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Abstract: In this paper presented is research on anatomy of growth of Croatian economy in the period 1990-2013. Results of this analysis basically should be understood as a kind of growth diagnostic of Croatian economy. Conventional sources of growth analysis, which measure contribution of different factors of production, is given for growth of GDP and per capita GDP in relevant sub-periods. To get deeper understanding of results provided in this way, authors continue with analysis of sectorial side sources of growth. Further insights are provided by demand side sources of growth. Particular attention is, in that respect, devoted to analysis of net-export, capital formation and final consumption. Brief notions on institutional and other fundamental causes of growth are given as well. Policy recommendations for overcoming existing deadlock and acceleration of economic growth are only briefly discussed in concluding section of the paper.

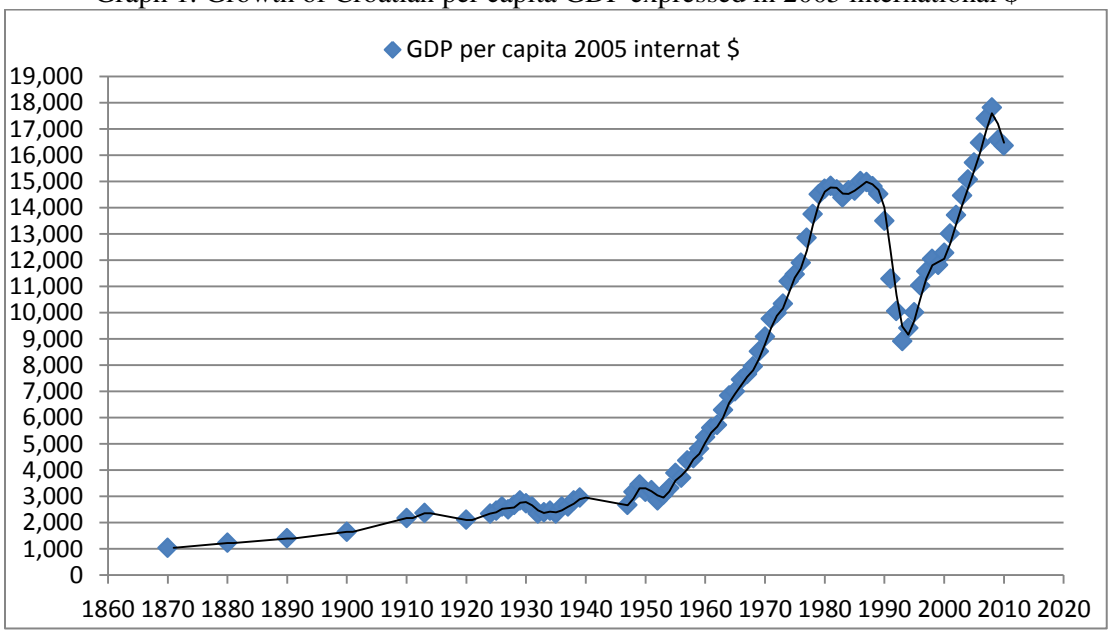
Key Words: sources-of-growth, capital, labor, total-factor-productivity, net-export, terms of trade, real exchange rate

INTRODUCTION

1. Main purpose of this paper is to provide some additional insights into the growth diagnostics for Croatian Economy. More precisely, it is an analysis of the proximate causes of growth of the Croatian economy in the era of globalization. As is well known, globalization in the world economy usually covers the whole period of 1980-2015. It started with trade liberalization in the beginning of eighties and then deepens with financial liberalization by the beginning of nineties. Croatia is in that respect, like other former SFRY countries, latecomer. Both trade and financial liberalizations took place by the end of millennium, much later than in majority of other world economies. Due to that fact and due to the lack of appropriate data for longer period of time, we focused our analysis on 1990-2013 period of time. So, the research presented here is more focused on the recent historical episode of globalization. This explains, first, why the approach taken here decomposes sources of growth only based on three factors – capital, labor, and Total Factor Productivity (TFP) - and second, why this approach puts a strong stress on the analysis of the demand and industry side sources of growth. It seems that the demand and industry side source of growth analysis can be crucial to understanding the consequences of globalization on both the level and the anatomy of economic growth.

In order to put this analysis in a broader historical context, let's first take a glance at the growth performance of the Croatian economy starting from 1870. In Tables 1 and 2 provided are data on rates of growth in certain sub periods as well as data on relative level of per capita GDP of Croatia in relevant years. These, as well as all other, tables are given in appendices at the end of the paper. Powerful visualization of Croatian per capita GDP growth is given in Graph 1. It is obvious that the Croatian economy started its industrialization and growth at the beginning of the last century. In more developed European countries, this same process started at the last half of the nineteenth century. Late arrival of Croatia is result of the fact that Austro-Hungarian empire, to which Croatia belong at that time, although great and mighty was not European champion of industrialization and to the fact that Croatia was periphery of that large empire. Really strong growth and industrialization of Croatia started after IIWW. In the so called period of golden growth, 1948-1973, per capita GDP rate of growth was 4,85 percent while GDP rate of growth was 5,33 percent. Under that circumstances level of GDP double every 13 years, meaning that at 1973 Croatian GDP was about four times larger than immediately after war, 1948. In subsequent 1973-1987 period Croatia experienced growth slowdown, per capita GDP growth rate dropped from 4,85 to 2,68 percent, which is mainly natural result of weakening of catch-up-effect experienced by most of world economies in respected period. Consequently, relative position of Croatian economy improved: compared to Austria, previous core of empire, per capita GDP in 1987 reached level of almost 60 percent, a jump from 33 percent in 1870. Similar improvement can be noticed when we look at Bulgaria and former Yugoslavia. When compared to Romania, Croatian position had improved till 1973 and then worsened, but that story is more about Romania than about Croatia.

Graph 1: Growth of Croatian per capita GDP expressed in 2005 international $



Sources: Authors' estimates based on Tica (2004), Maddison (2010), and IMF WEO

Note, however, that from 1987 Croatian economy experienced prolonged decline. It was only after 17 years, approximately in 2004, that it reached same level of per capita GDP as that in 1987. For first six years, 1987-1993, its growth rate was negative, -8,29 percent, and it take following eleven years, 1993-2004, with positive growth rate of 4,89 percent to reach level of per capita GDP from initial year 1987. Obviously, strong decline of economic growth in Croatia was only partly resulting of war from nineties.

Second and probably more important is a fact that most of Croatian capacities have been built for large Yugoslavian market, which, on a top of that, have been very protectionist. With brake up of former SFRY this market ceased to exist. Finally, a good part of prolonged decline should also be explained with collapse of existing economic system and consequent reforms. These reforms, even when successful, take a long period of time. All those factors together explain a fact that "transformation recession", to use Kornai (1993, 1994) words, has been so long and so deep in Croatia and other former SFRY countries (Čizmović and Popovic, 2013, 2014). To get an idea about the "price" of Croatian transformation recession we calculated cumulative losses in these 17 years, where loss for every year is calculated as a difference between GDP in 1987 and actual GDP in respected year. No doubt, this is very conservative measure because a right one should be based on differences between GDP from equilibrium growth path and actual GDP. Anyway, these losses present bit more than 3 times average Croatian yearly GDP produced in years 2000-2010 or, assuming investment rate of 20%, as Croatian investment for approximately 15 years. With this investment Croatian per capita GDP would be now larger for about 50 percent, if we assume growth rates from 1973-1987, or to 82 percent, if we assume growth rates from 1948-1987. Similar situation is with other SEE countries and even worse with CIS countries (Čizmovic and Popović, 2014). As a consequence relative position of Croatian economy deteriorates. Per capita GDP of Croatia is now only 41 percent of Austria's level compared to 59 percent in 1987. Same movement can be noticed when we compare it to Bulgaria or Romania. Only in the case of what we termed Yugosphere Croatian position improved, which is result of the fact that in other former SFRY countries transformation recession was even more devastating.

2. Before starting with the detailed analysis of Croatian growth in 1990-2013, it is appropriate to give some brief epistemological and methodological explanations and caveats. Within modern theories of growth, it becomes common practice to make a distinction between "proximate" and "fundamental" causes of growth (Acemogly, 2008, Acemoglu at al 2005). Proximate causes, usually comprised within the sources-of-growth analysis, are based on and developed according to the Solow Growth Model and its later amendments. The end result of this analysis is a decomposition of the GDP (gross domestic product) growth rate into the absolute and relative contribution of the increase in employment, the increase in capital, and the increase in the total-factor-productivity (TFP). The growth rate of the TFP is further decomposed into the contribution of human capital (skills), advance in applied knowledge (sometimes referred to as embodied technological progress), and contribution of organizational innovation, structural changes and similar factors.[1] When short run variations in the level of economic activity are eliminated what we get is long run TFP growth which captures impact of different kinds of knowledge on economic growth. This is why the TFP is sometimes referred to as the advance in "broader knowledge".

The so-called "fundamental" causes of growth, on the other hand, refer mainly to institutional factors but also to cultural, geographical, and other factors, including pure luck that may put a given country on an entirely different historical path. These factors determine the rate of growth by determining the rate of formation as well as an efficient usage of the proximate factors enumerated above. While differences in income levels can be attributed to differences in the proximate causes, the answer to the question of why growth rates differ among countries and within the same country at different times can be obtained only

[1] For more detailed insight into the sources of growth analysis see: Acemogly (2008), Agnion and Howit (2009), Romer (2001), Baro and Sala-i-Martin (1995), Crafts and Toniolo (1996), Mankiw (1995), Mankiw at all (1992), Madison (1982, 1987), Denison E. (1962, 1964, 1967, 1974, 1980. 1985), Abramowitz (1956, 1993), and, probably most important, early contribution of Jorgenson and Griliches (1967).

after additional insights from the analysis of fundamental factors. So we can say that, as noticed by Abramovitz (1993), relationships among proximate causes of growth are not additive, but very complex indeed. First, there are obvious direct inter-relationships among proximate causes of growth, like the one that we have between the accumulation of physical and human capital. And second, there are numerous complex indirect relationships that operate via fundamental causes of growth. It seems that the *growth diagnostic approach* developed by Housmann, Rodrik and Velasco (2005) can be regarded as, so far, the most appropriate for making a comprehensive analysis of all of those complex sets of factors of growth.

The state and development of the fundamental factors are ultimately and primarily determined by what is known as the political economy of a respected country. By political economy, we refer not only to power structures and power struggles within the respected country, but also to international or, better yet, global power structures as well. In fact, it is not possible to understand "domestic" political economy without connecting it to the political economy of international relations. This is especially important for small countries.

As already stated, this paper is primarily focused on the analysis of the basic proximate causes of growth in the Croatian economy augmented with demand side and industry side sources of growth. This kind of sources-of-growth analysis is, nevertheless, supposed to provide some important insight into the anatomy of the economic growth of Croatia. The comparative analysis of Croatia to some aspects of other transition countries' growth will, no doubt, also bring some additional insights. Especially important are the results related to the speed of convergence and other topics related to this issue. Apart from that, on the basis of this kind of research and on the basis of studies done by other authors, it will be possible to identify and briefly analyze some of the most important fundamental factors of economic growth. More importantly, demand and industry side sources of growth analysis will, as already stated, bring even more important insights into the analysis of some fundamental causes of growth in the era of globalization.

Methodological and empirical approach taken in this and other similar studies will be presented in the second section of this paper. In order to give wider and more theoretical view on growth anatomy, this survey is given in somewhat broader format than what this kind analysis requires. Apart from that, some theoretical dilemmas connected with this approach are also discussed in the section. Nevertheless, readers familiar with sources of growth analysis can skip this section and continue with the next one. The results of the proximate causes of GDP and per capita GDP growth analysis are presented in the third and fourth section of the research. Comparative source-of-growth analysis for GDP per capita as an approximation of growth of standard of living is especially insightful. Apart from these conventional sources-of-growth analysis, both the demand and the industry side of the decomposition of the GDP growth rate are given in the fifth and sixth sections of the paper. In the demand side of the sources-of-growth analysis, special attention is devoted to the issue of the real exchange rate level and its influence on the growth anatomy. Connected with this is the issue of the industry / sectors side of sources-of-growth analysis. The results of the above mentioned different sources-of-growth approaches present a good basis for identifying the main institutional and policy related factors that have determined the anatomy of economic growth. Each section of this paper provide only a brief notation of the fundamental factors of the growth, which are based on previous research on this issue as well as on the basis of results obtained within this comparative analysis of proximate factors. The paper ends with concluding remarks which recapitulate and integrate the main findings of the paper.

THEORETICAL AND EMPIRICAL APPROACH

1. The simplest and safest way to present the methodological approach taken here is to start with the distributive equation which assume one sector economy

$$p_t Q_t = w_t H_t + R_t C_t \quad (1)$$

where Q_t presents quantity of homogenous product being produced in the respected economy at a particular time t, p_t stands for price of that product at time t, H_t and C_t is quantity of labor and capital inputs actually used in production (hours of work of labor and machines), while w_t and R_t stands for price of labor and capital. By calculating the rate of growth of both sides of the above expression and after some manipulations we get the expression

$$r_Q = \frac{w_t H_t}{p_t Q_t} r_H + \frac{R_t C_t}{p_t Q_t} r_C + \left[\frac{w_t H_t}{p_t Q_t} r_w + \frac{R_t C_t}{p_t Q_t} r_R - r_p \right] = a_t r_H + (1-a_t) r_C + \left[a_t r_w + (1-a_t) r_R - r_p \right] \quad (2)$$

where r_X presents rate of growth of variable $X \epsilon [Q, H, C, w, R, p]$, while a_t and $(1-a_t)$, obviously, present labor and capital share in GDP. If we assume competitive economy, than it follows that wage to product price presents marginal productivity of labor, $w/p = F_H$, while price of capital to price of product presents marginal productivity of capital, $R/p = F_C$. For the sake of simplicity, from now on we will use symbols for factors prices to present symbols for marginal productivity of respected factors as well. In that case, labor and capital share become partial elasticity of production with respect to labor, $a_t = \frac{F_H H}{Q}$, and capital, $1 - a_t = \frac{F_C C}{Q}$, respectively. By further manipulations we get expression $r_Q - a_t r_H - (1-a_t) r_C = a_t r_w + (1-a_t) r_R - r_p = r_A$, which is a well-known expression, that shows two ways of calculating Total Factor Productivity (TFP) - r_A. The first way, primal approach, $r_A = r_Q - a_t r_H - (1-a_t) r_C$, is most commonly used, due to the fact that it is easier to get appropriate data. The second approach, called the dual approach, $r_A = a_t r_w + (1-a_t) r_R - r_p$, although very insightful, is very rarely used, due to a lack of appropriate data.

By substituting these results in expression (1) we get the well-known expression

$$r_Q = a_t r_H + (1-a_t) r_C + r_A \quad (3)$$

which decomposes the rate of GDP growth in parts that measure contribution of labor, $a_t r_H$, contribution of capital, $(1-a_t) r_C$, and contribution of TFP, r_A. For a good deal of the twentieth century, it has been noticed that factor shares had stayed unchanged and this became one of the most important stylized facts of growth as defined by Kaldor. Consequently, the above expression can be expressed in the following form that has been used most commonly in sources of growth analysis

$$r_Q = a r_H + (1-a) r_C + r_A \quad (4)$$

It is very simple to show that by solving expression (4) as a differential equation (by integrating and taking antilogarithm) we get expression

$$Q = AH^{a}C^{(1-a)} \tag{5}$$

which presents the well-known Cobb-Douglas production function.

The constancy of factor shares has been, until recently, regarded as one of the most important and unquestionable stylized facts of economic growth. The Cobb-Douglas (CD) aggregate production function and the Solow Growth Model (1956, 1957) satisfy this assumption and this is why this model of growth has been so frequently used in empirical as well as in theoretical research. It is rarely noticed, however, that the Cobb-Douglas aggregate production function is not the only one which satisfies the assumption of the constancy of factor shares. The same result can be provided with a zero-elasticity-of-substitution production function (Leontief production function), once it is assumed that technological progress shifts the kinked isoquant of new vintages of capital in a way where the capital-labor ratio increases at the same rate at which expected wages-profit ratio increases, which, according to equation $\frac{a_t}{(1-a_t)} = \frac{w_t H_t}{R_t C_t}$ guarantees constancy of factor shares. In this kind of growth model, the possibilities of factors substitution exists only before and during investments in R&D are undertaken and not before investment in new vintage of physical capital or after investment in new vintage have been done. A growth model based on such an aggregate production function could be regarded as a kind of putty-clay-clay production function. By allowing factors substitution only before new technology is designed, it describes what we have in reality in a much better way than the models based on CD function does. It is unacceptable to assume that economic agents conduct their R&D and inventive activities in order to "discover" all possible factor combinations that are associated with certain level of production. It would be prohibitively costly to do something like that and it is something that the CD function, by allowing factor substitution ex ante and ex post investment in new vintages of capital, implicitly assumes. Being rational ignorant, the economic agent makes his decisions on factor combinations during the R&D process following expectations regarding future wages and other factor prices. Note that in this case, demand for labor (and other factors of production) is, as usual, downward sloping. Consequently willingness to pay for additional units of labor (or any other factor of production) depends on vintage of capital. Most importantly, it allows growth accounting to be done in the exact same way as when CD production function is assumed.

Piketty (2014) recently questioned, among other things, the empirical validity of the constant factor share assumption. By presenting data for five countries in the 19th century, he showed that in the so called old *belle époque* period after industrial revolution in Europe and before IWW, capital share was much larger than what it used to be during most of the 20th century. Interestingly, in the recent *belle époque*, one which appeared after the modern technological revolution and before the most recent economic crisis, developed countries again experienced a significant increase of capital incomes share in GDP. The explanation might be very easy indeed. Note that technological progress is an uncertain activity and that sometimes strong technological shocks can cause capital-labor ratio to increase for a long time at higher rate than wage-profit ratio in which case we can experience an increase of capital share and decrease of labor share in GDP for a prolonged period of time. Economic and social consequences of this kind of shocks can be devastating indeed. So, taken as a whole, these "inventions" might act, at least for people who live in such "interesting times", more like "destructive creations" than like "creative destructions".

This is exactly what happened in both old and new *belle époques*. For further insights in this and other issues regarding dramatic changes in distribution and inequalities in last couple of decades, see Stiglitz (2012).

2. Assuming now an economy with *s* sectors, the distributive equation becomes

$$\sum_{i=1}^{s} p_{it} Q_{it} = \sum_{i=1}^{s} w_{it} H_t + \sum_{i=1}^{s} R_{it} C_t \tag{6}$$

where all symbols have the same meaning as in (1) except that they now refers for particular sector *i*. Rate of growth of economy can now, following same assumptions as before, be developed in the following simple way:

$$r_Q = \sum_{i=1}^{s} \frac{Q_{it}}{Q_t} r_{Qi} = \sum_{i=1}^{s} \frac{Q_{it}}{Q_t} a_{it} r_{Hi} + \sum_{i=1}^{s} \frac{Q_{it}}{Q_t} (1-a_{it}) r_{Ci} + \sum_{i=1}^{s} \frac{Q_{it}}{Q_t} r_{Ai} =$$

$$a_t \sum_{i=1}^{s} \frac{w_{it} H_{it}}{w_t H_t} r_{Hi} + (1-a_t) \sum_{i=1}^{s} \frac{R_{it} C_{it}}{R_t C_t} r_{Ci} + \sum_{i=1}^{s} \frac{Q_i}{Q} r_{Ai} \tag{7}$$

Now, adding and subtracting $a_t r_H = a_t \sum_{i=1}^{s} \frac{w_{it} H_{it}}{w_t H_t} r_H$ and $(1-a_t) r_C = (1-a_t) \sum_{i=1}^{s} \frac{R_{it} C_{it}}{R_t C_t} r_C$ from the right hand side of (7), after some simple manipulation we get the following decomposition of aggregate GDP rate of growth[2]

$$r_Q = a_t r_H + (1-a_t) r_C + a_t \sum_{i=1}^{s} \frac{w_i}{w} \Delta\left(\frac{H_i}{H}\right) + (1-a_t) \sum_{i=1}^{s} \frac{R_i}{R} \Delta\left(\frac{C_i}{C}\right) + \sum_{i=1}^{s} \frac{Q_i}{Q} r_{Ai} \tag{8}$$

If we now add and subtract *engaged* labor and capital contributions $a r_L + (1-a) r_K$ from expression (8) we get

$$r_Q = a_t r_L + (1-a_t) r_K + a_t r_{H/L} + (1-a_t) r_{C/K} + a_t \sum_{i=1}^{s} \frac{w_i}{w} \Delta\left(\frac{H_i}{H}\right) + (1-a_t) \sum_{i=1}^{s} \frac{R_i}{R} \Delta\left(\frac{C_i}{C}\right) + \sum_{i=1}^{s} \frac{Q_i}{Q} r_{Ai} \tag{9}$$

Comparing expression (9) and (1), we get the following decomposition of aggregate TFP growth

$$r_A = a_t r_{H/L} + (1-a_t) r_{C/K} + a_t \sum_{i=1}^{s} \frac{w_i}{w} \Delta\left(\frac{H_i}{H}\right) + (1-a_t) \sum_{i=1}^{s} \frac{R_i}{R} \Delta\left(\frac{C_i}{C}\right) + \sum_{i=1}^{s} \frac{Q_i}{Q} r_{Ai} \tag{10}$$

What can be seen from this above expression is that, even at this low level of disaggregation, growth rate of aggregate TFP is very complex indeed. The first two parts, obviously, present contribution of changes in labor and capital utilization. They can be very important in short run analysis, but should be negligible and eventually vanish in the long run analysis. More interesting are other parts of this expression. Note that in the third and fourth part of the expression, *relative* levels of marginal productivities of labor (w_i / w) and capital (R_i / R) in different sectors are multiplied with changes of their shares in total labor and capital. Obviously, these two parts together measure contribution of changes in sectorial structure to economic growth and they are most commonly known as inter-sectorial part of TFP. The last part, it is

[2] This has been first time derived by Massel (1961, 1964) and Domar (1961, 1962).

clear from the expression, measures the contribution of intra-sectorial TFP to economic growth. As far as the inter-sectorial part is regarded, note, first, that it is here defined in a pretty general form so that it can capture not only the so called Lewis-Renis-Fei effect (reallocation of labor from agriculture to industry), but also all other similar effects that naturally occur as a result of different levels of relative productivity between different sectors. Second, these differences in relative marginal productivities are the result of technical progress that has occurred in previous periods, so that this effect can also be eventually attributed to advances in knowledge. Technological progress always occurs in particular sectors, which in that way creates differences in factors' marginal productivity among different sectors. These differences are later sources of capital and labor reallocation and inter-sectorial contribution to TFP growth. Consequently, without technological innovations today it would be impossible to have a positive inter-sectorial effect in the future.

3. Much more insightful decomposition of GDP and TFP growth rate can be obtained if we disaggregate labor input according to the level of education of the labor force and capital input according to the vintage of capital (year of installation of machine and equipment). In this case, a distributive equation can be presented in following way

$$p_t Q_t = \sum_{s=0}^{n} w_{st} H_{st} + \sum_{v=t-h}^{t} R_{vt} I_{vt} \tag{11}$$

where, as before, all symbols have the same meaning except the new symbol I_{vt} which represents capital "installed" in year *v* which is still live in time *t*, *s* presents years of schooling, while *v* stands for year of "installation" of capital. The first part on the right hand side allows the effect of education to be isolated, while the second part allows so called "effect of embodied technological progress" to be seen. Most important thing to note is, first, that marginal productivity of higher levels of education is higher than that of lower level of education. Second, marginal productivities of newer generations of capital are higher than that of older generations. We can, in fact, assume that this productivity increases at annual rate λ, which is usually known as the rate of embodied technological progress (Sollow, 1959a, 1959b, 1962a, 1962b). Both these two effects taken together represent, in fact, the contribution of knowledge to economic growth: the first refers to knowledge that is "embodied" in labor, while the second one refers to knowledge embodied in capital.

The rate of growth in this case becomes

$$r_Q = \sum_{s=0}^{n} a_{st} r_{Hs} + \sum_{v=t-h}^{t} b_{vt} r_{Iv} + \left[\sum_{s=0}^{n} a_{st} r_{ws} + \sum_{v=t-h}^{t} b_{vt} r_{Rv} - r_p \right] = \sum_{s=0}^{n} a_{st} r_{Hs} + \sum_{v=t-h}^{t} b_{vt} r_{Iv} + r_B \tag{12}$$

where new symbols a_{st} and b_{vt} represent the set of partial elasticity of production with respect to particular kinds of labor and particular vintages of capital. The sum of all this elasticity is equal to one. After some simple but long transformations and manipulations, the above rate of growth can be decomposed in the following way

$$\frac{\dot{Q}}{Q} = a_{0t} r_H + \left[\frac{(w_t - w_{0t}) H_t}{Q_t} \right] r_H + a_t \sum_{i=0}^{n} \left(\frac{w_{it}}{w_t} \right) \Delta \left(\frac{H_i}{H} \right) + (1 - a_t) r_C + (1 - a_t) \left[\lambda - \lambda \Delta z \right] + r_B \tag{13}$$

where $a_{0t} = w_o H / Q$ now represents the elasticity of production with respect to »raw« labor (w_o is wages / marginal productivity of labor with zero years of schooling), $z = \sum_{v=t-h}^{t} \left(\frac{I_v}{C} \right) (v - t)$ is average age of capital, h is average »life« of capital, Δz is change in average age of capital, and r_B stands for newly defined residual.[3]

The first part of expression (13) represents the contribution of "raw" labor that is part of the labor contribution that all workers would »produce« even without any years of schooling. The second part measures the contribution of the efforts made to keep the education level of the increasing labor force stable and unchanged. It is obvious that the third part of the above expression represent the contribution of improvement of educational structure of workers. It is even intuitively clear that this part may be presented to be a function of the average years of schooling of workers. So, total contribution of education is given as a sum of the second and third parts of expression (13). The fourth part of the expression presents the contribution of aggregate capital measured as $C_t = \sum_{v=t-h}^{t} e^{-\lambda(t-v)} I_v$. Note that capital is here presented in efficiency (price) units of the last and best generation of capital. And finally, the fifth part of this expression represents the contribution of capital-embodied technological progress to economic growth. Note that this part varies with variation of average age of physical capital, $\lambda \Delta z$. However, average age of capital does not vary so strongly and this is the reason why it is not easy to isolate this part of knowledge contribution. If we now use this expression to present the growth of each sector of the economy and use similar techniques like before, we would be able to again isolate the inter-sectorial effects. Of course, this time it would have more inter-sectorial components than in expression (10). If, on a top of that, we isolate the effect of changes in factors utilization like we did before, than our picture of the structure of aggregate TFP growth would become extremely complex indeed.

4. Both kinds of knowledge, either one embodied in capital or one absorbed by labor, involve certain costs and investments. Starting from this fact, we can use the following distributive equation

$$p_t Q_t = w_{0t} H_t + \sum_{s=1}^{n} u_{st} E_{st} + \sum_{v=t-h}^{t} R_{vt} I_{vt} \qquad (14)$$

where $E_{st} \left(= H_{st} l_{st} \right)$ presents capital of education invested in employees with *s* years of education, $u_{st} \left(= \frac{\Delta w_{st}}{l_{st}} \right)$ presents "price" of respected educational (ED) capital, $\Delta w_{st} = \left(w_{st} - w_{0t} \right)$ as before presents wage premium of those with *s*-th years of schooling relative to those with zero years of schooling, while l_{st} stands for all costs and investment necessary to reach *s*-th level of education. It is very important to take into account all costs of education, regardless of whether they are private or social. Apart from the direct costs, all opportunity costs should be taken in account. Opportunity costs present foregone earnings by those who are attending schools and universities instead of being employed. It is

[3] For detailed derivation of this expression and for relevant and numerous references see Popovic (2006). Note also that this short exposition which is presented here heavily rely on previous one given in Popovic (2015).

only for the sake of simplicity that we avoid presenting rate of capital-embodied technological progress as a function of investment in R&D. A second reason for avoiding such complications is the fact that, while such an approach could be regarded as a good description for a country on the technological frontier, it cannot be taken as a good description of growth processes in smaller and, especially, less developed countries where capital-embodied progress is more determined with international trade and capital flows.

The rate of growth in this case becomes

$$r_Q = a_{0t} r_H + \sum_{s=0}^{n} f_{st}\, r_{Es} + \sum_{v=t-h}^{t} b_{vt}\, r_{Iv} + r_B \qquad (15)$$

where the new symbol $f_{st}\left(=\frac{u_{st}E_{st}}{p_t Q_t}=\frac{F_{Est}E_{st}}{Q_t}\right)$ stands for elasticity of production with respect to labor with *s* years of schooling, while other elements have the same meaning as before. One way to further develop this rate of growth is simply to add decomposition of contribution of capital from expression (13). In that case, the first part would represent, as before, the contribution of "raw" labor. Each element of the second part of the expression would represent the contribution of each category of workers to economic growth, while other elements would have the same meaning as in (13). It can also be easily shown that the second part of this expression should be equal to the sum of the second and third elements in expression (13), meaning that it presents the total contribution of education (Popovic, 2006).

More interesting results follow from the transformation of the previous expression in which the second and third terms are, first, multiplied and divided with $\sum u_{st} E_{st}$ and $\sum R_{vt} C_{vt}$ respectively, and, then, marginal productivities / prices (within summations) of each generation of physical capital are divided with marginal productivity of last generation of physical capital (Popovic, 2006).

$$r_Q = a_{0t} r_H + f_t \sum_{s=1}^{n} \frac{u_{st}\ E_{st}}{\sum u_{st} E_{st}} r_{Hs} + \left(1 - f_t - a_{0t}\right) \sum_{v=t-h}^{t} \frac{(R_{vt}/R_{tt}) I_{vt}}{\sum (R_{vt}/R_{tt}) I_{vt}} r_{Iv} + r_B \qquad (16)$$

Let us now, first, assume constancy of "raw" labor share in GDP $(a_{0t} = \frac{w_0 H}{Q} = a_0)$, constancy of human capital share in GDP ($f_t = \frac{\sum u_{st} E_{st}}{Q} = f$), and constancy of physical capital share (elasticity) in GDP, $\left(1 - f_t - a_{0t}\right) = \frac{\sum R_{vt} C_{vt}}{Q} = \left(1 - f - a_0\right)$. Second, assume constancy of marginal productivities of different kind of ED capital ($u_{st} = u_s$), and constancy of ratio of marginal productivity of all vintages of capital to that of last generation of capital ($(R_{vt}/R_{tt}) = \frac{e^{\lambda v} R_{0t}}{e^{\lambda t} R_{0t}} = e^{-\lambda(t-v)}$). Finally, if we now take (16) as a differential equation and solve it (by integrating and taking antilogarithm of expression (16)), after some manipulation, we get the following production function

$$Q_t = B_t H_t^{a_0} \left[\sum u_s E_{st}\right]^f \left[\sum_{v=t-h}^{t} e^{-\lambda(t-v)} I_{vt}\right]^{(1-f-a_0)} = B_t H_t^{a_0}\ E_t^{f}\ C_t^{(1-f-a_0)} \qquad (17)$$

Finally, if we assume that per capita cost of reaching additional *i*-th year of schooling (g_{it}) are constant and equal for all levels of schooling, that is $g_{st} = l_{st} - l_{(s-1)t} = l_s - l_{(s-1)} = g_s = \bar{g}$, than total per capita cost of reaching i-th year of education can be approximated as $l_s = s\bar{g}$. Substituting this now into the expression for capital of education per capita we can show that

$$l_t = \sum_{s=1}^{n} l_s \left(H_{st} / H_t \right) = \sum_{s=1}^{n} s\bar{g} \left(H_{it} / H_t \right) = \bar{g} \sum_{s=1}^{n} s(H_{st} / H_t) = \bar{g} y_t \tag{18}$$

where, obviously, $y_t = \sum s(H_{st} / H_t)$ presents average years of schooling. Since $\bar{g}$ is constant by assumption, than obviously the rate of growth of the capital of education per capita will be equal to the rate of growth of average years of schooling. Now it is possible to present value of total ED capital simply as $\sum_{s=1}^{n} E_{st} = H_t \sum_{s=1}^{n} l_s \left(H_{st} / H_t \right) = H_t y_t \bar{g}$. It follows that the rate of growth of ED capital can be presented as a sum of the rate of growth of labor and rate of growth of the average years of schooling done by employed workers. This is exactly the approach taken in numerous cross-country analyses in which case we can assume that this method can be regarded as acceptable. However, keeping in mind all assumptions on which it is based, it seems that this approach cannot give the most appropriate results in the case of sources of growth for a particular country.

A closer look at the production function given in (17) reveals that it is the same one that has been used in the well-known paper written by Mankiw, Romer and Weil (1992). Now that we can explicitly see all the underlying assumptions on which this function is based, it is easy to see that it has some serious shortcomings.[4] Rates of growth of total physical capital, total labor and total ED capital (or average years of schooling) are weighted with their shares in GDP which are assumed to be constant. This is a very problematic approach since it assumes that, *ceteris paribus*, the growth rate of total physical capital to total ED capital ratio is followed by the same growth rate of their average prices (marginal productivities) ratio but in the opposite direction. This is theoretically unacceptable since investors in all kinds of capital (physical, ED, or human in general) behave in a way which implies relative constancy of their marginal productivity (price) ratios. In other words, we should assume unlimited partial elasticity of production between all kinds of capital, not just among different kinds of particular capital like in the above expression. If we take this assumption, substitute it in (16) and then solve it as a differential equation we get (Popovic, 2006)

$$Q_t = B_t H_t^{a_0} \left[\sum u_s E_{st} + \sum_{v=t-h}^{t} e^{-\lambda(t-v)} I_{vt} \right]^{(1-a_0)} = B_t H_t^{a_0} \left[E_t + C_t \right]^{(1-a_0)} \tag{19}$$

This kind of production function is almost the same as the one used implicitly by Mankiw (1995). The realistic assumptions on which it is based recommend it as the best possible approach for isolating the ED contribution to economic growth. Not only that, it is also better than the one given in (17), which is most commonly used nowadays, but it is much better than the one used so frequently in earlier studies by Denison and others. While constancy of rates of return on investment in different tangible and intangible capital is pretty acceptable for analysis of growth anatomy, assumption of constancy of ratios of different wages to wages of those with zero years of schooling, on which the old studies are based, is nowadays, due to the rising wage premium that started in the mid-seventies, absolutely unacceptable.

[4] For detailed derivation and analysis of this function see Popovic (2006).

Of course, long run constancy of rates of return of investment in different kinds of capital is not the result of the linear nature of respected isoquant. On the contrary, they are kinked here like in the capital / labor case. Elasticity of substitution is, in other words, zero in this case as well. What makes constancy of rates of return realistic is human behavior: investors tend to invest in certain kind of capital until its rate of return drop to the level of its Required Rate of Return. It is also what makes sources of growth analysis based on this production function the most suitable one, regardless of different theoretical explanations that might support such a measurement approach.

5. It has already been stated that as far as sources of growth are regarded, only decomposition on three basic causes will be performed here – capital, labor, and aggregate TFP impact. The period covered is 1990-2013. Also, apart from GDP sources of growth, the same analysis is given to per capita GDP growth. This is an important insight since GDP per capita growth presents the best possible proxy for growth of the standard of living. The most important contribution in this paper, however, refers to demand and industry side sources of growth analysis since it offers some additional and clearer insights on the impact of globalization on the economic growth of the Croatian economy.

Data on GDP in current and constant 2005 reference prices are provided from UN data base. The same refers for demand and industry composition of GDP in current and constant prices. Note that all these data are based on official national statistics data. Data on employment and population have been taken from the Croatian Statistical Institute.

The data about the gross value of capital as a common measure of "number of machines", as well as the data about net value of capital, does not exist for Croatia and we approximated it by using a perpetual inventory method, based on the available data about investment. Capital measure of "number of machines" (or, better, productive capacity) was estimated based on previously derived expression

$$C_t = \sum_{v=t-h}^{t} e^{-\lambda(t-v)} I_v \qquad (20)$$

Estimation is based on the assumption that constructions have a life span (h in above expression) of 70 years, while equipment and other elements of physical capital have a life span of 10 years. Also assumed is the "one-hoss-shay" decay pattern. In fact, in reality productive capacity does not drop to zero, but, instead, machines are being replaced due to their technological obsolesce that reflects as inability of h years old vintage of capital to produce non-negative earning. Value of h is, obviously, determined with the value of λ and not with physical deterioration of equipment. According to our assumptions, physical capital on average has a life span of about 40 years, which is in accordance to results of numerous studies that have used Nehru and Dhareshwar (1993) methodology in estimating average life span of physical capital. We assumed λ to be equal to zero because several of our simulations for different values of λ and h delivered pretty robust results regarding capital rate of growth not only for the whole period but for different short sub-periods as well.

Despite new trends regarding movements of factor share that are characterized with an increase of capital share, in this analysis constancy of factors share will be assumed, except that this time capital share will be taken to be slightly higher than in the old-fashion analysis. Based on some recent measurements and on

now widely used practices, in this analysis it is assumed a and $(1-a)$ to be equal to 0.60 and 0.40 respectively. Available data for Croatia in 1995-2012 are in perfect accordance with these assumptions.

As far as division on different sub-periods is regarded, distinction between following periods is made: 1990-2000, 1990-1995, 1995-2000, 2000-2008, and 2008-2013. In the case of Croatia, recession, in fact, started in 2009 but in order to compare Croatian growth with that of other SEE and CE countries we take 2008 year as a relevant.

Finally, all relevant measurements and calculations are presented in ten tables. These tables are given in appendices at the end of the paper. Visualizations of these results are presented in the same number of graphs that are for obvious reasons given in the main body of the paper. Within graphs some basic and most important figures are given as well. Analysis and comments of the results are based, however, on figures from both tables and graphs.

SOURCES OF GDP GROWTH ANALYSIS

In Table 3 given in appendices, the results of sources-of-growth analysis for Croatian economy for 1990-2013 and for different sub-periods are given. As can be seen, the first column in the table presents rates of growth of the respected factors of production: capital, labor, and total factor productivity. The second column presents the absolute contribution of those factors to the GDP rate of growth, while the last column presents the relative contribution (%) of those respected factors to the GDP rate of growth.

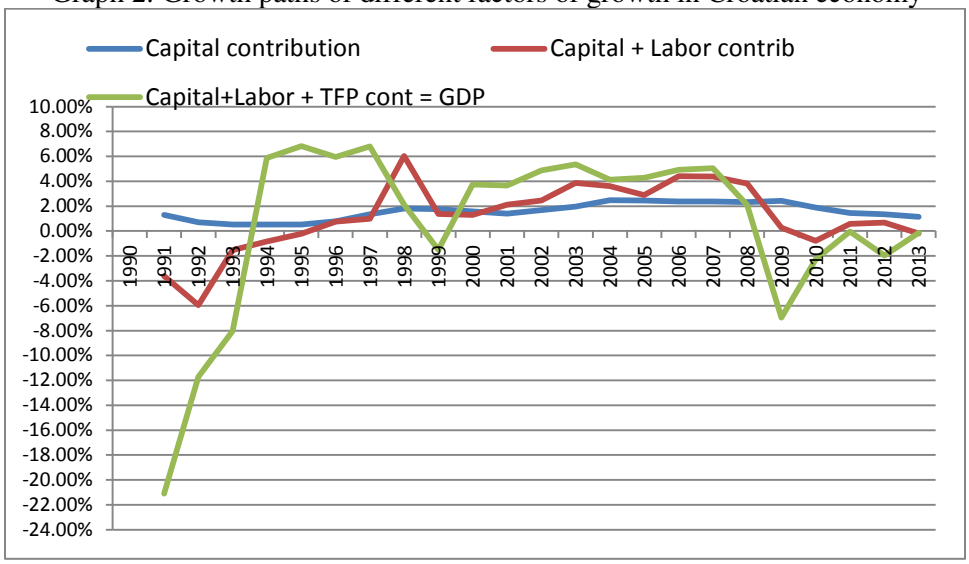
In Graph 2 and Graph 3 decomposition of annual GDP growth rate is presented. In the Graph 2, blue line presents absolute contribution of capital alone, $(1-a_t)r_C$, while red line presents contribution of capital and labor together, $a_t r_H + (1-a_t)r_C$. So, the differences between red and blue line presents contribution of labor alone, $a_t r_H$. We can see that while the contribution of capital is pretty stable, contribution of labor is volatile. Contribution of capital should also have been volatile if we were able to calculate capital actually used in production. Finally, green line presents contribution of all factors which is equal to growth rate of GDP, $r_Q = a_t r_H + (1-a_t)r_C + r_A$. Obviously, differences between green and red line presents contribution of TFP. These differences, as we see, are even more volatile. Nevertheless, Graph 2 validates and justifies our decision regarding choice of sub-periods to be analyzed: noticeable is certain stability and similarity of growth patterns in respected sub-periods.

In order to make further validation of chosen methodology we make measurement of TFP using both primal and dual approach in measuring it. This analysis is made for period 1995-2012 for which we found data on functional structure of GDP that is data on primary incomes. Results are presented in Table 4. Although results obtained from primal and dual approach are not the same, they are very close while their trends and variations are very similar. This further validates approach taken in this analysis.

Looking at the results for the *entire 1990-2013 period*, see Table 3 and Graph 3, it can be noticed that the GDP growth rate in Croatia was smaller than that of developed countries, which are on the frontiers of production possibilities, where GDP growth rate have been between 2,00% and 2,50%. As can be seen average GDP growth rate in Croatia was only 0,28 percent, while in whole SEE region it was 1,07 percent

(see Čizmovic and Popović, 2014). It means that it take 250 years to double GDP in Croatia and 70 years in SEE countries. Regarding other SEE countries, noticeable are bad results for Serbia, with negative GDP growth rate of -1,45 percent and Montenegro, with 0,34 percent. Bit better are results for Macedonia (1,22%), Bulgaria (1,17%), Romania (1,41%) and Greece (1,34%). Only Albania, with growth rate of 3,34 percent is well above average for whole region.

Graph 2: Growth paths of different factors of growth in Croatian economy



Sources: Authors' calculations based on UN data set

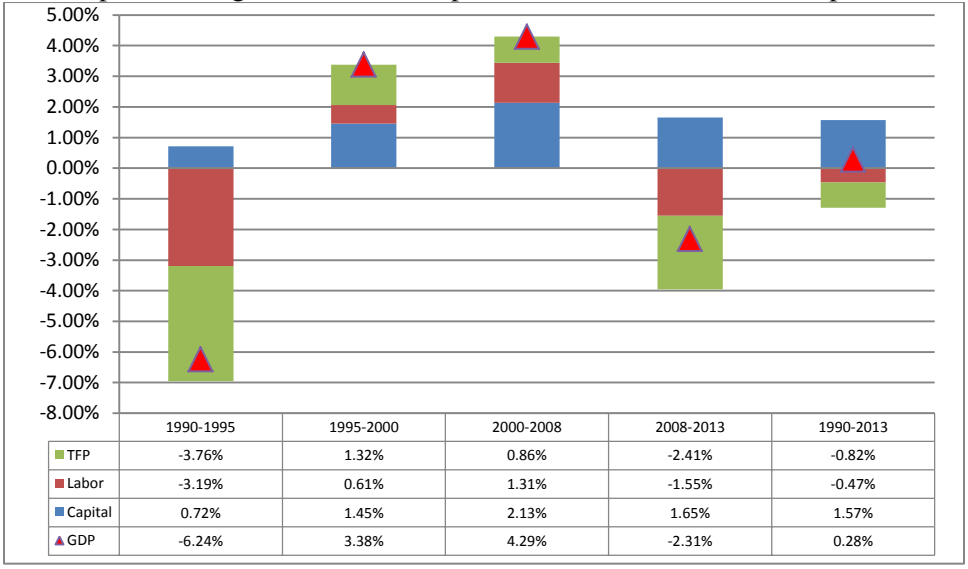
Small GDP growth rate in Croatia has been followed by a negative growth rate and contribution of employment and TFP in explaining GDP growth. Relative contribution of capital, on the other side, was significant in Croatia, although its absolute contribution was not impressive compared to previous period. Capital rate of growth was 3,92 percent, its absolute contribution was 1,57 percent and its relative contribution was about 564% in whole respected period. In whole period, absolute and relative contribution of labor to growth rate was negative: -0,47 percent, for absolute contribution, and about -170% of the GDP growth, for relative contribution.

On the other hand, in whole respected period absolute contribution of TFP in Croatia was negative, -0,82 percent, while its relative contribution was about -295%. In this respect Croatia differs sharply from other SEE and CE countries. In other SEE countries TFP rate of growth was positive, 0,80 percent on average, while its relative contribution was even more impressive: 48% of growth can be explained with increase of TFP. In CE and Baltic countries TFP contribution was even higher: on average, absolute contribution was 1,30 percent per year while relative contribution was 75% in these countries (Čizmović and Popović, 2014).

Important additional insights can be obtained from analysis of the GDP growth in particular *sub-periods*. This analysis will, among other things, bring first explanation for slow growth rate. Note first that the growth rate was pretty volatile and that growth rates have varied significantly in all respected sub-periods. Particularly important in this respect are the sub-periods 1990-1995, 1995-2000 and post crisis period 2008-2013. The first two sub-periods, that cover the nineties, are in the former socialist countries known as "transformational recession" (Kornai, 1993, 1994). As can be seen, in Croatia the GDP growth rate was

negative (-6,24%) in the first five years and positive (3,38%), in the second five years of the nineties. Similarly, in South Easter Europe these rates were -3,99 percent and 5,0 percent in respected periods. Keeping in mind that the year 1990, which is taken here as the starting year, is not actually the starting year of the transformation recession, meaning that it was not the year with the highest GDP before the beginning of recession, it can be pretty safely concluded that in the case of SEE countries it had taken more than one decade until level of GDP which prevailed before the beginning of transformational recession has been reached. We have already shown that in the case of Croatia it had taken seventeen years to reach pre-recession level of per capita GDP.

Graph 3: GDP growth rate decomposition for 1990-2013 and sub-periods



	1990-1995	1995-2000	2000-2008	2008-2013	1990-2013
TFP	-3.76%	1.32%	0.86%	-2.41%	-0.82%
Labor	-3.19%	0.61%	1.31%	-1.55%	-0.47%
Capital	0.72%	1.45%	2.13%	1.65%	1.57%
GDP	-6.24%	3.38%	4.29%	-2.31%	0.28%

Sources: Based on data from Table 3 in Appendices

When we compare this findings with that for Europe after World War II (Baldwin & Wyplosz, 2009), it can be concluded that, from an economic point of view, during the transformational recession, SEE countries had experienced disaster that is relatively, at least, as large as that during the WWII. The usual explanations point to the complexity of the transformation process from one unsustainable economic system to a new one and to the internal political economy related to it. However, it seems that the brake-up of the matrix of international economic relations that existed before the transition among former socialist states and international political economy related to it played an equally important, if not a greater, role. Example of Chinas' growth in last 37 years, with growth rate around 10% per year, clearly shows that transition can be done without such astonishing sacrifices and, in fact, without any transitional recession (Čizmović and Popović, 2014).

Second important explanation for the bad performance of Croatia and other SEE countries in the last quarter of century can be the recent financial crisis, which hit these countries much harder than the other European countries. In Croatia the GDP growth rate dropped from 4,29% in pre-crisis period 2000-2008 to negative rate of -2,31% in post-crisis period 2008-2013, which is a decline of 6,60 percentage points. This is dramatic decline indeed. In other SEE countries it declined on average by 5,76 percentage points, a drop from 4,74% to -1,02%. Finally, as in the case of some other SEE countries (Iradian, 2007; Popović and Čizmović, 2013), it can be also seen from data in this research, that GDP growth rates of Croatia can

be comparable to that of other decently growing economies only in sub-periods of 1995-2000 and 2000-2008. Note, however, that high rates of growth in Croatia in the 1995-2000 sub-period (3,38%) can be largely attributed to an increase in utilization of the capital that declined dramatically in the previous period. On the other hand, relatively high rates of growth in the pre-crisis period, 2000-2008, which in Croatia was 4,29%, can be attributed to an overheating of economy experienced by all European countries. Simply speaking, it is very difficult to judge what might be the magnitude of long run rates of the growth of Croatia on the basis of this analysis.

Noteworthy is also a fact that in whole respected period 1990-2013 Croatia experienced something that in some earlier papers was termed as a "jobless growth" (Popović and Čizmović, 2013, 2014; Popović, 2010, 2013). Indeed, negative growth rate of employment in Croatia explains not only slow GDP growth but a good deal of its growth anatomy as well. In Croatia, like in other former SFRY countries, which now make 7 SEE states, during the socialism, economic activity was mainly organized within the system of worker self-management characterized by strong "internal" solidarity among workers, implying a decent wage flexibility, and low "external" solidarity due to low propensity to saving. In order to preserve power and social peace, the state or political nomenclature, as the company's "implicit stockholder", created hidden unemployment within the company and provided financial assistance for companies in troubles. The implicit social contract between the nomenclature and the working class was that the nomenclature would provide job security to workers in return for political stability (Županov, J. 1983 and 1983a). This is how is obtained the high contribution of labor and the low contribution of TFP to the economic growth of that period. However, at the end, the implicit social contract between working class and political nomenclature turned out to be unsustainable. By somewhat modifying the prospect of upward mobility (POUM) hypothesis, it can be concluded that the mentioned implicit social contract broke down at the moment when the nomenclature became unable to provide the prospect of upward mobility to people.[5] This is mainly caused by the fact that "deruralisation" and urbanization, as the main sources of providing upward mobility and social promotion, were almost exhausted by the middle of the eighties.

By the end of the cold war and brake up of Soviet Union and SFRY, economies of new states were in a very bad shape. One decade was lost. The existing capacities were old and technologically obsolete, mainly built to serve the already non-existing communist state block (SEV) and SFRY markets. In such circumstances, instead of adopting an active economic policy directed toward "rediscovering economy" (Hausmann at all, 2005), the new government(s) opted for all kinds of "neoliberal shocks". These "shocks" almost destroyed the domestic economies. Adopted models of privatization were especially bad and destructive. Foreign direct investments, especially at the beginning, were mostly comprised within the so-called "brown-field" investment based on privatized companies. To make a long story short and relevant for the issue being discussed, it is important to emphasize that the new domestic or foreign owners of privatized companies reduced employment in their companies to technologically acceptable level. In other words, hidden unemployment disappeared and became explicit unemployment. New

[5] While original formulation of POUM (prospect of upward mobility) hypothesis, developed by Benabou and Ok (2001), might be questioned from many viewpoints, another one that we can establish on the basis of communist countries experience is much more convincing and interesting: human beings might be ready to give up democracy for an increased level of upward mobility. "Fighting for democracy" and "civil disobedience" was rare in communist countries as long as totalitarian regimes were able to provide high expectations regarding upward mobility. By using the strategy of "big push" and consequent rapid industrialization and urbanization, communist regimes were able to keep a high level of upward mobility and to hold power for so long.

investments in new or old companies, on the other hand, were insufficient to compensate for this effect and increase employment significantly. On the top of that these new investment, by using new technologies, substitute labor with capital even further, making in that way situation much more complicated. Apart from that, these new investments were mainly directed toward industrial centers, very rarely to less developed and distant regions, so that number of "closed" companies especially increased in less developed areas that once had labor intensive capacities. From the sources of growth point of view the consequence of all this is negative contribution of employment. Later, within demand and industry side sources of growth, we will see that some other factors also might have played important role in generating this kind of growth anatomy.

By saying that instead of adopting policy toward "rediscovering economy" Croatia and other SEE countries opted for all kind of "neoliberal shocks", it was not meant that these countries really applied recipes from "Washington consensus". Far from that: in fact, rarely anybody in SEE countries did. Either measured with share of public spending or with its' regulatory impact, the role of state has been still very strong. The point is that this role has not been devoted to, so badly needed, selective industrial policy aimed at promoting economic growth by mitigating numerous market failures, but to promoting interest of newly established business elites. It has always been the end result of neoliberal game. Market rhetoric, on the other hand, has mainly been used to justify acquired position of new elites. Being implicit "owner" of the state and by promoting their interest via state, new elites in fact contribute market failures to be amplified even further. So, what we got is, in fact, combination of the worst from both worlds: economies with extreme number of market failures and even greater number of state failures. All kind of corruptions are extremely widespread in these countries. In fact, we can say that *grand corruption* can be regarded as *genesis* of new order in these countries, while *petit corruption* can be regarded as a new *life style*. Consequences of state capture, corruption and unsolved problems of market failures for economic growth are enormous and well known (Čizmović and Popovic, 2014).

GDP PER CAPITA SOURCES OF GROWTH

The analysis of the GDP per capita sources of growth, given in Table 5, will be useful in focusing on and analyzing another important source of growth and reserve for future growth – the increase in the labor participation rate. Taking P to present population and Q to present GDP, the growth of GDP per capita can be decomposed in the following way:

$$\frac{Q}{P} = \frac{L}{P}\frac{Q}{L} = \left(\frac{L}{P}\right)\frac{AC^{(1-a)}L^{a}}{L} = \left(\frac{L}{P}\right)A\left(\frac{C}{L}\right)^{(1-a)} \Rightarrow \quad r_{Q/P} = r_{L/P} + r_{Q/L} = r_{L/P} + (1-a)r_{C/L} + r_{A} \quad (21)$$

where r represents the rate of growth of the variable given in the subscript. The growth of GDP per capita is decomposed into a part that measures the contribution of the increase in the employment share in the population (employment population ratio, $r_{L/P}$) and a part that measures contribution of productivity ($r_{Q/L}$) to economic growth. Contribution of productivity is further decomposed on a part that measure the contribution of the increase in the capital labor ratio ($(1-a)r_{C/L}$), and a part that measures the contribution of the TFP (r_A). The results presented in Table 5 and Graph 4 have been obtained by applying the above analytical framework on the existing data pertaining to Croatia. The results for Croatia are accompanied by comparing them with those obtained for other East European countries (Čizmović and Popović, 2014).

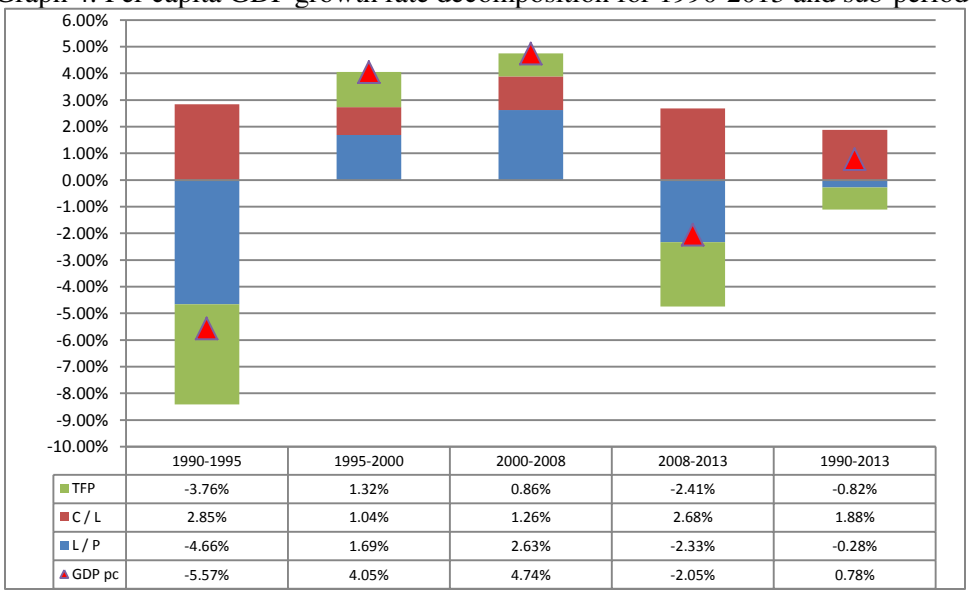
Note again that, although far from perfect, the GDP per capita is usually regarded as a good proxy for the level of welfare and standard of living. The less developed the country, the better measure of welfare it is. Numerous researches, especially those related to the economics of happiness, revealed that this does not apply to developed countries.[6] Next, usually the less developed the country, the more important source of its' rate of growth is the increase in the employment participation ratio. Finally, the increase in the employment population ratio, apart from increasing the standard of living, reduces economic inequality and eradicates poverty. In fact, it is the most powerful channel to reduce poverty. At the same time, it is the only sustainable way to do it.

Let see how Croatia position itself against these issues. Looking at the entire period 1990-2013, the first thing that attracts attention is the growth of population. Same as other Central and South East European countries that have mainly experienced a significant decline in population, Croatia also has experienced negative growth rate of population (-0,50% per year). These trends in population movements within CE, SEE and FSU countries are the result of movements in natural rate of growth of population, on the one hand, which was weak in CE and SEE countries, and movement in migration on the other hand, where CE and SEE become emigration countries. Both trends are, of course, the result of different long run economic movements in two groups of countries and of different cultural shapes that determine fertility rate and other population indicators. Same trends are noticeable in Croatia as well. According to the available data (see, for example, PRB report, 2013), the natural rate of population growth (birth rate minus mortality rate) has been negative in majority of former communist states. On a top of that, due to worsened economic conditions and to a liberalized approach to labor market in core European countries, CE and SEE countries experienced significant emigration rate. As a consequence all of these countries have been important destinations for remittances from core EU countries (World Bank, 2007).

As a result of negative trends in the movement of population, the GDP per capita growth rates increased and even become favorable for Croatia as well as for other CE and SEE countries. The average GDP per capita growth rate in Croatia was 0,78% in the entire 1990-2013 period. This result implies that in Croatia it takes about 90 years to double GDP per capita. If GDP per capita growth rate of most developed countries in the same period is taken as a benchmark, 1,31% for 12 most developed European countries and 1,38% for USA, it can be concluded that Croatia has experienced a strong divergence in 1990-2013. Assuming per capita GDP growth rate of just 6%, than per capita GDP would double every 12 years. Looking at the different sub-periods it can be noticed that the per capita GDP growth rate in Croatia was very volatile. Indeed, in the first five years of the nineties it was much slower than average (around -5,57%) and then much higher than average (4,05%). In post-crisis period it was again very weak, around -2,05%. In most stable pre-crisis period, 2000-2008, it was 4,74%. Taking this figure as a possible proxy for long run growth rate it follows that it would take around 15 years to double per capita GDP in Croatia. Although this is much better result and, definitely, much more realistic picture of what Croatian economy could do, it is obvious that this result is not impressive at all having in mind high possibilities to exploit catch-up effects available to Croatia.

[6] For brief insights and references on the issue of economics of happiness see, for example, Layard (2003, 2005) and Graham (2010).

Graph 4: Per capita GDP growth rate decomposition for 1990-2013 and sub-periods



	1990-1995	1995-2000	2000-2008	2008-2013	1990-2013
TFP	-3.76%	1.32%	0.86%	-2.41%	-0.82%
C / L	2.85%	1.04%	1.26%	2.68%	1.88%
L / P	-4.66%	1.69%	2.63%	-2.33%	-0.28%
GDP pc	-5.57%	4.05%	4.74%	-2.05%	0.78%

Sources: Based on data from Table 5 in Appendices

Further important insights can be obtained from the anatomy of the GDP per capita growth analysis. During the whole 1990-2013 period, the participation rate has had a negative absolute contribution (-0,28%) to per capita GDP growth, which is not surprising keeping in mind that the population growth rate despite being negative (-0,50%) was not sufficient to compensate for strong negative impact of employment in Croatia (-0,78%). Similarly, in other SEE and CE countries the growth of labor participation rate and its contribution to per capita GDP growth rate was, despite negative growth rate of population, also negative, due to the fact that decline of employment has been even stronger than that of population. As a consequence, in the 1990-2013 period, the GDP per capita growth rate in Croatia can be predominantly explained with labor productivity growth: its absolute contribution was 1,06% and it explains about 136% of GDP per capita growth. Further decomposition shows that the increase of capital labor ratio explains about 242% (out of 136%) of that growth, while the increase of TFP explains about -105% (again, out of 136%) of per capita GDP growth.

Looking at the GDP per capita sources of growth for different sub-periods, many additional and interesting insights can be obtained for Croatia. It is noticeable that the source of growth structure is pretty volatile in Croatia as well as in the other respected countries. As usual, this volatility is especially significant during transformational recession period (1990-1995 and 1995-2000) and in post-crisis period 2008-2013. Volatility is especially significant when we analyze growth of TFP. In the pre-crisis sub-periods 2000-2008 the growth anatomy in Croatia as well as in all other countries is more stable and more in accordance with the usual long run shapes. Looking only at relatively stable sub-period 2000-2008, it is noticeable that absolute contribution of labor participation rate was 2,63%, while its relative contribution was 55%. Absolute contribution of labor productivity is 2,12% and it explains 45% of per capita GDP growth in that period. On the other hand, absolute contribution of increase of capital labor ratio was 1,26% and it explains about 27% of GDP per capita growth. Rest of growth is explained with TFP: absolute contribution was 0,86% and its relative contribution was just about 18% of per capita GDP growth.

So, even in most favorable sub-period, both absolute and relative contribution of TFP was pretty weak in Croatia. As already noticed, weak absolute and relative contribution of TFP to economic growth is peculiarity of Croatia. Contrary to that, other SEE and CE countries have had strong relative and even absolute impact of TFP on economic growth.

DEMAND SIDE SOURCES OF GROWTH

1. Additional insights in this analysis can be provided by the demand and industry side of sources of growth analysis. Results for demand side sources of growth are presented in Graph 5 and Tables 6 and 7, while results for industry side sources of growth are given in the next section. Table 6 presents demand structure in particular years (black letters) and its changes in respected periods (red letters). These values are calculated based on current and constant 2005 reference prices. Calculations based on current prices are presented in red letters. In fact, structural changes calculated in current prices can be decomposed on effect of quantity changes (volume effect), which presents changes measured in constant prices, and effect of relative price changes (price effect). Decomposition on volume and price effects is presented in Table 7 with blue letters. Green letters in that table presents rate of growth of relative prices of particular type of demand. More formally

$$\frac{Q_{it}p_{it}}{\sum_{i=1}^{n} Q_{it}p_{it}} - \frac{Q_{i0}p_{i0}}{\sum_{i=1}^{n} Q_{i0}p_{i0}} = \left(\frac{Q_{it}p_{it}}{\sum_{i=1}^{n} Q_{it}p_{it}} - \frac{Q_{it}p_{i0}}{\sum_{i=1}^{n} Q_{it}p_{i0}}\right) + \left(\frac{Q_{it}p_{i0}}{\sum_{i=1}^{n} Q_{it}p_{i0}} - \frac{Q_{i0}p_{i0}}{\sum_{i=1}^{n} Q_{i0}p_{i0}}\right) \quad (22)$$

Q_{it} and Q_{i0} present quantity of goods *i* consumed or produced at years t and 0, while p_{it} and p_{i0} present their prices in respected years. Obviously, the two expressions at the left hand side of this equation present shares of a particular type of consumption (or production) in two years, which are given in black letters on the tables, while the whole left side of the equation stands for change in share in respected periods measured in percentage points, which are given in red letters on the tables. When, from the left hand side, *i*-th shares in year *t* measured in *0*-th year prices are added and subtracted, then, after some manipulations, decomposition is obtained which shows how much of structural change is attributable to relative price changes, what can be seen in the first part of the right hand side of the equation, and how much is attributable to quantity of goods consumed (or produced) changes, second part of right hand side of equation. Since the value of $Q_{it}p_{i0}$ is not available, it was not possible to calculate relative price effect directly by using the above equation. Instead, this effect is calculated by subtracting quantity effect from the left hand side of the above equation. Quantity effect is, on the other hand, calculated by using appropriate values in 2005 prices, since these data are available. This is legitimate because these data are calculated using prices from 2005 as a reference price (calculated by chain indexes), not as exact prices from that year, so that any year reference prices would give the same results. In order to conserve space, only calculations for the difference between the last and first years of the observation are presented in the tables, and it is given in the last two columns of the tables (blue letters).

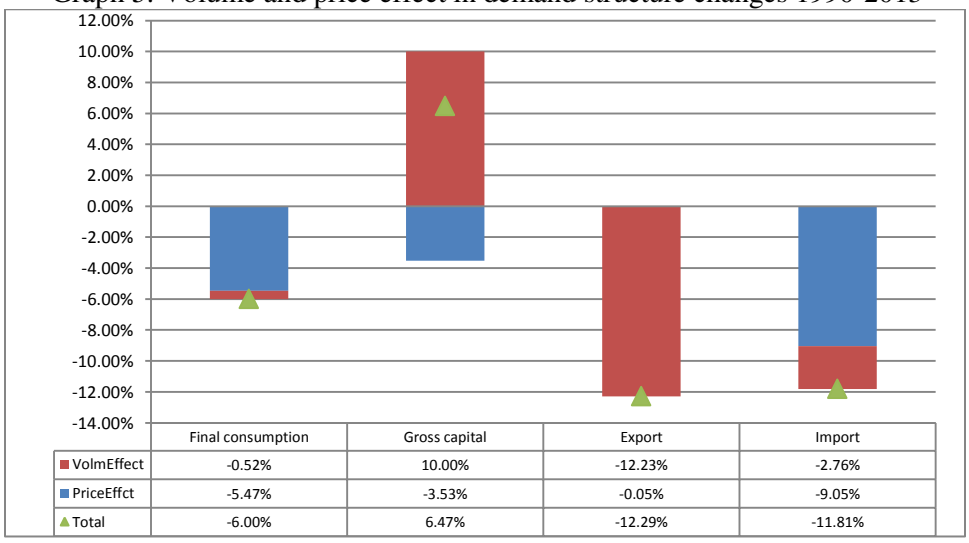
Apart from that, a calculation of the rate of growth of relative price levels has also been done and given, as we already mentioned, in green letters for each respected period. This is done by subtracting the rate of growth of implicit deflator from rate of growth of prices of particular variable in respected period. Rate of growth of prices of particular variable is obtained as difference between respected variable measured in current and constant price. On a top of that, due to its great importance, calculation of rate of growth of

Terms of Trade (TOT), relative export to import price, is also presented. TOT growth rates are here calculated using the expression

$$r_{TOT} = \left[\frac{(1+r_{xp})}{(1+r_{mp})} - 1\right] \tag{23}$$

where r_{mp} and r_{xp} stand for growth rates for import and export prices. This can also be approximated with differences between these two growth rates, $(r_{xp} - r_{mp})$. On the other hand, growth rates of import and export prices are calculated as a difference between the growth rate of import and export measured in current prices (r_{mqpt} and r_{xppt}) and those measured in constant prices (r_{mqp0} and r_{xqp0}). More formally, it was calculated using expressions $(r_{mqpt} - r_{mqp0})$, for import prices, and $(r_{xqpt} - r_{xqp0})$, for export prices. Note that *TOT* calculated in above way is not same as one provide by using standard methodology. Nevertheless, it is very insightful and indicative for this kind of analysis.

Graph 5: Volume and price effect in demand structure changes 1990-2013



	Final consumption	Gross capital	Export	Import
VolmEffect	-0.52%	10.00%	-12.23%	-2.76%
PriceEffct	-5.47%	-3.53%	-0.05%	-9.05%
Total	-6.00%	6.47%	-12.29%	-11.81%

Sources: Based on data from Table 7 in Appendices

2. Note that sum of price and volume effect, given within Table 7 and on Graph 5, should be equal to change in share given in Table 6. Obviously, volume effect presents change in share measured in constant prices.

Regarding the aggregate demand side, the first important thing to note from Table 6 is the fact that final consumption (household and government spending), as a dominant part of aggregate demand, has played a much stronger role at the beginning of the nineties (86,54%) and in 2000 (84,21%) than at the 2008 and 2013 year when it presented 77,33% and 80,54% of GDP respectively. So, measured in current prices, its share in GDP decreased by 6 percentage points in 2013 compared to 1990 year and by 9,21 percentage points in 2008 compared to same 1990 year.

More interestingly, as can be seen from Table 7, the decrease of final consumptions share in whole 1990-2013 period is dominantly the result of price effect. Relative prices of goods and services covered by final consumption have declined by -0,28% per year in the 2000-2013 period and, as a consequence, the

contribution of price effect to its decrease of share in GDP was negative -5,47 percentage points. The volume effect was also negative but very weak, -0,52 percentage points, meaning that when measured in current prices, the share of final consumption in fact decreased by about 6,00 percentage points. Note, again however, that this decline is dominantly result of price decline and that, in fact, when measured in constant prices, share of final consumption has stayed pretty much the same.

Secondly, net-exports have been negative in all respected years except in the first and last year when net export was negligible. In 1990 and 20013 net export was even positive: 1,08% in 1990 and 0,61% in 2013. Size of negative net export, which indicate level of capital account inflow, was about -9% in 1995, -3,11% in 2000 and -7,76% in 2008 year. More importantly, all this has been followed by a significant decrease of both import and export share in GDP, implying either that even at the beginning of respected period level of trade account liberalization was pretty high in Croatia compared to other transition countries or that this decrease of share was result of brake up of former SFRY (for other SEE and transition countries see Čizmović and Popović, 2014). In the whole period 1990-2013, import shares decreased by -11,81 percentage points, so that it now presents 42,39% of GDP compared to 54,20% in 1990. On the other hand, export shares dropped by -12,29 percentage points in 1990-2013 period, so that it now presents 43,00% of GDP compared to 55,28% in 1990.

In fact, it seems that second explanation for export and import share decrease offered above is the right one. Our data show that decrease of export and import shares in GDP happened in sub-period 1990-1995, when former SFRY market disappeared. In just five years export share dropped for about 22 percentage points, from 55% in 1990 to 33% in 1995. In the same five years import share dropped for about 12 percentage points, from 54% in 1990 to 42% in 1995. So, it can be said that compared to 1995 year export share in fact increased from 33% to 43% in 2013, an increase for about 10 percentage points, while import share stayed pretty high and stable, about 42%.

Compared to other former SFRY countries, it can be noticed that only Slovenia have experienced such strong impact of SFRY brake-up on export and import share. This decline of share was even stronger in the case of Slovenia: share of export decreased for 38 while that of import decreased for 25 percentage points. On the other side, in Bosnia and Herzegovina, for example, export and import share dropped in these five years for just -2,25 and -4,54 pp respectively. In Macedonia it surprisingly even increased for about 5 pp for both export and import. In the case of Montenegro it was almost unchanged which is not surprise since at that time it decided to stay in federation with Serbia. For Serbia there is no appropriate data for 1990 year. Apart from that Serbia (and Montenegro) had been under UN Security Council sanctions, so that even if we had data it would be difficult to give proper meaning to them.

Looking at Table 7 and Graph 5, it can be noticed that in 1990-2013 period, measured in Kuna, relative export prices have been pretty stable, they gave grown at negligible and insignificant rate of 0,02% per year, while relative import prices decreased very strongly at annual rate of -0,80% per year. Consequently, the decrease of export share in GDP was entirely attributable to volume effect (-12,23%), meaning that decrease of export was significant even when measured in constant prices. Import share decrease, on the other hand, have been predominantly result of price effect (-9,05%) and only mildly result of volume effect (-2,76%), meaning that, when measured in constant price, decrease of import was not very significant. Notice also that relative export to import prices (terms of trade – TOT) increased by 0,825% per year in the 1990-2013 period. According to this data, it can therefore be concluded that terms

of trade have been improving (less domestic product for unit of foreign import) which, ceteris paribus, should have had a positive effect on the Croatian economy. Note, however, that this movement of terms of trade worsened the relative competitiveness of the domestic economy by making domestic export prices relatively more expensive compared to import prices.

Even more interesting are the results for the sub-periods 2000-2008 and 2008-2013. In the first sub-period, relative prices of export decreased at lower rate (-0,66% per year) than that of import (-2,01% per year), so that the terms of trade rate increased at annual rate of 1,376%. Consequently, changes of export and import shares, 0,38 pp and 5,03 pp respectively, in the pre-crisis period should be attributed to both volume and price effect. Price (-2,16 pp) and volume (2,54 pp) effect almost canceled in the case of export, and it is why change of export share was so weak when measured in current prices, 0,38 pp. Note, however, that when measured in constant prices increase of export share was not insignificant, 2,54 pp. In the case of import, increase of its share measured in constant prices (volume effect) is even higher, 12,18 pp. However, due to strong price effect, -7,15 pp, share of import measured in current prices increase for just 5,03 percentage points.

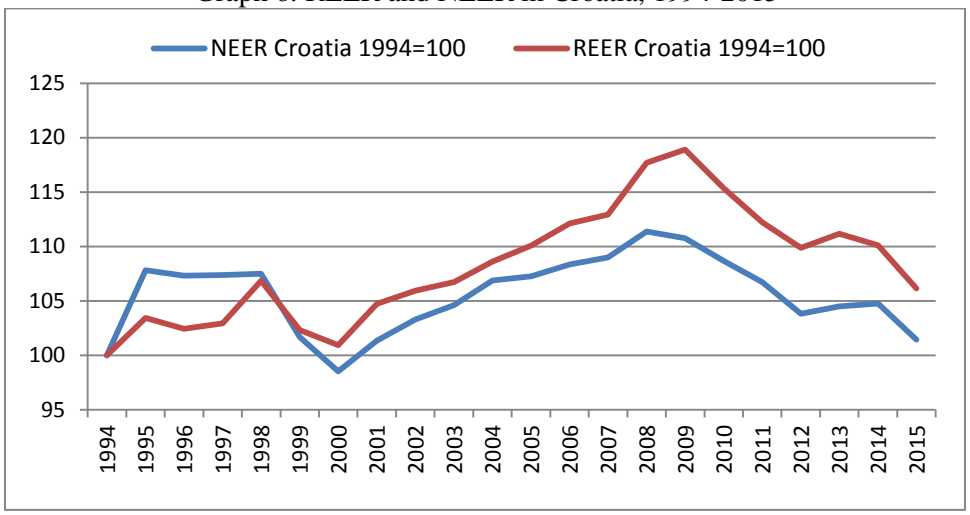
In the 2008-2013 post-crisis period, however, the relative price of export start increasing at 0,43% per year, while relative import prices exhibited very weak, almost negligible, rate of just -0,01%. So the terms of trade (export to import price ratio) rate of growth increased at the rate of 0,44% per year. Quite naturally in that circumstances volume effect on export was negligible: export share measured in constant price increased for just 0,02 pp. It is only due to price effect, which was 0,91 pp, that export share measured in current prices increased for 0,93 pp. On the other side, import share measured in current prices decreased for -7,44 pp, mainly due to price effect, -7,68 pp, while volume effect was positive but negligible, 0,24 pp. The above finding implies that real effective exchange rate appreciated strongly and that net-export part of aggregate demand have been unable to absorb external shocks.

Third important set of conclusions refer to movement and relative magnitude of gross fixed capital formation. Note that, when measured in current prices, gross fixed capital formation share in GDP increased, first, from about 12% in 1990 to about 19% in 2000 (for 7 pp) and then increased further to bit more than 27% in 2008 (for 8 pp). After that, in post-crisis period 2008-2013 this share decreased to about 19% in 2013, drop for 8 percentage points. On the other hand, the relative price of investment decreased during the 1990-20013 period at a rate of -0,69 percent a year. Consequently, a jump of investment rate by 7,57 percentage points in that period is to certain extent attributable to price effect, for 3,26 pp. As a result, the volume effect was, in fact, so dominant that, when measured in constant price, gross fixed capital formation share in GDP increased for about 11 percentage points in whole period 1990-2013. In fact, investment rate increased from 12% in 1990 to 23% in 2013. Strong increase of investment rate in pre-crisis period 2000-2008, jump for 8,40 percentage points, was result of strong positive volume effect (almost 10 pp) and mild negative price effect (1,59 pp). On the other hand, decrease of investment share in GDP in five post-crisis years for dramatic -8,05 percentage points, was combination of negative price effect (-2,13 pp) and bit stronger negative volume effect (-5,93 pp).

Note, however, that due to capital account liberalization, the saving rate has not followed the investment rate. What Croatia experienced at respected period was a significant decline in the domestic saving rate which jeopardized its growth rate. Quite naturally, this decline in domestic savings and increase of the saving-investment gap was matched by widening of net-export account and an increase in the capital

account as implied in the previous tables. In whole period 1990-2013 net-export deficit presented about 20% of investment in Croatia. Taking negative net-export as a proxy for capital inflow, it can be inferred that one fifth of investment have been financed from external sources. Note, however, that reliance on external sources in financing domestic growth is much stronger if we look only at periods of relatively strong growth. In 1995-2000 net-export presented 37% of gross fixed capital formation, while in 2000-2008 it presented about 30% of capital formation. Obviously, like other SEE countries, Croatia accepted model of growth in which foreign sources present main engine of growth. The model happened to be unsustainable on the long run. It contributed a lot of other dis-equilibriums to accumulate in 1995-2008 period.[7] When economic crisis erupted capital inflow dropped and, as a consequence, country experienced sharp decline in economic growth. Public and private debt further increased to the unsustainable level. Fiscal policy that relies solely on saving is not able to provide any significant results in acceptable future.

Graph 6: REER and NEER in Croatia, 1994-2015



Sources: Calculated as annual average of BIS monthly estimates

On the other hand, according to majority of authors and researchers, exchange rate policy has had adverse effect on economic growth in both, pre-crisis and post-crisis periods.[8] In pre-crisis period it decisively contributed inflation rate to be calmed down. However, this policy was also followed with significant appreciation of real exchange rate. Our previous findings on growth of *TOT* indicate that real exchange rate appreciate indeed. Graph 6 present time path of real effective exchange rate (REER) and nominal effective exchange rate (NEER) calculated on the bass of BIS estimates. It further validates our claim that in pre-crisis period Croatian REER appreciated significantly. In fact, compared to its initial level in 1994 it appreciated for almost 20% in 2009. In such circumstances competitive position of Croatian economy deteriorates. This significantly contributes to further deindustrialization of domestic economy and to worsening of its export sophistication.

Appreciation of real exchange rate is, in fact, most important disequilibrium that has accumulated in 1995-2013 period. This disequilibrium is also one which predominantly influenced all other disequilibria

[7] For much more detailed analysis on issue of sustainability of SEE and CE growth models and on accumulation of other dis-equilibriums in Croatia see Becker at all (2010) and Europska komisija (2014).

[8] For broader survey on this issue see: Becker at all (2010), Sonora and Tica (2014), Erjavec, Cota, and Jakšić (2012), Egert (2004), Šonje (2000), Sorić (2007), Crespo-Cuaresma, Fidrmuc, and Silgoner (2004).

to occur and accumulate in respected period of relatively good growth record. On the other hand, appreciation of REER was a consequence of strong capital inflow that Croatia has had in that time.

In post-crisis period 2008-2013 REER in Croatia depreciated to the certain level, but it is still appreciated compared to its initial level. Despite depreciation it was not possible to absorb significantly external shocks by an improvement of net-export as a part of aggregate demand. Even worse, there is no space for further depreciation of REER via nominal exchange rate even if Central Bank of Croatia decides to change its original mandate. Croatian banking system is, like in all other in SEE countries, highly dollarized (eurized) and space for such policy is extremely limited. Internal depreciation, apart from taking too much time, is also limited due to the level of accumulated debt.

3. Finally, on the basis of the previously presented results, it is possible to present the contribution of different part of aggregate demand to economic growth. Results of this analysis are presented in Graph 7. Basically, the decomposition is done following next expression

$$r_Q = \sum s_i r_{Q_i} \qquad (24)$$

where r_Q presents rate of growth of aggregate demand (and GDP) in respected period, s_i is share of particular kind of expenditure in aggregate demand, while r_{Q_i} stands for rate of growth of *i*-th kind of expenditure. Note that these findings refer to what was previously termed as volume effect. Note also that in this kind of analysis relative decrease of import has positive impact on growth, while decrease of export has negative impact on growth.

Graph 7: Demand side sources of growth in Croatia, 1990-2013 and sub-periods

	1990-1995	1995-2000	2000-2008	2008-2013	1990-2013
Import	4.67%	-1.77%	-3.58%	2.57%	-0.07%
Export	-7.63%	2.25%	2.10%	-0.92%	-0.36%
Gross Capital	0.25%	1.39%	2.84%	-2.42%	0.52%
Final Consumption	-3.53%	1.51%	2.94%	-1.54%	0.18%
GDP	-6.24%	3.38%	4.29%	-2.31%	0.28%

Sources: Based on calculations using UN data set for Croatia

As can be seen, in whole respected period 1990-2013 contribution of both export (-0,07 percent) and import (-0,36 percent) was negative, meaning that net-export contribution was negative and very significant, -0,43 percent per year, especially keeping in mind low level of GDP growth rate (0,28 percent). This happened due to relative increase of import and decrease of export. Due to high level of capital inflow and consequent strong increase of export and import, in the pre-crisis period 2000-2008 is

noticeable strong negative contribution of import, -3,58 percent, and bit weaker positive contribution of import, 2,10 percent. Net-export effect was negative, -1,48 percent. Due to shrinking of capital inflow and consequent reduction of net-export, exactly opposite happened in post-crisis period 2008-2013. Import decreased and its contribution became positive (2,57 percent). Export also decreased and its contribution became negative (-0,92 percent). Still, net-export effect have been positive, 1,65 (=2,57-0,92) percent.

Contribution of gross fixed capital formation is mirror image of that of net export. In whole period contribution of investment is positive and relatively significant, 0,52 percent. In pre-crisis period 2000-2008 its contribution was very strong, 2,84 percent per year, reflecting strong capital inflow and its strong impact on growth, which is indicated with negative contribution of net-export (-1,48 percent). Contrary to that, in post-crisis period 2008-2013 contribution of gross capital formation is negative (-2,42 percent), reflecting decline of capital inflow and consequent strong decline of import and increase of net-export contribution to growth (1,65 percent). Contribution of final consumption has similar shape and can be explained in almost same way.

So, as far as demand side sources of growth is regarded, it can be concluded that striking asymmetry between contributions of net-export, on the one side, and gross capital formation and final consumption, on the other side, is main characteristics of growth anatomy for countries that, like Croatia and other SEE countries, heavily rely on foreign capital as a source and main engine of growth. Apart from being very vulnerable, growth models based predominately on foreign capital are unsustainable on the long run.

INDUSTRY SIDE SOURCES OF GROWTH

1. Industry structure dynamics, given in tables 8 and 9 and visualized in graphs 8 and 9, is analyzed in the same way as demand side dynamics. Interestingly enough, it can be regarded as a mirror image of demand structure dynamics. The first and most important thing to notice is a sharp decrease of share of industry and particularly manufacture in GDP between 1990 and 2013, measured in current prices. Share of industry decreased in whole period for unbelievable -15 percentage points, a drop from about 33% to about 18% of GDP. To make situation even worse, this decrease is entirely attributable to decrease of share of manufacture in GDP. Its share in GDP decreased from 28% in 1990 to about 12% in 2013, dramatic drop for about -16 percentage points.

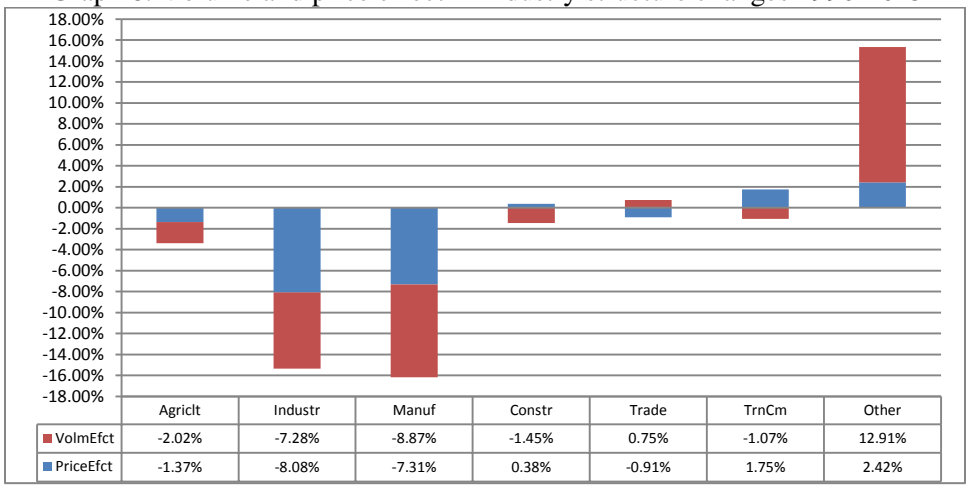
Again, like with decrease of export and import, this predominantly happened in the period 1990-1995 when former SFRY market was destroyed. Industry share decreased in that sub-period from 33% in 1990 to 21% in 1995, drop for 12 percentage points. Manufacture share in GDP, on the other hand, decreased in the same sub-period from 28% in 1990 to 18% in 1995, drop for about -10 percentage points. In the following years, from 1995 to 2013, industry share dropped for additional 3 percentage points and manufacture share dropped for additional 6 percentage points.

So, someone might be tempted to conclude on the basis of above mentioned data that deindustrialization in Croatia is mainly result of disappearance of large SFRY market and to a lesser degree result of other factors. To get clearer picture about this issue we should take a look at data on price and volume impact on structural changes. As can be seen from Table 9 and Graph 8, drastic decline in share of industry and manufacture in entire 1990-2013 period can be equally attributed to price and to volume effect. In the case of industry, the price effect was -8,08 percentage points while volume effect was -7,28 percentage

points. Similarly, in the case of manufacture price effect was -7,31 while volume effect was -8,87 percentage points. So, when measured in constant price deindustrialization seems to be a bit less striking: industry share decreased for -7,28 percentage points while manufacture share in GDP decreased for -8,87 percentage points.

Large price effect is, on the other hand, result of strong decline in relative prices of industry and manufacture. Industry prices have declined at annual growth rate of -1,05% while manufacture prices have declined at rate of -1,29%. All this happened due to two connected factors. First, liberalization of trade account usually bring instant, one time decline of prices, which should have had negative effect on domestic industry and manufacture share in GDP. Indeed, this happened in all former SFRY countries. Therefore, even with broader SFRY market it would not be possible to avoid this problem. Second, exposure to world market competition put Croatia and other SEE countries in market which is characterized with continuous decrease of industry and manufacturing prices resulting from East Asia countries (primarily China) competition. This, in fact, explains why whole western world was not able to avoid sharp deindustrialization. In such competitive market it was hard to keep previous share and previous structure of industry in Croatia and other SEE countries.

Graph 8: Volume and price effect in industry structure changes 1990-2013



	Agriclt	Industr	Manuf	Constr	Trade	TrnCm	Other
VolmEfct	-2.02%	-7.28%	-8.87%	-1.45%	0.75%	-1.07%	12.91%
PriceEfct	-1.37%	-8.08%	-7.31%	0.38%	-0.91%	1.75%	2.42%

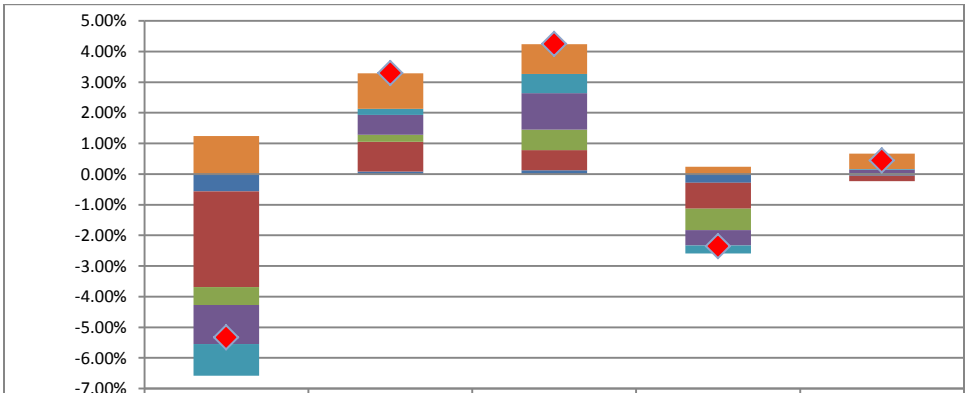
Sources: Based on Table 9 in Appendices

The second important trend is a decrease of share of agriculture in GDP since 1990 until 2013. Strangely enough, we have deindustrialization coupled with "deagrarization". Share of agriculture, forestry, hunting and fishing in GDP dropped from 7,00% in 1990 to 3,60% in 2013. This drop of -3,40 percentage points, in fact, almost halved share of agriculture in Croatian GDP. Having in mind broader social meaning and importance of agriculture this problem is especially worrisome despite the fact that agriculture does not have so large share in modern economies. This decrease is attributable to price effect (-1,37 pp) and somewhat stronger to volume effect (-2,02 pp). Price effect is a result of relative price decrease, -0,89% per year. Decrease of agriculture share in GDP was continuous process in Croatia. In the first decade, 1990-2000, this decrease was -1,62 pp, than in 2000-2008 period it was additional -1,10 pp, while in post crisis years 2008-2013 it was -0,68 pp. In the pre-crisis period both price and volume effects had been negative and significant. In post crisis period price effect was negative (-0,73 pp) while volume effect was slightly positive (0,05 pp). In all pre-crisis sub-periods relative price decreased but in post-crisis sub-period relative price of agricultural products increased slightly, 0,38% per year.

The third important trend is related to what is in the tables defined as other activities. Its share increased for almost 15 percentage points, jump from 22% in 1990 to 37% in 2013. It is important to note that these activities cover mainly non-tradable services that are not covered within some of other activities. Interestingly enough, relative price of this sector increased mildly in 1990-2013 at annual rate of 0,47%. Price effect was naturally positive but not very significant, 2,42 percentage points. Predominant is here volume effect, 12,92 percentage points. This is quite in accordance with expectations regarding non-tradable services. A fact that their relative prices exhibited certain increase while prices of manufacture and agriculture, whose product belong to tradable goods, exhibited strong decline are indication of real exchange rate appreciation. Earlier mentioned and discussed issue of terms of trade increase and calculation based on BIS data also indicates that real exchange rate has appreciated significantly in Croatia.

2. In Graph 9 presented is industry side sources of growth analysis. Analysis is again based on expression (24) as in the case of demand side sources of growth analysis except that now subscript *i* refer to different sectors of economy.

Graph 9: Industries contribution to growth in Croatia, 1990-2013 and sub-periods



	1990-1995	1995-2000	2000-2008	2008-2013	1990-2013
Other	1.24%	1.16%	0.98%	0.24%	0.51%
TransCom	-1.03%	0.20%	0.63%	-0.26%	0.01%
Trade	-1.27%	0.65%	1.19%	-0.50%	0.13%
Construct	-0.59%	0.22%	0.67%	-0.70%	0.02%
Industry	-3.12%	0.97%	0.66%	-0.84%	-0.17%
Agricltre	-0.57%	0.09%	0.12%	-0.28%	-0.06%
Value Added	-5.34%	3.29%	4.24%	-2.36%	0.44%

Sources: Based on calculations using UN data set for Croatia

Contribution of industry and agriculture is, as expected, negative in whole period as well as in all sub-periods except in sub-periods of rapid growth 1995-2008. On the other hand, non-tradable services (in graph denoted as other activities) have had positive contributions in all respected sub-periods. As far as other sectors are regarded, figures speak for themself and there is no need for further comments.

No doubt, change of industry structure is just a mirror image of demand structure changes. The model of growth which heavily relies on foreign capital and in which foreign capital presents a main engine of growth is inevitably followed with appreciation of REER. Appreciation of REER is followed with an increase of domestic exported goods prices at foreign markets and decrease of foreign imported goods prices at domestic market. The competitive position of a domestic economy deteriorates significantly,

which results in deterioration of tradable activities. This is what deindustrialization is about. Of course, in the case of Croatia (and other former SFRY countries) deindustrialization is to a large extent, at least in the beginning of nineties, the result of the disappearance of the large SFRY market for which a good deal of Croatian capacities had been built.

3. Apart from above given decompositions, it would be very useful to isolate parts that measures effect of intra-sectorial and inter-sectorial growth of TFP. Intra-sectorial part measures contribution of increase of TFP within all sectors disregarding the change of sectorial structure, while inter-sectorial part measures impact of improvement of sectorial structure on TFP. This is more formally presented in expression (10) given previously in section on methodological approach. Unfortunately, due to lack of data on capital for different sectors, it was not possible to make such decomposition of TFP growth rate. What we can do, however, is to decompose growth rate of labor productivity on inter-sectorial and intra-sectorial part of growth. Formally, index of aggregate labor productivity can be decomposed in the following way:

$$\frac{\frac{Q_t}{L_t}}{\frac{Q_0}{L_0}} = \frac{q_t}{q_0} = \frac{\sum q_{it}\, l_{it}}{\sum q_{i0} l_{i0}} = \left[\frac{\sum q_{it}\, l_{it}}{\sum q_{it} l_{i0}}\right]\left[\frac{\sum q_{it}\, l_{i0}}{\sum q_{i0} l_{i0}}\right] \qquad (25)$$

where q_{it} stands for labor productivity of sector *i* in year *t* (or in the beginning year if 0). Again, due to a lack of appropriate data, such analysis is done only for 2000-2012 period.

First part of this expression, obviously, presents contribution of intra-sectorial effect, while second part present effect of inter-sectorial shift of labor on productivity growth. Growth rate of these effects are calculated on the basis of these indexes. Analysis is presented in Table 10 and Graph 10.

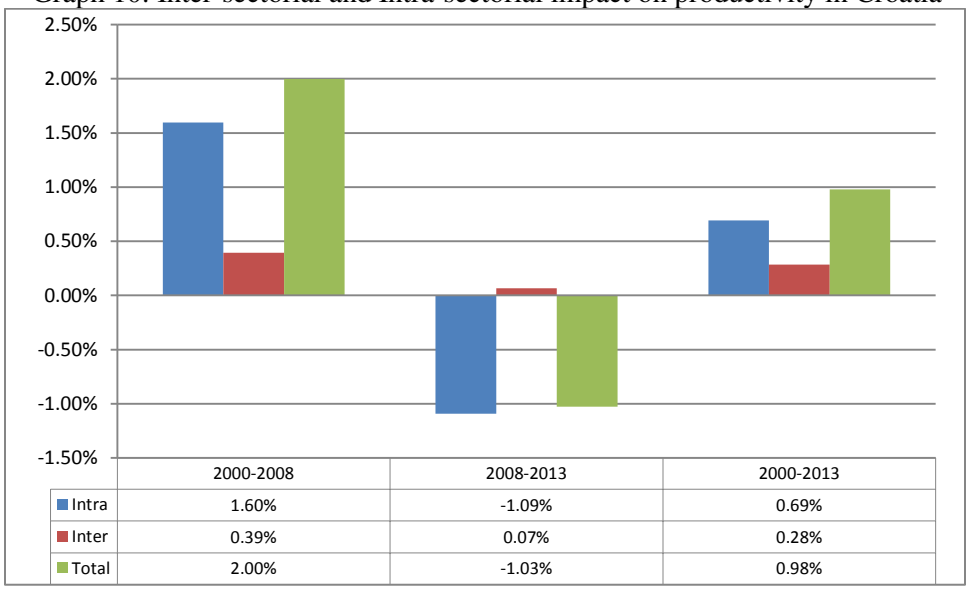
Looking solely at Table 10, we see that in entire period 2000-2012 labor productivity has grown at 0,98% per year. Absolute contribution of intra-sectorial effect was 0,69% per year and it explains about 71% of labor productivity growth at entire period, while inter-sectorial absolute contribution was 0,28% per year which explains about 29% of productivity growth. Strong inter-sectorial effect is expected having in mind dramatic changes that happened in Croatian economy after desolation of former SFRY and opening to world market.

However, if we take look at particular sub-periods, we can notice that in pre-crisis period productivity growth (2,00%) was, quite naturally, much higher than in post-crisis period, when it was in fact negative, -1,03% per year. Its structures also differ significantly.

It is interesting that in pre-crisis period inter-sectorial effect was very strong, 1,60% per year, and that it explains almost 80% of productivity growth. The rest is explained by intra-sectorial effect: absolute contribution is 0,39% per year while relative contribution was about 20%.

Contrary to that, in post-crisis period inter-sectorial effect was slightly positive, 0,07% per year, while intra-sectorial effect was very dominant and negative, -1,09%. This finding is quite natural due to the fact that negative intra-sectorial effect in post-crisis period reflect impact of decline of economic activity, while positive intra-sectorial effect reflect sectorial shifts and adjustments caused by crisis.

Graph 10: Inter-sectorial and Intra-sectorial impact on productivity in Croatia



	2000-2008	2008-2013	2000-2013
Intra	1.60%	-1.09%	0.69%
Inter	0.39%	0.07%	0.28%
Total	2.00%	-1.03%	0.98%

Sources: Based on results from Table 10 in Appendices

CONCLUDING REMARKS

Economic growth of Croatia in 1990-2013 was extremely weak. Anatomy of that growth is characterized with dominant role of physical capital, strange and disappointing negative employment growth rate and, despite strong propensity to investment in education, with negative absolute and relative contribution of "broader knowledge" to economic growth. In fact, high propensity to invest in education is just indication of inability of economy to solve problem of unemployment and of consequent low opportunity cost of schooling that, despite bad growth prospects, generates illusion of high private returns on investment in education. With annual growth rate of just 0,28 percent in respected period, Croatian GDP double every 250 years Due to negative growth rate of population, annual growth rate of per capita GDP was bit stronger, 0,78 percent. This implies that in Croatia it takes about 90 years to double standard of living as measured by GDP per capita. Taking per capita GDP growth rate of most developed countries as a benchmark (1,31% for 12EU most developed countries and 1,38% for USA), it can be concluded that Croatia, just like other SEE countries, has experienced a strong divergence in the era of globalization.

Closer look at certain sub-periods reveals a lot about possible causes of such weak growth performance. Two sub-periods are, in that respect, especially important: period of "transitional recession" or period of "long nineties", that started at the end of eighties and ended at the beginning of new millennium, and period from 2000 to 2009 in which, despite decent growth performances, some important disequilibria have been accumulated. Those disequilibria contributed economic crisis that followed to have more devastating effect on Croatian economy than in other countries. What happened in these two periods is, in fact, story about "globalization and its' discontent" in Croatia.

Period of "transformation recession" that, in the case of Croatia, lasted from 1987 to 2004 explains a good deal of slow growth. For first six years of "transformation recession", 1987-1993, growth rate of Croatian GDP per capita (measured in international $) had been negative, -8,29 percent, and it had taken following eleven years, 1993-2004, with positive growth rate of 4,89 percent, to reach level of per capita GDP from

initial 1987 year. In those 17 years of "long nineties" Croatia lost more than 3 averages GDP or, when measured with investment in physical capital, it lost investment for about 15 years. Strong decline of economic activity in Croatia was only partly the result of war from nineties. Second and probably more important is a fact that a great part of Croatian capacities had been built for large Yugoslavian market. Note also that, on a top of that, former SFRY market had been very protectionist. With brake up of former SFRY this market ceased to exist. Finally, to a certain degree prolonged decline should also be explained with collapse of existing economic system and consequent reforms. These reforms, even when successful, take a long period of time.

Our analysis further shows that Croatia has experienced strong decrease of export and import shares in GDP exactly in the beginning of nineties, 1990-1995, when former SFRY market disappeared. In just five years export share dropped for about 22 percentage points, from 55% in 1990 to 33% in 1995. In the same five years import share dropped for about 12 percentage points, from 54% in 1990 to 42% in 1995. Export share later increased from 33% in 1995 to 43% in 2013, an increase for about 10 percentage points, while import share stayed pretty the stable, about 42%, meaning that Croatian export and import share in GDP never recovered to its previous level.

Other side of this same story is sharp decline of industry and especially manufacture share in GDP. All this predominantly happened in the period 1990-1995 when former SFRY market was destroyed. Industry share decreased in that sub-period from 33% in 1990 to 21% in 1995, drop for 12 percentage points. Manufacture share in GDP, on the other hand, decreased in the same sub-period from 28% in 1990 to 18% in 1995, drop for about 10 percentage points. In the following years, from 1995 to 2013, those shares never recovered to previous level. Industry share dropped for additional 3 percentage points and manufacture share dropped for additional 6 percentage points till 2013.

First eight years of this millennium are characterized with much higher rates of growth. Annual GDP growth rate was 4,29 percent, while per capita GDP growth rate was, due to population decline, bit higher, 4,74 percent. Both of those rates are pretty decent although much smaller than what, due to high catch-up reserve, Croatia can really perform. Looking at the structure of the growth, it can be noticed, first, that capital still has dominant role in explaining GDP growth rate. Second, labor impact is in this period, like in previous five years, positive and its absolute contribution is 1,31 percent. Finally, absolute contribution of TFP was 0,86 percent and it explains about 20% of GDP growth. Interestingly, in previous five years, 1995-2000, both absolute (1,32 percent) and relative contributions (40%) of TFP was much higher than that in the next eight years. Note, however, that such great contribution of TFP is a result of increase of utilization of capital which naturally occurs in the period of recovery. So, we can conclude that TFP contribution was pretty low either regarding its absolute or relative level. In that respect Croatia strikingly differs from other SEE and CE countries which almost all, exception is Montenegro, have decent level of absolute contribution of TFP and its *very strong relative contribution to economic growth.*

The analysis of changes in demand and sectorial structure that happened in 2000-2008 reveals to a great degree what are the reasons for low level of TFP and for weak catch-up effect in Croatian economy. In 2000-2008 export share stayed almost constant, while import share increased for about 5 percentage points. Note, however, that export share was smaller in 2008 than in 1990 for 13,22 percentage points, while import share was smaller for 4,37 percentage points. Increase of trade and current account deficit was only possible due to increase of capital inflow. Appreciation of real effective exchange rate, that

followed, was a consequence of strong capital inflow that Croatia, just like other SEE countries, has had in that time. Appreciation of real exchange rate is, in fact, most important disequilibrium that has accumulated in this period. Same factors that have generated this disequilibrium strongly influenced all other disequilibria to occur and accumulate in respected period of relatively good growth record.

Not only that export share did not increase, but its level of sophistication deteriorates significantly. Inability of Croatian economy to increase export share and to improve its level of sophistication together explain why TFP rate of growth was so weak even in these years of decent growth of GDP. All this is to a largest degree consequence of the appreciation of real exchange rate, which deteriorates competitive position of Croatian tradable sectors, on the one hand, and of a the lack of adequate selective industrial policy that might mitigate numerous market failures, on the other hand. All these limitations had led to further decrease of tradable sectors share in GDP. Deindustrialization of Croatian economy continues even in those good years. Industry share in GDP dropped for additional 3,67 percentage points in 2000-2008. Similarly, manufacture share dropped for additional 3,01 percentage points. So, in 2008 year industry and manufacture share was smaller for 16,85 and 14,52 percentage points than in 1990.

No doubt, changes of industry structure are just a mirror image of demand structure changes. The model of growth which heavily relies on foreign capital and in which foreign capital presents a main engine of growth is most often followed with appreciation of REER. Such appreciation of REER is followed with an increase of domestic exported goods prices at foreign markets and decrease of foreign imported goods prices at domestic market. The competitive position of a domestic economy deteriorates significantly which results in deterioration of tradable activities. This is what deindustrialization is about in Croatia and other SEE countries in period 2000-2008.

In order to get deeper understanding of the problem, reader should be reminded that decrease of industry and manufacture share in GDP, measured in current price, can be explained as being to a significant degree result of decrease of their relative price, meaning that, when measured in constant price, this decrease was much smaller. Consequence is that, when looking at demand side, import share decrease in whole respected period was predominantly also result of price effect. Industry price decrease was, on the other hand, the result of globalization and of the expansion of Asian export of cheap industrial products. Of course, Croatia does not import great deal of Asian goods. Rather, Croatia is 'price taker' at world market on which cheap Asian export determines price level of these products. Only producers able to compensate for the price decrease with productivity increase can survive at such market. Many have not been able to manage this and it is why many, even developed, countries have experienced significant deindustrialization. In those circumstances it was not easy for Croatia and other SEE countries to avoid real exchange rate appreciation, generated by this channel, and consequent further deindustrialization.

When the world financial crisis erupted in 2008 it, for natural reasons, especially wounded all those countries that adopted a growth model in which foreign capital presents a main engine of growth. This refers to all SEE countries including Croatia. The fact that all these countries, *de jure* or just *de facto* (due to eurization of the banking system), have fixed exchange rate regimes, has made the situation even worse. Monetary and exchange rate policies are extremely limited in such circumstances. Policies aimed at internal depreciation of real exchange rate are also very limited. As expected, fiscal policy measures have been extensively applied in the beginning. However, since this crisis is in its nature a structural one, one that has much longer duration than expected, public debt accumulated to a dangerous level, making in

that way classical expansive fiscal policy useless in the management of crisis. Only selective industrial policy is left in such circumstances. Being a member of the EU, Croatia can, to a certain degree, rely on adequate European funds. But having in mind depth of the crisis impact on the Croatian economy, it will definitely not be enough. On top of that, this crisis is in its nature international one and, as such, requires international solutions. Not only are those solutions missing thus far, but it seems that at the international level we are approaching much more complicated and more dangerous problems.

Sažetak

U ovom prilogu je prezentirano istraživanje anatomije rasta hrvatske ekonomije od 1990 do 2013. Rezultate istraživanja, u suštini, treba shvatiti kao jednu vrstu dijagnostike stanja hrvatske ekonomije. Data je konvencionala analiza izvora rasta u kojoj se meri uticaj raznih faktora proizvodnje na rast BDP-a i BDP-a po glavi stanovnika u različitim pod periodima. Da bi dublje sagledali značenje ovako dobijenih rezultata autori daju i analizu uzroka promene sektorske strukture privrede. U istom smislu se dalje nastavlja i sa analizom izvora rasta agregatne tražnje. Posebna pažnja je, u tom smislu, posvećena analizi neto-izvoza, investicija u fiksne fondove i finalne potrošnje. Ukratko su analizirani i uticaju institucionalnih i ostalih fundamentalnih faktora rasta. Isto se odnosi i na mere ekonomske politike koje bi se mogle preduzeti radi ubrzanja privrednog rasta Hrvatske.

APPENDICES

Table 1: Growth rates of main variables in Croatia: 1870-2010

Period	Population	GDP PC in 2005 internat$	GDP in 2005 internation$
1870-1890	0.83%	1.51%	2.36%
1890-1900	1.03%	1.63%	2.67%
1900-1910	0.91%	2.81%	3.75%
1910-1920	-0.04%	-0.31%	-0.35%
1920-1939	0.85%	1.80%	2.66%
1939-1948	-0.75%	0.79%	0.03%
1948-1973	0.46%	4.85%	5.33%
1973-1987	0.41%	2.68%	3.10%
1987-2004	0.02%	0.04%	0.05%
1987-1993	0.01%	-8.29%	-8.29%
1993-2004	0.02%	4.89%	4.92%
2004-2008	-0.03%	4.27%	4.24%
2008-2010	-1.17%	-4.17%	-5.29%
1870-2010	0.43%	1.99%	2.43%
1993-2008	0.01%	4.73%	4.74%

Source: Calculated on the basis of data from Maddison (2010), Tica (2004) and IMF WEO.

Table 2: Relative level of Croatian GDP PC PPP

	Austria	***Romania***	***Bulgaria***	***Yugosphere***
1870	33.42%	66.88%	74.13%	113.01%
1910	39.64%	78.57%	117.98%	134.04%
1939	43.31%	137.60%	105.85%	136.47%
1973	55.40%	495.57%	117.80%	137.31%
1987	58.88%	219.38%	141.28%	142.03%
2010	40.88%	211.68%	110.10%	147.16%

Source: Same as in Table 1.

Table 3: Sources of growth of Croatian economy in 1990-2013

GDP GROWTH ACCOUNTING	1990-2013			1990-1995			1995-2000			2000-2013			2000-2008			2008-2013		
a=0,4	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%
Capital - K	3.92%	1.57%	564.30%	1.79%	0.72%	-11.48%	3.63%	1.45%	42.96%	4.86%	1.95%	114.26%	5.33%	2.13%	49.64%	4.12%	1.65%	-71.42%
Labor - L	-0.79%	-0.47%	-169.67%	-5.32%	-3.19%	51.24%	1.02%	0.61%	18.12%	0.32%	0.19%	11.22%	2.18%	1.31%	30.44%	-2.59%	-1.55%	67.19%
T F P	-0.82%	-0.82%	-294.63%	-3.76%	-3.76%	60.24%	1.32%	1.32%	38.92%	-0.43%	-0.43%	-25.48%	0.86%	0.86%	19.92%	-2.41%	-2.41%	104.23%
G D P - Q	0.28%	0.28%	100.00%	-6.24%	-6.24%	100.00%	3.38%	3.38%	100.00%	1.70%	1.70%	100.00%	4.29%	4.29%	100.00%	-2.31%	-2.31%	100.00%

Sources: Authors' calculations based on methodology explained in the paper and on the data from UN data set for Croatia

Table 4: Primal and Dual approach in measuring TFP for Croatia in 1995-2012

	1995-2012		1995-2000		2000-2008		2008-2012	
DUAL APPROACH	Growth	Contrib	Growth	Contrib	Growth	Contrib	Growth	Contrib
GDP Deflator	3.97%	3.97%	5.47%	5.47%	4.08%	4.08%	1.93%	1.93%
Labour Price Growth	5.89%	3.54%	10.27%	6.16%	5.40%	3.24%	1.61%	0.96%
Capital Price Growth	1.34%	0.54%	1.79%	0.71%	4.98%	1.99%	-6.08%	-2.43%
Total Factor Productivity	0.10%	0.10%	1.41%	1.41%	1.15%	1.15%	-3.39%	-3.39%
	1995-2012		1995-2000		2000-2008		2008-2012	
PRIMARY APPROACH	Growth	Contrib	Growth	Contrib	Growth	Contrib	Growth	Contrib
GDP	2.30%	2.30%	3.38%	3.38%	4.29%	4.29%	-2.84%	-2.84%
Labour	0.68%	0.41%	1.02%	0.61%	2.18%	1.31%	-2.68%	-1.61%
Capital	4.62%	1.85%	3.63%	1.45%	5.33%	2.13%	4.45%	1.78%
Total Factor Productivity	0.05%	0.05%	1.32%	1.32%	0.86%	0.86%	-3.02%	-3.02%

Sources: Authors' calculations based on methodology explained in the paper and on the data from Croatian Statistical Institute and UN data set

Table 5: Sources of per capita GDP growth in Croatia in 1990-2013

GDPpc GROWTH ACCOUNTING	1990-2013			1990-1995			1995-2000			2000-2013			2000-2008			2008-2013		
a=0,4	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%	GrwthRate	Contrib	%
Population - P	-0.50%			-0.67%			-0.67%			-0.37%			-0.45%			-0.26%		
Labor participation rate - L/P	-0.28%	-0.28%	-36.54%	-4.66%	-4.66%	83.64%	1.69%	1.69%	41.68%	0.69%	0.69%	33.34%	2.63%	2.63%	55.38%	-2.33%	-2.33%	113.49%
Labor productivity - Q/L	1.06%	1.06%	136.54%	-0.91%	-0.91%	16.36%	2.36%	2.36%	58.32%	1.38%	1.38%	66.66%	2.12%	2.12%	44.62%	0.28%	0.28%	-13.49%
Capital labor ratio - K/L	4.71%	1.88%	241.64%	7.11%	2.85%	-51.11%	2.61%	1.04%	25.80%	4.55%	1.82%	87.56%	3.15%	1.26%	26.58%	6.71%	2.68%	-130.70%
T F P	-0.82%	-0.82%	-105.10%	-3.76%	-3.76%	67.47%	1.32%	1.32%	32.51%	-0.43%	-0.43%	-20.89%	0.86%	0.86%	18.04%	-2.41%	-2.41%	117.21%
GDP per capita - Q/P	0.78%	0.78%	100.00%	-5.57%	-5.57%	100.00%	4.05%	4.05%	100.00%	2.08%	2.08%	100.00%	4.74%	4.74%	100.00%	-2.05%	-2.05%	100.00%

Sources: Authors' calculations based on methodology explained in the paper and on the data from UN data set for Croatia

Table 6: Dynamics of demand structure in Croatia 1990-2013 (based on current price)

	1990	1995	1990-1995	2000	1990-2000	2008	2000-2008	1990-2008	2013	2008-2013	2000-2013	1990-2013
Final consumption expenditure	86.54%	92,88%	6,34%	84.21%	-2.33%	77.33%	-6.88%	-9.21%	80.54%	3.21%	-3.67%	-6.00%
Household consumption expenditure	64.94%	67,27%	2,33%	61.82%	-3.12%	58.54%	-3.28%	-6.41%	60.56%	2.02%	-1.26%	-4.38%
General government final consumption expenditure	21.60%	25,61%	4,02%	22.39%	0.79%	18.79%	-3.60%	-2.80%	20.03%	1.23%	-2.36%	-1.57%
Gross capital formation	12.38%	16,09%	3,71%	18.90%	6.52%	30.43%	11.53%	18.06%	18.85%	-11.58%	-0.05%	6.47%
Gross fixed capital formation	11.73%	13,56%	1,83%	18.95%	7.22%	27.35%	8.40%	15.62%	19.30%	-8.05%	0.35%	7.57%
Changes in inventories	0.65%	2,53%	1,88%	-0.05%	-0.69%	3.08%	3.13%	2.44%	-0.45%	-3.53%	-0.40%	-1.09%
Exports of goods and services	55.28%	33,46%	-21,82%	41.69%	-13.60%	42.06%	0.38%	-13.22%	43.00%	0.93%	1.31%	-12.29%
Imports of goods and services	54.20%	42,43%	-11,77%	44.80%	-9.40%	49.83%	5.03%	-4.37%	42.39%	-7.44%	-2.41%	-11.81%
Gross Domestic Product (GDP)	101.12%	100,36%	-0,76%	100.00%	-1.12%	100.00%	0.00%	-1.12%	99.92%	-0.08%	-0.08%	-1.20%
Statistical errors and discrepancies	-1.12%	-0,36%	0,76%	0.00%	1.12%	0.00%	0.00%	1.12%	0.08%	0.08%	0.08%	1.20%
GDP Corrected for errors and discrepancies	100.00%	100,00%	0,00%	100.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%

Source: Authors calculations based on methodology explained in the paper and on data from UN data set for Croatia

Table 7: Price and volume effect in explaining change of demand structure in Croatia 1990-2013

	1990-2013			1990-2000			2000-2008			2008-2013			2000-2013		
	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth
Final consumption expenditure	-5.47%	-0.52%	-0.28%	-3.38%	1.05%	-0.40%	-3.38%	-3.50%	-0.52%	1.28%	1.93%	0.33%	-2.10%	-1.57%	-0.19%
Household consumption expenditure	-3.83%	-0.56%	-0.26%	-2.85%	-0.27%	-0.45%	-3.26%	-0.02%	-0.68%	2.29%	-0.26%	0.77%	-0.97%	-0.28%	-0.12%
General government final consumption expenditure	-1.61%	0.04%	-0.34%	-0.49%	1.28%	-0.24%	-0.21%	-3.39%	-0.08%	-0.92%	2.15%	-0.93%	-1.13%	-1.24%	-0.41%
Gross capital formation	-3.53%	10.00%	-0.82%	0.03%	6.49%	-0.12%	-1.60%	13.13%	-0.78%	-1.96%	-9.63%	-2.26%	-3.56%	3.51%	-1.35%
Gross fixed capital formation	-3.26%	10.83%	-0.69%	0.46%	6.76%	0.22%	-1.59%	9.99%	-0.83%	-2.13%	-5.93%	-2.27%	-3.72%	4.07%	-1.38%
Changes in inventories	-0.35%	-0.75%	-4.24%	-0.45%	-0.24%		0.06%	3.07%		0.05%	-3.58%	-1.68%	0.11%	-0.51%	-192.85%
Exports of goods and services	-0.05%	-12.23%	0.02%	1.20%	-14.80%	0.36%	-2.16%	2.54%	-0.66%	0.91%	0.02%	0.43%	-1.25%	2.56%	-0.24%
Imports of goods and services	-9.05%	-2.76%	-0.80%	-2.15%	-7.26%	-0.22%	-7.15%	12.18%	-2.01%	0.24%	-7.68%	-0.01%	-6.91%	4.50%	-1.25%
Gross Domestic Product (GDP)	-0.57%	-0.63%	-0.02%	-0.83%	-0.30%	-0.08%	0.60%	-0.60%	0.07%	-0.34%	0.26%	-0.07%	0.26%	-0.34%	0.02%
Statistical errors and discrepancies	0.57%	0.63%	-193.89%	0.83%	0.30%	-100.00%	-0.60%	0.60%	84.46%	0.34%	-0.26%	89.89%	-0.26%	0.34%	
GDP Corrected for errors and discrepancies	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
TOT (terms of trade – Export to Import price)			0.825%			0.577%			1.376%			0.442%			1.016%

Source: Same as in Table 6.

Table 8: Dynamics of industry structure in Croatia 1990-2013 (based on current price)

	1990	1995	1990-1995	2000	1990-2000	2008	2000-2008	1990-2008	2013	2008-2013	2000-2013	1990-2013
Agriculture, hunting, forestry, fishing	7.00%	6.16%	-0.84%	5.38%	-1.62%	4.28%	-1.10%	-2.72%	3.60%	-0.68%	-1.78%	-3.39%
Mining, Manufacturing, Utilities	33.24%	21.26%	-11.98%	20.07%	-13.18%	16.40%	-3.67%	-16.85%	17.89%	1.49%	-2.18%	-15.36%
Manufacturing	28.02%	18.44%	-9.58%	16.50%	-11.51%	13.50%	-3.01%	-14.52%	11.84%	-1.66%	-4.67%	-16.18%
Construction	5.60%	4.86%	-0.74%	4.19%	-1.41%	7.28%	3.09%	1.67%	4.53%	-2.75%	0.33%	-1.08%
Wholesale, retail trade, restaurants and hotels	13.78%	12.97%	-0.81%	12.05%	-1.72%	14.20%	2.14%	0.42%	13.62%	-0.58%	1.57%	-0.16%
Transport, storage and communication	7.36%	7.65%	0.29%	8.47%	1.11%	8.63%	0.17%	1.27%	8.04%	-0.60%	-0.43%	0.68%
Other Activities	21.68%	28.92%	7.25%	32.91%	11.23%	34.68%	1.77%	13.00%	37.01%	2.33%	4.11%	15.34%
Total Value Added	88.66%	81.82%	-6.84%	83.06%	-5.60%	85.46%	2.40%	-3.20%	84.68%	-0.78%	1.62%	-3.98%
Net Taxes	11.34%	18.18%	6.84%	16.94%	5.60%	14.54%	-2.40%	3.20%	15.32%	0.78%	-1.62%	3.98%
Statistical errors and discrepancies	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
GDP Corrected for error and discrepancy	100.00%	100.00%	0.00%	100.00%	0.00%	100.00%	0.00%	0.00%	100.00%	0.00%	0.00%	0.00%

Sources: Authors' calculations based on methodology explained in the paper and on the data from UN data set.

Table 9: Price and volume effect in explaining change of industry structure in Croatia 1990-2013

	1990-2013			1990-2000			2000-2008			2008-2013			2000-2013		
	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth	Price Effect	Volume Effect	Price growth
Agriculture, hunting, forestry, fishing	-1.37%	-2.02%	-0.89%	-1.06%	-0.56%	-1.54%	-0.37%	-0.73%	-0.85%	0.05%	-0.73%	0.38%	-0.32%	-1.46%	-0.38%
Mining, Manufacturing, Utilities	-8.08%	-7.28%	-1.05%	-9.19%	-3.99%	-3.11%	-2.02%	-1.65%	-1.39%	3.12%	-1.63%	3.76%	1.10%	-3.28%	0.56%
Manufacturing	-7.31%	-8.87%	-1.29%	-6.21%	-5.30%	-2.29%	-2.05%	-0.95%	-1.70%	0.96%	-2.62%	1.41%	-1.10%	-3.57%	-0.51%
Construction	0.38%	-1.45%	0.24%	0.06%	-1.47%	-0.16%	0.71%	2.38%	1.77%	-0.39%	-2.36%	-1.35%	0.31%	0.02%	0.56%
Wholesale, retail trade, restaurants and hotels	-0.91%	0.75%	-0.29%	0.21%	-1.94%	0.26%	-1.14%	3.28%	-1.16%	0.02%	-0.60%	0.01%	-1.12%	2.69%	-0.71%
Transport, storage and communication	1.75%	-1.07%	0.85%	3.46%	-2.36%	4.04%	-1.13%	1.29%	-1.60%	-0.59%	0.00%	-1.41%	-1.72%	1.29%	-1.53%
Other Activities	2.42%	12.91%	0.47%	-1.32%	12.55%	0.00%	6.34%	-4.57%	2.34%	-2.60%	4.93%	-1.53%	3.75%	0.36%	0.83%
Total Value Added	-7.03%	3.06%	-0.36%	-9.21%	3.61%	-1.08%	2.74%	-0.34%	0.41%	-0.56%	-0.22%	-0.13%	2.18%	-0.56%	0.20%
Net Taxes	7.03%	-3.06%	2.12%	9.21%	-3.61%	6.39%	-2.74%	0.34%	-2.17%	0.56%	0.22%	0.76%	-2.18%	0.56%	-1.05%
Statistical errors and discrepancies	0.00%	0.00%		0.00%	0.00%		0.00%	0.00%		0.00%	0.00%		0.00%	0.00%	
GDP Corrected for error and discrepancy	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%

Sources: Same as in Table 8.

Table 10: Inter-sectorial and intra-sectorial sources of growth of labor productivity in Croatia, 2000-2012

Sources of Productivity Changes	INTRA SECTORAL		INTER SECTORAL		TOTAL	
	GrowthRate	%	GrowthRate	%	GrowthRate	%
2000-2008	1.60%	79.94%	0.39%	19.74%	2.00%	100.00%
2008-2012	-1.09%	106.32%	0.07%	-6.39%	-1.03%	100.00%
2000-2012	0.69%	70.73%	0.28%	29.07%	0.98%	100.00%

Source: Authors' calculation based on Croatian Statistical Institute data on GVA and employment for different sectors

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