not include investment function, nor technological development function, nor expectation function, which would shed some light on motivation, nor does it include any other explanation why the convergence should be faster or slower, or successful or unsuccessful.

The question is, whether the keynesian model give more insight. The fact is that keynesian model contains investment function and some kind of expectation function. The crucial question is whether the concept of aggregate demand gives some insights into question of convergence. Keynesian models of growth relied on the concept of unused internal production capacities which could be put in use with greater aggregate demand.

Orthodox keynesian explanation rely on insufficient demand. Greater demand can cause better use of production capacities. This could be important for TC, however it is not decisive. TC have, let's say, fully used disposable internal production capacities. Theirs development problem is that the DC have greater development possibilities. Part of these possibilities are at the disposal also for TCs. The question is than, how can TCs make good use of development possibilities, which are at their disposal in other countries. If the TC is able to transfer this development possibilities, it could catch up with DCs.

How can a country in transition, which is at the same time a less developed country, make a better use of development resources which are in other countries? The TC does not discover new things in the world framework, TC tries to use the potential which already exist in the world. This can be done by learning, imitation and by transfers.

3.2.   Factors increasing the capacity for catching up

Factors of development could be grouped into two groups: (1) factors which enhance the internal development factors, and (2) factors which enhance the capacity of the country for making use of development potentials in other countries. Factors of two groups overlap. However, the factors of enhancing capacity for catching up could be listed as follows:

(1) Educated labour force. Increase of human capital, knowledge and learning would enhance the catch up capacity. People have to learn what in other countries is already known.

(2) Increased investment activity which enables the introduction of technology known in other countries.

(3) Social capital or social infrastructure. Social and economic institutions have to be compatible with making use of development potentials in developed countries.

(4) Foreign direct investment is part of overall investment activity. It has to be isolated as distinct factor of enhancing the catch up capacity because of specific problems in transition countries.

(5) Widening of the markets and increasing of export demand. Development spreads in clusters. East-Asian countries made around the Japan an development cluster. The European Union (EU) could form a development cluster. In this case the joining to EU would be for TC growth enhancing.

(6) Demonstration effect as a form of formation of increasing expectations. Increased expectations which result out of emulation of living patterns of developed countries have development effect. Demonstration effect is a function of the gap between actual (in TC) and target level of development (in DC).

The question for theory and model builders is how to introduce these factors into theory and into growth models. The next question is, is keynesian or neoclassical framework better suited for such extensions? There is no doubt, that aggregate growth models have to be extended.

3.3.   The extension of aggregate growth theory with industrial economics and with microeconomics

As soon as the adjustment and convergence process is put into the centre of attention one needs to lower the analysis toward sector and firm level. Macro approach does not suffice any more.

The extension of the growth theory is possible with structural aspects:

(1) Structural aspect of development of economics, which points to changing sectoral change of the economy.

(2) Structure the economy by the size of the firms out of industrial economics, concepts of competitiveness (Porter 1990).

(3) Market structure of perfect and imperfect market competition of microeconomics.

The structure by firm size and market structure determine the speed and the way of adjustment of the firms and the economy as a whole.

In continuation of the article we shall point to the investment adjustment and technological development in relation to the size of the firms as two important factors for countries in transition

4.   THE SPEED OF INVESTMENT ADJUSTMENT OF THE ECONOMY

For investment we can take the neoclasssical investment function:

$$(5) \quad I \quad = \quad ß \ (K^* - K_{-1}).$$

Investment depends on the gap between the actual (K_{-1}) and the desired capital stock (K^*), and on the speed of adjustment of the economy (ß) from the actual to the desired state. The desired stock of capital is a function of rental costs of capital (rc), consisting of interest rate (i), depreciation rate (d), and of expected output (Y^*).

$$(6) \quad K^* \quad = \quad K(i,d,Y^*).$$

We shall postulate that the speed of adjustment is the function of degree of privatisation (g),of existing the capital stock (K_{-1}), and of uncertainty ('),

$$(7) \quad ß \ = \ ß \ (g, K_{-1}, ').$$

The degree of investment adjustment for firms is one of the most sensitive areas of investment policy, because it depends on the behaviour of firms, on the formation of expectations, and on the general flexibility of the economy. These are institutional factors imbedded in the economic system and economic institutions of the country. Transition that is too slow may delay the adjustment of firms; too hasty, almost revolutionary transition, may disrupt the adjustment ability of firms. In both cases the investment activity is heavily damaged and investment will radically fall. What is the right speed of the transition process? Somewhere between a slow gradualism and revolutionary shocks? It is hard to say. Slovenia has chosen a gradual transition, avoiding radical and revolutionary changes. The idea is that this will bring quick recovery of investment activity, because the adjustment ability of the economy will not be totally destroyed.

The fact is that in Slovenia a large stock of capital exists, which seems to be ready to be used, however it has no market value, because the markets for products of this capital have been lost. New markets need new capital stock. The large, unemployed existing capital stock, is a detrimental factor affecting investment negatively. Firms should scrap the existing capital more easily and should not hang on to the existing useless capital stock. This process is connected with closing down of enterprises and is socially and economically painful. The disinvestment is a precondition of new wave of investment in Slovenia. In 1995-96 Slovenia is on its way to complete major disinvestments and bankruptcies to prepare a starting point for new investments.

Pindyck (1991, p. 1110) points to two important characteristics of investment expenditures. First, investment expenditures are largely irreversible; they are mostly sunk costs that cannot be recovered. Second, investments can be delayed, giving a firm an opportunity to wait for new information to arrive about prices, costs, and other market conditions before it commits its resources. The reason is that there may be uncertainty and risk connected with the existing information and investment decisions. Such considerations point to the fact, that it is not only the level and the magnitude of changes of the variables in the investment equations (4-6), that is important but also the volatility of these variables. Pindyck (1991, p. 1141) suggests that the level of interest rates, tax rates, and so on, may be of only secondary importance as determinants of aggregate investment spending; the interest rate and tax rate volatility may be more important. The major cost of political and economic instability may be in its depressing effect on investment. Therefore, macroeconomic policies which rigorously pursue stability and credibility, may be more important for the recovery of investment activity than a specially tailored investment policy with a package of particular levels of tax rates and interest rates.

This special emphasis on uncertainty and risk, and on the irreversibility of investment decisions and sunk costs, affects the speed of adjustment in an important way. It is especially important for the economies in transition, where firms tend to stagger in their investment adjustment because of high uncertainty due to economic crisis and to institutional uncertainty. Of course, most of this institutional uncertainty is the result of ongoing political democratisation, privatisation and marketisation of the economy and the society.

These considerations of uncertainty, which reflects themselves in country risk, are especially important for inward foreign direct investment (FDI). FDI can be considered as an important chanell of bringing developmental factors into the country, and therefore contribute considerable to improved cach-up capacity of the country.

For Slovenia, the fulfilment of convergence criteria of the European Monetary Union (EMU) would bring about economic stability. The signing

of the Association Agreement with the European Union would bring direction to future perspectives. Both should favour investment.

5. TECHNOLOGICAL DEVELOPMENT, INNOVATION AND ENTERPRENEURSHIP

The second major factor influencing the rate of convergence is technological development. A remarkable contribution to this field was given by J.A. Schumpeter (1934). The conclusions of countless studies of particular industries and innovations can be summarised as follows (Grossman and Helpman 1994): (1) Commercial exploitation of scientific ideas almost always requires substantial investment of resources. (2) A large proportion of scientific research conducted in the OECD countries is financed by private industry. (3) The number of national scientists and engineers and the level of spending on R&D enter significantly in the determination of a country's income level. (4) Some imperfect competition in product markets is necessary to support private investments in new technologies. Innovation requires the existence of monopoly profits. (5) The spillover emanating from the industrial research lab suggests that markets provide insufficient incentive for investments in knowledge. R&D subsidy, which raises the private profitability of R&D, can be used to spur innovation and growth. (6) The existence of local or national technological externalities has introduced an important role for history in the determination of a dynamic comparative advantage. More open trade will increase the profitability of R&D in a country only if its firms can hold their own in the rivalry with foreign firms. For potential innovators in a small country this need not always be the case. (7) A country that lacks the size and the technological experience to support a world class R&D efforts typically will gain from specialising in the production of goods that do not require the latest technologies. Whereas many firms in the industrialised North race to bring out the latest innovative products, most firms in the developing South confine their technological efforts to imitating products developed abroad.

If the argument in favour of the European Union stresses economies of scale then it follows that there will be greater benefits for large enterprises. The pure case for economic integration is based on the assumption of perfect market competition. If we take into the account the fact that imperfect market competition inside the economic area of EU is important then, again, we have to notice that the imperfect competition favours large enterprises. If other countries will have a better infrastructure, if in other countries entrepreneurs fare better in competition, the R&D resources may be diverted from the local economy due to economic integration. Therefore, in the short to medium run one cannot exclude that the integration of less developed Slovenia, in comparison with the EU average, into EU may produce industrial and regional polarisation at a

disadvantage of Slovenia, and divergence instead of development and convergence.

Out of such findings about the characteristics of technological development we can draw one conclusion for our topic. The size of the country and the size of enterprises is very much relevant for the quantity, quality and types of innovations. A country without large enterprises is in a disadvantageous competitive position in the field of innovations and technological development.

6. DEVELOPMENTAL ROLE OF FIRMS SIZE STRUCTURE OF THE ECONOMY

6.1. The developmental role of small fast growing small enterprises

The transition of former socialist economies is accompanied by a sharp drop and a shift in demand and by a radical transformation of existing institutions and the development of new market institutions. Such processes of transition can not be dealt with the concept of the production function. One is tempted to include a more elaborate concept of enterprise into the set of analytical tools of the growth theory. Enterprise is an institution of the market. The concept of enterprise would fill up, a little bit at least, the black box nature of the production function. In this sense it could complement the concept of the production function. The enterprise demands for factors of production, combines them, innovates, produces and supplies products on the market. J.A. Schumpeter has brought the concept of enterprise in the centre of the development theory.

There is a thesis (Vahcic 1995) which claims that new small and fast growing enterprises, so called "gazelles", are the centre-pillars of economic development. New enterprises are bearers of development. The argument goes that small and fast growing enterprises grow for different reasons. (1) Their growth is based on use of unused developmental factors, e.g., unemployed labour, unused capital. (2) They grow by using innovations, mostly their own innovations, which are, however, not the result of their own expenditures on research and development. (3) The grow on the basis of finding and using market niches of potential and not yet satisfied demand. (4) They grow because the fill up the gaps in the structure by size-class of enterprises. As we see, from such a list of growth factors, small and fast growing enterprises are using the unused possibilities and resources for an extensive growth so on the side of factors, as on the side of markets and structures. So long as the economy operates in the extensive phase, what is typical of a transition period, there are good conditions for growth of "gazelles".

In a more mature, more fully engaged, and more stable economy the conditions for fast growth of new small enterprises are more difficult. Their conditions are even more difficult in the environment of small national

economy. In a small country there are by definition not many gaps, rifts, or niches at disposal. Among elephants, among large enterprises, there exist always many rifts, gaps, niches, where new small and fast growing enterprises find their place and opportunity.

I guess that in the future when the transition process is over, when the SMEs will prevail, when the structure of enterprises will be dense, and when the resources will be scarce, then the role of new "gazelles" will be much smaller. The established firms will be the centre-pillars of development, and among them also large enterprises.

6.2. The developmental role of large enterprises

The arguments in favour of small enterprises is neoclassical by nature. Closer to keynesian approach is pointing to the role of large enterprises and on the developmental repercussion of imperfect market competition. The advantages which are potentially connected with large enterprises are: economies of scale, innovations based on own research and developmental work inside the firm, expert specialisation, large research and developmental projects, competitive advantages in international markets, management of large enterprises. I will not elaborate further on these aspects of great importance for economic development.

The question which is relevant for Slovenia is, whether a country will speed up the rate of convergence mostly with small and medium sized enterprises.

One could pose a theses that large enterprises are better facilitated to make use of development opportunities which are available in other developed countries. Larger enterprises are better facilitated to go to the world scene to fish for knowledge and technology. They can better penetrate world markets of products. For developmental catch up is needed so to be present on world factor markets as on world product markets.

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