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Introduction

The common attitude among many economists is that the market economy should intrinsically be stable and be stabilizing in case of exogenous chocks. This view is held on a basis of a multitude of tests of theoretical models.

Milton Friedman claimed once that a market economy is a necessary condition for democracy and thus we may perhaps also replace the political system with a pure market economy void of collective interference.

A further example of juxtapositions of economic market theory, i.e. neoclassical theory and political dimension, is the widespread comments from economists but even political scientists and sociologists on Arrow's Impossibility theorem. In later years, the understanding of the paradoxical result has increased but still one hears interpretations that while the market is efficient the democratic system is not so.

The recent past starting at the financial debacle in 2008 and its economic and political aftermath has been characterized by confusion and inconsistency both with respect to market behaviour as well as the economic political behaviour.

One example of what we were told by leading theoretical and policy making economists was that low inflation is a necessary condition for long run growth, while we now see central banks trying to cut inflation rate to increase inflation and thereby growth. In this debate, it is interesting to see a rather curious belief that reversibility which occurs in economic models also is believed to exist as a simple relation, with respect to interest rate and inflation.

Such a belief is obviously built on a very superficial analysis between interest rate and inflation where for example Wicksell's distinction between and analysis of natural rate and market rate is completely forgotten.

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Let us go back to the three examples of outspoken believes in the economic theory, particularly the neoclassical theory, which hovers underneath the pure scientific attitudes.

Is the Market Intrinsically Stable?

The question implies that on one hand we may ask if the market as it occurs is stable/stabilizing irrespective of social, cultural political and economic structures and on the other hand we may ask if economic theory can prove that the market is stable/stabilizing per se, using the neoclassical axiomatic structure.

In everyday life, the word stable/stability has one meaning, but in mathematics it has a quite different meaning. Let us start with the latter. In mathematics stability, a bit loosely means that if we are in a certain let us call it A and the state is somehow perturbed and we are instead experiencing state B, there exists "forces" of such a kind that the system brings us back to A after a convergence process.

Still loosely speaking un-stable/instability means that no such convergence process exists so the system will not return to A. We observe here that while the mathematical view of stable/stability is precise, the concept of non-stable/non-stability lacks precision. Instability contains widely different cases such that the state B is in the neighbourhood but is a stable state. However, it can also mean that the system outside A is oscillating. Furthermore, we can think of a situation where the state, which might be thought of as a growth process for example, is thrown out of A, and it adapts to a completely new growth pattern. However, there are many more possibilities.[1]

[1] In economics, the so called Hopf-bifurcation is an interesting analogy. The very state of equilibrium is un-stable but outside the equilibrium state there is a stable oscillation path which is stable but gives rise to oscillations. One could allude to business cycles which oscillate around some kind of expansion path.

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This is by the way an example of a logical principle that says that while defining A the non-A is just a residual which is not defined other than in the negative sense.

Thus, mathematics has a very precise way to define at least stable/stability, but how about the reality? Can we transpose real stability problems into mathematical modelling?

Let us start with an example:

We know that the axioms of the neoclassical theory imply that we define a Euclidian ordered space where the commodities are the different dimensions of the space and consequently the agents are vectors. To aggregate the agents is thus the simple procedure to aggregate vectors of a linear space. Thus, we can discuss economic growth by letting the upper limit of commodities for some or all the dimensions increase. This is quite possible to calculate mathematically but what happens if growth takes place in form of a change number of dimensions and/or some earlier commodity dimensions cease to exist and are replaced by others which have different social roles? Such a transformation of the commodity space is impossible to even think of within an axiomatically defined commodity space.

To make mathematical operations viable between two spaces is that Brouwer's Dimension Invariance Theorem must hold. It tells us that the dimensionality of the two spaces must be the same.[2]

However, when we watch such processes they seem well-behaved. The gigantesque imputation of the digital technique during the late 1900s and early 2000s has had social effects but it at least seems that many societies can cope with it. Interestingly those who seem to have the most problematic effects are societies which are rather closed and show reluctance to the flow of information.

[2] P^n is Homeomorphic to P^m if and only if n = m

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Consequently, it is not a far-fetched suspicion that the smoothness of introduction of new commodity dimensions is affected by social, cultural and political structures.

If this suspicion should be of some relevance, then we leave the realm of the neoclassical theory and must involve the entire dimensionality of the society.To model that seems from a mathematical point of view a bit troublesome.

In economic theory, the commodities are always seen as atomic variables implying that the single commodity is demanded as a physical item independent of any societal structures. From a mathematical point of view this has a rather amusing effect.

A correlate to the neoclassical axiomatic structure is that for any binary choice the preference order is independent of the rest of the commodities in the basket. This means, if we go back to the dimensionality question, that if we have two commodities α and β in a n-dimensional basket, the preference order of α and β is independent of the number of commodity dimensions. This means that we can choose any commodity as a representative commodity and use it as a measure of inflation and/or growth. Thus, we get rid of the dimensionality problem.

Looking at modern consumer theories at the microscopic level they usually starts from Becker's *household production theory* which contradicts the neoclassical axiomatic structure in terms (Becker, 1976; Becker, 1981).

When it concerns the intrinsic stability of the theoretical versus the empirical economy we can say that they are of fundamental different characters. The theoretical picture which is expressed in the neoclassical theory has no stability whatsoever since it is *nowhere dense*.With this we mean that either we are in a prevailing general equilibrium, then the axioms hold, or not. If so any chock which will affect the price-vector will throw the system into a permanent disequilibrium since exchange can only occur in general equilibrium. That the general equilibrium

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is nowhere dense thus implies that it has no neighbourhood.A simple mathematical example is the expression $y = \frac{1}{x}$ where x may converge to 0 but if so from the negative side we approach negative infinity while from the positive side we approach the positive infinitive. Consequently 0 is not a part of any neighbourhood.

The general equilibrium has no neighbourhood, either you are permanently in it or it does not exist. That is so for all axiomatic structures in mathematics. Either they hold or not, no approximations.

The general equilibrium concerns commodities which are completely independent of each other;thus, they can never be part of any commodity structure. This follows from the fact that the axioms define a Euclidian space where the commodities are independent dimensions of the space. If a set of commodities should be transformed to a fixed structure, meaning that the agent bought a structure z such that $z = f(x_i - x_j)$, i,j – 1---n the dimensionality would be reduced to x_1, ---, z, --- x_m, $m < n$.

Consequently, the commodities are demanded only as physical entities. Substitutions are only triggered by price differences. The different preference functions are defined on commodities which are defined in one and only one way. This is the only way that a commodity space could be transformed to a Euclidian space. The commodities are atomistically defined.

In real world, most, not to say all, commodities are dependent on the specific context of the agents. That means that commodities are part of specific consumption structures; Amartya Sen uses the word *menus*.But that also means that the commodities per se are not preferred by the consumers but as parts of wider consumption structures and in that case the same commodity may appear in different such structures. That will also imply that there will be no unique price-vector for the single commodity and a sort of average price will not do.

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It is obvious that if we have a sufficient inertia we may work with single markets per the neoclassical postulates as some kind of proxy but with respect to all kind of aggregation and studies of aggregate levels we are lost.

That means among other things that our measures of inflation must be reconsidered. I will come back to this later.

Thus, we can draw the conclusion that if the empirical economy somehow is stable, such a stability must be defined in a different way than we do in mathematics and furthermore that the causes of such a stability must emanate from the complex of social, cultural and political structures.

This conclusion, which is elaborated in my book from September last year, is also hinted many years ago by *Arrow's Impossibility Theorem* or sometimes *Arrow's paradox*. (Ekstedt, 1915).

The paradoxical result has been discussed even outside the realm of economics by political scientists and even sociologists. Many explanations and interpretations have appeared. All this has certainly been useful at least as intellectual exercises, but the Theorem basically shows an anomaly in the axiomatic structure of the neoclassical theory.

What happens is that Arrow,based on the axioms of the individuals, constructs axioms for the society which keep the basic structure of the axioms concerning the individuals. This means that:

> Pro primo:The individuals are unable to choose in a real meaning but given the preference structure the one controlling the price vector does the very choice (invisible hand perhaps).
>
> Pro secondo: The individuals are unaware/independent of other agents' choice.

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> Pro tertio: The individuals are unaware of the additive aggregation process and cannot affect it.

This is chosen as a norm for the analysis. Then Arrow substitutes these agents constructed by the axioms with agents who are aware of other agents' choice and are aware of the aggregate results and furthermore they can choose among alternatives based on the expected aggregate result.

When we have made this substitution of agents we will have a quite different outcome of the market process which most probably implies that the society will not achieve a Pareto optimum.

Thus, Arrow's Impossibility Theorem is achieved since he analyses agents who do not fulfil the neoclassical axioms.The neoclassical agents are formed by the transformation of the market space to a Euclidian space, where agents are vectors just represented by numbers with no other characteristics. Then we obviously achieve a different result of the market process when these kinds of agents are substituted by agents not fulfilling the axioms.

I mentioned Friedman's claim that free markets are a necessary condition for democracy. I think that I can agree with that if and only if the free markets are not defined as they are formed by the neoclassical axiomatic structure. Thus, we must switch our focus to a non-equilibrium economy where at best local and temporal equilibria may occur but these are dissipative.

In my book from last year I formulate two theorems, one for a barter economy like the neoclassical one and one for a money economy.

For a Barter Economy defined as by the neoclassical axioms we have:

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Proposition I:

> *Assume a system A* consisting of a finite number of subsystems, which are to be regarded as proper classes, s_1 --- s_n. If then we have a measure allowing us to define an optimizing rule both on A* as well as s_1 --- s_n; optimization of the global system A* must imply that at least one of the subsystems s_i must sub-optimize.*
>
> *If on the other hand all the subsystems, s_1 --- s_n are optimized according to the same optimizing process the global system A* must sub-optimize* (Ekstedt, 2015, p.79).

However, when we pass over to analyse a money economy we implicitly reject the general equilibrium theory and money prices become only relevant as measures locally and temporally. In such a state, *with respect to barter economy*, there does not exist anything but at best local and temporal equilibria and these are dependent on social and cultural inertia.

But with respect to a money economy where commodities are valued in money prices, Proposition I has no logical meaning. It is shown in Ekstedt (2015, ch.3):

Proposition II:

With respect to a real analysis equivalent to barter, the Proposition I hold.

When we pass over to a non-equilibrium analysis where goals and restrictions are formulated in monetary terms we lose all logical relations to the real economy and consequently Proposition I has no meaning (Ekstedt, 2015, p.141).

The reason why we get these two results is intrinsic to the very logical character of real commodities and money.

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As we have discussed above we find that the neoclassical axioms transform the commodity space to a Euclidian space and consequently a point in this space is empty of any content except for its numerical value. Following Cantor's unaccountability theorem however we get that any numerical point defined on a real space has the Lebesque value Zero. Thus, the commodities become atomic variables and thus lack any relation to each other.

When we come to money however these are in fact also defined as atomic variables. Any value is defined by the numerical value of money which is a measure.

Consequently, when we for a barter economy rejects the axiomatic structure on the very ground that commodities are structurally defined by the consumer, the demand side will be at variance with the supply side. Consequently, from the producers point of view the commodity is defined as just a physical item, but from the consumers point of view the commodity is defined by its structural components in the current context.[3] We thus transform the commodity to complexes by rejecting the neoclassical axiomatic structure.[4]

However, doing so we also throw out the possibility of a general equilibrium. But money, as we know it in daily use, which has no meaning in a general equilibrium will now become possible to use as a measure. But this measure holds only in a non-equilibrium economy where only at best local and temporal equilibria exist

[3]As a matter of fact, is that the only ranking economist who has observed this is Gerard Debreu who in his book claims that commodities should be indexed locally and temporally and difference in the index implied different commodity. Thus, the only sensible way to interpret Debreu is that a general equilibrium per axiomatic structure is only local and temporal.

[4] We should remind of that Keynes' was one of the more prominent discussants in analytical philosophy of the problem of atomic facts versus complexes, so he was aware of the principle problems we are discussing here.

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and there are no unique price vectors. We can then quote Jean-Baptiste Say (1834[1803], p.247):

> When I am told that the great pyramid of Ghaize is 656 feet square at the base, I can measure a space of 656 feet square at Paris or elsewhere, and form an exact notion of the space the pyramid will cover; but when I am told that a camel is at Cairo worth 50 sequins, that is to say, about 90 ounces of silver, or 100 dollars in coin, I can form no precise notion of the value of the camel; because, although I may have every reason to believe that 100 dollars are worth less at Paris than at Cairo, I can not tell what may be the difference of value.
>
> Thus, we do not know what money measures except the very transactions we are currently involved in.

But having said this we arrive at Proposition II. If we use money as a global measure of values which have appeared in market transactions, we can in fact arrive at a general equilibrium, since we now have transformed the commodities implicitly by using money values as if these were set per the neoclassical axioms. *This is the fundamental theoretical contradiction in economic theory.* It is a trap in which also Keynesians often fall.

The serious effect is mostly concerninflation measurement. Using a mixture of norm baskets built on Laspeyre and Paasche principles will juxtapose the effects caused changes in relative prices and the changes in the dimensionality of the commodity space. Thus, we will have a juxtaposition between inflation and growth. In a very strict anti-inflation regime this might have disastrous long run effects. In Ekstedt (2015: ch.3) such effects are analysed.

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Economics and Ethics

Adam Smith made a very unlucky reference to ethics when he said that the butcher would not sell because of his good heart but because he receives incomes from selling. This has influenced neoclassical economists to make claims that the market principle is an ethical corrective and indeed it is when we analyse the neoclassical axiomatic structure.

As said above the axioms are the same as to construct a Euclidian normed and directed space,the commodities are dimensions and the agents are vectors. Thus, an agent is a point in the interior of the space. But then the agent is also fully represented by its numerical vector value and as such with the Lebesque value zero and completely independent of other points/agents. We also mentioned that the axioms reject any form of commodity structures since the agents are just vectors in the interior space. Consequently, the agents are also denied to form any structures, contrary to what John Donne says in his poem "Every man is an island".

This means that all agents are totally independent of each other except from the very market action. This makes the "neoclassical society" a bit strange from an ethical point of view. We can think of two kinds of examples which in the end are close to each other since both are examples of Nash-equilibrium and imply that everyone has an individual veto concerning all kinds of societal problems. One example of such a society is where we have total chaos. Chaos is a form of equilibrium where we have no ordered changes/developments. The interesting thing about this from a philosophical point of view is that time as a social and/or individual concept disappears. From an economic point of view ordered changes imply conscious actions towards a goal. You can meet this type of society among people deprived of economic and/or social means to change their situation. Noble actions from people of authorities directed to these people without their control is as random as spending the night in jail or be mistreated physically or finding a suitcase with 100 000 euro. Good or bad events are completely out of their control. That means that stealing and robbing is as natural as helping and crying for a

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friend. You cannot speak about moral with a person deprived of any control over her/his own life. So, if we think of legal sanctions, punishment of an individual and a warning to others, it simply does not work since the individual is deprived of any internal possibilities to strive towards a goal.

The other interpretation is the Kantian categorical imperative:*act in such a way that your action could be raised to a common law*.

We can interpret this like all individuals, given budgets, act with the preference functions of all other individuals as restrictions for the choice. This is another formulation of Nash-equilibrium and it partly explains why the idea of market, in its neoclassical formulation, should appear as a corrective.

The weakness of this link between the function of the market and ethics is obvious. First it implies that differences in the contextual apprehension can never occur; there is one and only one right perspective of what is happening and that is the objectively right one. This is the Platonic root. Second the dimensionality of the space of choice must either be constant or perfectly symmetric for all agents. Third, the goals of the individual must never concern any collective/aggregate matters since it is given once and for all. Forth, all possible alternatives are strictly positive and desired by all. Thus, there are no intrinsic conflicts in the choice space.

Fifth, the first four points imply a strictly deterministic universe of the Laplacian kind. This means that we rule out all causal chains and the thought of human being as a subject and a final cause. I remind of the fact that if we have determinism we thus deny cause – effect matters since that implies complexities thus leading us into probability structures.

We may therefore conclude that the ethical content of the neoclassical market theory is built on strict determinism which we earlier saw is the essential part of the axiomatic structure. Determinism also rules out all kind of ethics since ethics is only a relevant concept when there are asymmetric apprehensions of the choice

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space due to a mixture of external and internal factors of the individual, which is then seen as a subject and a final cause.

We have so far dealt with the neoclassical approach. How about Keynesians and Keynes? Keynesians are a rather heterogenous group ranging from those who more or less buy Hicks' approach in the 1937-paper "Mr. Keynes and the Classics", where Keynes' thoughts could be a short run variant of the neoclassical theory which holds in the long-run, to institutional and evolutionary theories. I will therefore avoid commenting on Keynesian approaches (Hicks, 1937). Keynes however is of utmost interest since he wrote his master thesis on philosophy on ethics and more precise on Moore's paradox. G.E. Moore was in Cambridge at the time of Keynes and finished "Principia Ethica" published 1903 (Hicks, 1980-1981).

Moore formulated two versions of his so-called paradox; the strong and the weak form. The weak form technically expressed is:

WF: $a \wedge f(\neg a)$ read a and "I believe non-a"

It is raining but I don't believe it is raining.

The strong form is subsequently:

SF: $a \wedge \neg a$ read a and non-a

Moore's paradox both in its weak and strong form is obviously nonsense when we deal with atomic variables and this was the first real attack on the problem of atomic versus complex variables in logic. Keynes tried to solve this with ordinary logic but his effort was, rather brutally, rejected by Alfred Whitehead, who together with Russell wrote "Principia Mathematica". Whitehead's criticism was that ordinary logics dealt with atomic variables and not complexes. Keynes however took care of the critique and came back with perhaps his most fruitful

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work "Treatise on Probability" where he criticised the probability theory on the bases of the distinction between atomic and complex variables. His main point was that the real scientific problem occurred in the very transformation of a complex variable into an atomic one which can be handled by the probability theory. Since there are no standardised rules for this transformation it is up to the pleasure of the individual scientist who then is the fundamental source of analytical errors. He was supported by Wittgenstein, who in Tractatus Logico Philosophicus formulated the following proposition (Wittgenstein, 1974[1921], p. 65):

> In real life a mathematical proposition is never what we want. Rather, we make use of mathematical propositions only in inferences from propositions that do not belong to mathematics to others that likewise do not belong to mathematics. (In philosophy the question, 'What do we actually use this word or this proposition for?' repeatedly leads to valuable insight.

Anyway, Keynes' philosophical works led him to his famous criticism of Tinbergen in a letter to Roy Harrod, 10th of July 1938 (Keynes Collected Works).

> My point against Tinbergen is a different one. In chemistry and physics and other natural sciences the object of experiment is to fill in the actual values of the various quantities and factors appearing in an equation or a formula; and the work when done is once and for all. In economics that is not the case, and to convert a model into a quantitative formula is to destroy its usefulness as an instrument of thought. Tinbergen endeavours to work out the variable quantities in a particular case, or perhaps in the average of several particular cases, and he then suggests that the quantitative formula so obtained has general validity. Yet in fact, by filling in figures, which one can be quite sure will not apply next time, so far from increasing the value of his instrument, he has destroyed it. All the statisticians tend that way. Colin, for example, has recently persuaded himself that the propensity to consume in terms of money is constant at all phases of the credit cycle. He works out a figure for it and proposes to predict by using the result, regardless of the fact

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> that his own investigations clearly show that it is not constant, in addition to the strong a priori reasons for regarding it as most unlikely that it can be so.

Keynes' philosophical works are of utmost importance since it clearly draws the borderline between natural and social research. It is not concerning mathematics per se or using analogies from natural sciences. The fundamental difference between natural and social sciences is the realization and acceptance of the fact that human beings are subjects and consequently final causes and that implies that they do not react upon the world as given by the physics per se but they reach upon the appearance of the world given by the epistemology and the perspective of the individual. This is also basically what Moore's paradox is about.

It is with this very realization and acceptance, that the fundamental importance of ethics starts, and that the humans themselves are the very roots of uncertainty and instability.

I will not go into discussions of ethical systems and behavioral rules but link ethics to the earlier comments on the neoclassical theory and our two rather disturbing theorems.

With respect to Proposition I it occurs because we reject the transformation of commodities and agents into atomic facts at the macroscopic level. We then have a fundamental rift between the microscopic and the macroscopic level implying that the individuals may well behave per some ethical system but that has no automatic effect of their behavior as a group/collective/society. Thus, a global ethics must explicitly contain the problem of aggregation of ethics. In Roman time, there was an expression *fides punica,* which means that those who belonged to the Roman civilization were separate and different from an ethical perspective. We must revive this expression in our days and ask ourselves of similarities and if we find similar patterns what they imply.

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The second problem to handle with respect to the rift between the microscopic and the macroscopic level is the concept of loyalty. The French minister of foreign affairs during Napoleon and later during the restauration Talleyrand said once "I have always been loyal to France but not so to her rulers".

With respect to Proposition II the conclusions are of a partly different kind. The proposition concerns the different logical character of money and real commodities. The very difference is displayed in Russell's paradox which goes (Weissein, 2000):

Let Pbe the set of all sets which are not members of themselves. Then Pis neither a member of itself nor not a member of itself. Symbolically, let $P = \{x : x \notin x\}$. *Then* $P \in P$ *iff* $P \notin P$.

Thus, we can define two types of sets one type that we call proper sets, where the universal set does not belong to itself. An example is the universal set of brands of cars which is not a brand of a car.

The other type, that we call it non-proper sets, where the universal set belongs to itself. All kinds of numbers, natural, rational, real are such that the universal set obviously belongs to itself. Consequently, all matters which can be simply transformed to atomic variables belong to a non-proper set. Although money is used in different ways it is a kind of measure even if it's just a local and temporal measure but it functions as belonging to non-proper classes.Assume that we have coins of different values, then a set of three coins of value 1 and five coins of value 5 and one of value 2 is equal to one coin of value 10. Thus, we have additive aggregation. As we see this is what we also obtain with respect to commodities and agents by the neoclassical axiomatic structure but this is not possible when the matters we are dealing with are complexes. Russell's paradox can therefore be used to prove both proposition I and II.

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Consequently, from a scientifically point of view this is where methodological ethics becomes important exactly in the way Keynes spells out in his letter to Harrod.

From a macroscopic point of view however we see that proposition II implies that apart from locally and temporally inert situations macroeconomic monetary manipulations with the economy will have distributional and allocational effects on the microeconomic level which are not measurable at the macroeconomic level. Thus, welfare effects as well as growth effects would most probably be asymmetric and would thus also have effects of social, cultural and political character.

We have earlier mentioned the problem of separating growth from inflation when we have a changing dimensionality of the commodity space. Such effects might be dismissed in the short run but repeating a certain policy as the strict anti-inflationary policy in Europe will certainly have social effects.

Another question which might be of utmost importance is the problem of debts, state debts and private debts. Due to changes in the international financial system, banks are refinancing lending at the bond-market thus the value of debt is spread among the actors at the financial markets even households outside the control of the central banks. Thus, state debt and other debts will occur more directly as an asset in the wealth of the households and other market actors. The banks are in fact only to see as mediators. Inflation will then be a threat to the value of the wealth. But then we must ask: What is the value of an asset issued in monetary terms?

Relating to the methods of measuring inflation the value must be measured with respect to a real basket of commodities. So, the future value of a paper asset must be measured in a future commodity basket. If we now maintain a strict austerity policy to protect the value of money debts at the price of growth of welfare and employment, what is then the value of the future commodity basket?

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We have arrived at a pretty nasty question for economic policy which in the end is of pure ethical character: Are we to protect the future value of paper assets and liabilities at the expense of real growth? If we answer Yes to that question we must ask what and who we protect. We perhaps can say that we protect a financial wealth at the price of a shrinking production system and we then also create a process of unlimited concentration of economic wealth. Whether this is socially/culturally/ethically sustainable others than me may answer.

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Introduction: Worldwide Tourism in the New Millennium

At the beginning of the new millennium (in the year 2001), the World Tourism Organization (WTO) published its *Tourism 2020 Vision*, in which it described eleven major "factors" for the development of worldwide tourism. Among these, key factors for our research are:

Key Factors for Our Research

1) Economy (from post-war to newly emerging economic powers);
2) Demography (a possible fragmentation of traveler segments and tourism markets); and
3) Social-environmental awareness (rising since shortly before the new millennium)).

Around the same time (in the year 2004), the WTO also proclaimed twelve "major megatrends" of global tourism impacting its policies and strategies.Among these megatrends, these were especially relevant from our point of view:

Megatrends Especially Relevant for Our Research

1) Consumer-led campaigns for sustainable tourism (especially sustainability and fair trade);
2) Increased socio-environmental consciousness (versus simple mass travel consumption).

Similarly, the recent literature(see for example Dwyer, Edwards, Mistils, Roman, Scott and Cooper, 2013), sees six "key drivers" for world tourism.Among these key drivers, these are especially interesting for us:

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Especially Interesting Key Drivers for World Tourism

1) Economic (effects of globalization, labor demographics, and global wealth distribution);
2) Social (such as societal value changes);
3) Environmental (energy and natural resource preservation, or global climate change); and
4) Basic human needs (global food provision, or strategies for increasing cultural diversity).

Whichever model of major tourism influences in the new millennium one prefers to follow (or combine), all suggest complex interdependencies, especially when considering them holistically under the concept of sustainability.This concept first developed independently of the tourism industry, before being incorporated and increasingly refined by and within it.

The Integration of Sustainability in Tourism

First Definitions

"Sustainable development" was first defined without any direct relation to the tourism industry, namely in the 1987 so-called*Brundtland Report* by the *World Commission on Environment and Development* (UNWCED) as "meeting the needs of the present without compromising the ability of future generations to meet their own needs," uniting goals of economic progress and of environmental protection. Following up on these ideas, the 1992 *United Nations Conference on Environment and Development* (UNCED) in Rio de Janeiro produced the *Rio Declaration on Environment and Development* and *Agenda 21* (with principles and guidelines for sustainable development), followed in turn by the 2002 *World Summit on Sustainable Development* (UNWSSD) in Johannesburg, and then the 2012 *United Nations Conference on Sustainable Development* (UNCSD) in Rio de Janeiro.

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Tourism-Related Definitions

For tourism, the WTO and the United Nations Environment Program (UNEP), in a 2005 *Guide for Policy Makers* entitled *Making Tourism More Sustainable*, defined sustainability as the suitable, long-term and evolving balance between the 1) environmental, 2) economic and 3) socio-cultural dimensions of tourism development. Specifically, sustainable tourism should 1) optimally use environmental resources (as by maintaining ecological processes and preserving natural resources and biodiversity), 2) respect the socio-cultural authenticity of host communities (as by conserving their cultural heritage and traditional values), and 3) ensure viable, long-term economic operations (as by providing and fairly distributing socio-economic benefits to all stakeholders, especially employees, host communities, and the poor).

Critics and Contemporary Integration

Critics see the concept of sustainable development as vague and leading to uneven practices, or as Western or Euro-centric, suiting the developed nations but preventing developing countries from following their path of industrialization, and acquiring their living standards. Yet sustainability has become widely used in international key policy agreements and in industry practice, so most agree that it should be furthered in global tourism via specific frameworks and measures, such as the triple bottom line ("TBL"; informally also "3BL").

The Connection between Tourism, Sustainability, and the Triple Bottom Line

The Triple Bottom Line for Tourism

The first literature voice to suggest a comprehensive approach to sustainable development and environmental protection as a central business challenge was John Elkington's 1997 book *Cannibals with Forks: The Triple Bottom Line of 21st*

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Century Business: corporations should consider not just their economic, but also their environmental and social influence. His "triple bottom line" required business activities to be socially, economically and environmentally sustainable. The global tourism industry was soon attributed a key role for advancing and implementing this concept, due to its responsibilities for social and economic development.

The Triple Bottom Line Concept

Conceptually, the triple bottom line frames business and corporate activities and performances, adding the two bottom lines (balance sheets) of socio-cultural and environmental impacts, thus providing criteria for audits and evaluations, and standardizing the assessment and reporting of all three types of impacts (economic, socio-cultural and environmental). Operationally, the triple bottom line assists internal management planning and decision-making, and external reporting on the economic, environmental and social implications of organizational decisions and activities.

The Triple Bottom Line Practice

For each of the three dimensions, the reports use key indicators, depending on the tourism industry sector. As each of the three bottom lines measures different types of impacts, weighing and assessing them requires a company judgement. This is why they are seen as tools of a holistic process of appraisal, and more than just an accounting mechanism, namely as the most comprehensive consideration of multi-dimensional impacts of business activities.

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The Triple Bottom Line: Dimensions and Assessments

Company Impact Dimensions and Report Cards

In practice, a company monitors and reports to its triple bottom line using three "report cards":

1) Business Report Card (BRC),
2) Social Report Card (SRC), and an
3) Environmental Report Card (ERC).

For each card, the company selects key indicators (significant and measureable variables) relevant to its operations, expressed either quantitatively (as a percentage over time, such as of growth), or qualitatively indicators (as for evaluating levels of visitor satisfaction around tourist attractions, or the quality of staff-delivered safety instructions and training).

For an overview of the three report cards and their indicators of a tourism business (company, attraction, destination, or event), below the three impact dimensions (I-III) are categorized according to company stakeholders and interests (A, B, C), key indicators measuring tourism impacts (1, 2, 3), and possible sub-categories (a, b, c). A tourism company need not use all of these indicators, yet might add others that better suit its activity profile.

Overview of the Three Impact Dimensions and Report Cards of the Triple Bottom Line

I) Economic Impacts (BRC):
A) Company Benefits from Tourism:
1) Revenue;
2) Net profit or net income before tax (NIBT);

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3) Number of visitors.

B) Company Costs from Tourism:

1) Direct expenditures, including

a) Remunerations (wages, salaries or rewards),

b) Taxes paid, or

c) Costs for regulatory reports;

2) Indirect expenditures, including

a) Externalities (costs not chosen, such as pollution cleanups),

b) Opportunity costs (investments in other feasible attractions).

C) Stakeholder Benefits from Tourism:

1) Total shareholder return;

2) Value added or distributed to suppliers.

D) Community and Destination Benefits from Tourism:

1) Management of visitor demand and volume;

2) Reduction of seasonality effects.

E) Community and Destination Costs from Tourism:

1) Costs for attraction's deterioration and repair;

2) Costs for destination preservation.

II) Socio-cultural Impacts (SRC):

A) Tourist Satisfaction:

1) Openness of access;

2) Visitors' motivation.

B) Tourism's Impact on Public Health and Welfare:

1) Workplace stability;

2) Employee safety and risk management, including

a) Occupational health and safety audits and training,

b) Emergency plans,

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c) Written safety instructions,
d) Security signage and lighting, or
e) Security patrols;
3) Visitor safety (analog to 2).

C) Host Community's Wellbeing and Participation:
1) Impact on community quality of life;
2) Impact on community pride;
3) Local satisfaction with tourism;
4) Community support and involvement, e.g. partnerships;
5) People performance management, or employment conditions:
a) Opportunity,
b) Diversity,
c) Non-discrimination,
d) Human rights respect, and
e) Ethical corporate governance.

D) Destination Planning and Control:
1) Socio-cultural carrying capacity;
2) Tourism integration into regional planning and development;
3) Tourist transportation facilities;
4) Sustaining the social and cultural assets of the destination;
5) Protecting the image of the destination.

III) Environmental Impacts (ERC):

A) Managing and Protecting Scarce Natural Resources and Valuable Assets:
1) Energy management and conservation, such as of
a) Oil,

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b) Gas and
c) Electricity;
2) Water
a) Availability,
b) Quality and
c) Conservation;
3) Emissions from transportation of tourists.

B) Limiting Damaging Impacts of Tourism:
1) Destination's
a) Physical and
b) Environmental carrying capacity;
2) Ecosystems'
a) Conservation and
b) Rehabilitation;
3) Waste water quality and recycling;
4) Solid waste (metal, wood, paper, plastics) management or recycling;
5) Sewage treatment;
6) Weed and pest control,
7) Pollution via
a) Air,
b) Noise or
c) Visuals (such as architectural degradation);
8) Greenhouse gas emission reduction, such as
a) Carbon dioxide (CO2) from transport, or
b) Hydrofluorocarbons (HFCs) from cooling;
9) Land-from-sea reclamation;
10) Ecological efficiency via
a) Design;
b) Packaging and

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c) Recycling (strategies and actions for business operations),
11) Monitoring suppliers' environmental performances.

Criticism and Advantages of Triple Bottom Line Reporting

Criticism of the Triple Bottom Line

In a very condensed fashion, one could summarize criticism of the triple bottom line as mostly addressing these issues:

1) Redundancy (its three dimensions could be taken care of by single assessments);
2) Practical challenges (finding suitable or quantifiable social and environmental indicators);
3) Potential bias by businesses picking indicators to justify their investments.

Defense of the Triple Bottom Line

Against these points, among the main argumentsthat are invoked in defense of the triple bottom line, one could mention in a similarly concise manner:

1) The TLB is precisely about unifying separate bottom lines;
2) It allows for qualitative measurements alongside quantitative ones; and
3) User bias is unavoidable and even speaks for the overall practicability of the approach.

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Overall Evaluation of the Triple Bottom Line

Improvements of an Organization via the Triple Bottom Line

Overall, the triple bottom line approach can improve a tourism organization in manifold ways, which could be structured as follows, from theoretical to practical aspects, from internal to external company involvements and relationships, and in an order where all aspects are interconnected yet especially enable and reinforce the subsequent one:

1) Conceptual clarity about sustainability (comprehensively defining and operationalizing it);
2) Practical clarity about how to achieve it (slogan: "what gets measured gets managed");
3) Strategic decision making (integrated and holistic decisions within ethical framework),
4) Transparency and accountability (for stakeholders and society);
5) Shareholder value (the TBL also positively impacts the economic "single" bottom line);
6) Quality standards (institutionalizing best practices and benchmarks);
7) Employee relationships (employees are more likely to be loyal and low in turnover);
8) Corporate reputation (boosting company's products, marketing, and brand awareness);
9) Market positioning (via self-reinforcing cycles of positive reputation);
10) Stakeholder relationships (TBL implementations fulfil stakeholder demands); and
11) Destination benefits (differentiation from competition, and benefit for local community).

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Conclusion

Even most of the voiced criticism of the triple bottom line implies that it is, at least as of now and still, the most comprehensive and holistic framework for evaluating key indicators in the three most important dimensions that all tourism stakeholders face as a core concerns and responsibilities in the new millennium. Other models might appear soon, while some have been under discussion for some time. But their features do not show such a substantial differentiation from the here discussed conceptual or practical approach to justify a separate treatment. For example, some openly admit of being as of yet still in an "experimental stage" (Tyrrell, Paris and Biaett, 2013, p. 279). Others just rephrase the three dimensions as "three pillars" or as three inserted figures of a "Russian doll" (Royal Institution of Chartered Surveyors, 2007, p. 4).

So far and for the rest, no other model available at the moment seems to achieve the same degree of conceptual convincingness and real-life efficiency within a company and its day-to-day operations, transparency to the outside world and its stakeholders, comprehensiveness and clarity of its goals in conjunction with reliability and validity in terms of the measuring their fulfilment, and individual adaptability and flexibility with respect to the single tourism business or company in the increasingly globalized and interconnected tourism market, itself one of the biggest and fastest growing business branches of our time.

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Introduction

Credit rating agencies and their decisions influence significantly the financial market. The changes of the mentioned notes have significant influence on the prices of securities, for example, stocks or bonds. As a result,it is important to analyse the impact of the credit rating changes on the financial market. Most of the analysis concern the stock market. A strong impact of the mentioned changes on the abnormal stock returns has been observed. The strongest impact has been observed for the downgrade of them. Previous literature review suggests that a different reaction of banks' and productive companies' stock prices can be observed. In the case of banks' notes both the downgrades and upgrades influence significantly the abnormal stock returns (Chodnicka – Jaworska, 2016).

The presented findings evoke the following research question: how countries' credit rating changes influence exchange rates. As a result, the aim of the paper is to verify the impact of countries' credit rating changes on the rates of return of exchange rates, taking into account the level of economic development. The following hypotheses have been put: Exchange rates have stronger reaction to countries' credit rating changes in developed economies. The strongest impact of the credit rating changes is observed for a downgrade, both in developed and developing economies. The mentioned hypotheses have been verified by using event study methodology. The analysis has been prepared based on daily data collected from the Thomson Reuters Database from the years 1980 to 2015 given for all the countries rated by both smaller and larger CRAs. To the Author's best knowledge, the mentioned researches have not been presented before.

The paper is organized as follows: Section 2 presents the literature review of the impact of credit rating changes on currency rates. Section 3 contains the methodology and data description. Next results concerning the impact of credit rating changes on exchange rates have been presented. The last part concludes the findings.

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Literature Review

The previous studies relate mainly to the impact of credit rating on the fluctuations in stocks, bonds or CDS spreads and interest rates. There is a lack of researches about the impact of changes of credit ratings on exchange rates. In the Author's opinion particular countries or groups of countries can characterize asimilar business cycle, as a result of which exchange rates in those countries can react in the same way. Consequently, the following hypotheses have been put: Exchange rates have stronger reaction to countries' credit rating changes in developed economies. The strongest impact of credit rating changes is observed for a downgrade, both in developed and developing economies. Most of the analysis concerns acomparison of the behaviour of the currency market to other instruments. In **Table 1** a literature review has been presented.

Table 1. Literature Review

Authors	**Findings**
Brooks Faff, Hillier, Hillier (2004)	shares and exchange rates; credit ratings downgrade adversely affects the rate of return on the stock market, and the national exchange rate per USD depreciates
Kraussl (2005)	exchange rates, interest rates, share prices; rates of return reduction as an effect of downgrades of credit ratings; credit ratings changes increase market speculation expressed in nominal changes in exchange rates, daily interest rates prices; improving credit ratings or announcements has not effecton rates of return or has got a limited influence.
Kim, Wu (2008)	exchange rates, stock prices, bonds; the upgrade of long-term issuer credit ratings influence the financial markets in developing countries.

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Hooper, Hume, Kim (2008)	exchange rates, stock prices, bonds; 1995-2003, 42 countries, credit ratings upgrades significantly influence currency appreciation; stronger reaction as an effect of credit ratings downgrades.
Wu, Treepongkaruna (2008)	exchange rates, stock market; The impact of credit ratings changes on the stock market volatility and exchange rates in the Asian market; stronger reaction to the currency market.
Alsakkaa, Gwilym (2011)	exchange rates; 1994-2010, Fitch, Moody, S&P, the impact of credit ratings changes on both appreciation and depreciation of the currency; markets react to Fitch credit rating changes exactly at the time of publication; downgrades of S&P notes have stronger influence on the financial markets. The impact of political divisions and geographical conditions.
Brooks Faff, Treepongkaruna, Wu (2015)	exchange rates, stock prices; 1996 - 2010, 76 countries, the stock market and foreign exchange react differently to credit ratings changes; the stock market is more sensitive.
Baum Karpava, Schafer (2014)	bonds, exchange rates; 2011 - 2012, S&P, Moody, Fitch, credit rating and announcements changes; GARCH, exchange rates from 17 European countries; French, Italian, German, Spanish bonds; credit ratings downgrades have a negative impact on the exchange rate and increase its volatility; notes downgrades increase the yields of French, Italian and Spanish bonds, and decrease the German ones.
Asonuma (2016)	credit rating changes influence the currency depreciation

Source: own elaboration.

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Previous studies indicate the impact of countries' credit ratings changes on the real exchange rates (Bissoondoyal-Bheenick, 2005; Chodnicka-Jaworska, 2015). As a result, it can create a spiral phenomenon between these variables. According to the previous researches and analyses of the methodologies presented by CRAs, currency depreciation lowers countries' credit ratings. Alower credit rating causes deepening of the phenomenon of depreciation. As a result, the currency market crises influence notes, which deepens the crisis and causes contagion effects on financial institutions (Reinhard, 2002; Gadanecz, Miyajima, Shu, 2014). El-Shagi (2010) uses exchange rates in addition to stock indexes as the primary indicator of the crisis by analysing a case study on five Asian countries mostly hit by the Asian financial crisis. He found that exchange rates changes usually precede credit rating downgrades. On the other hand, he points out that there is no empirical evidence that the changes do not contribute significantly to the acceleration of the Asian financial crisis. However, credit ratings may generate short-term currency fluctuations.

What could pose an important research problem is the impact of credit ratings changes from the investment in speculative notes and vice versa. A stronger influence is observed in the case of the stock market for the credit ratings downgrades than upgrades. In this situation, after the literature review the following hypotheses have been put: The exchange rates have stronger reaction to the countries' credit rating changes in developed economies. The strongest impact of the credit rating changes is observed for a downgrade, both in developed and developing economies.

In the next section the methodology and data description taken into consideration during the verification of the mentioned hypothesis are presented.

Methodology

The aim of the paper is to verify the influence of countries' credit ratings changes on the rates of return of exchange rates, taking into account the level of the

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economic development. The verification of the mentioned goal has been made on daily data from Thomson Reuters Database from 1980 to 2015 for 225 countries. Long-term issuer credit ratings published by both smaller and bigger CRAs[1] are treated as observed variables. The larger credit rating agencies include Fitch, Moody and S&P. The remaining ones are classified as the smaller ones. Daily differences between the logarithmized rates of return of exchange rates are taken into consideration as a dependent variable.

The sample has been divided into subsamples according to the level of the economic development proposed by the World Bank. The grouping of countries has been presented in **Table 2**.

Table 2. Country groups singled out according to financial development criterion.

The level of the economic development	**Country**
High Income OECD Members	Australia, Austria, Belgium, Canada, Switzerland, Czech Republic, Germany, Denmark, Spain, Estonia, Finland, France, United Kingdom, Greece, Hungary, Ireland, Iceland, Israel, Italy, Japan, Korea, Luxembourg, Netherlands, Norway, New Zealand, Poland, Portugal, Slovak Republic, Slovenia, Sweden, United States
High-Income Non-OECD Countries	Aruba, Andorra, United Arab Emirates, Bahrain, Bahamas, Bermuda, Barbados, Cyprus, Hong Kong, Croatia, Isle of Man, Kuwait, Macao, Monaco, Malta, Oman, Qatar, Saudi Arabia, Singapore, San Marino, Trinidad and Tobago

[1]Dagong Long-term Issuer Credit Rating, Dominion Bond Rating Service (DBRS) - Long-term Issuer, Fitch Long-term Issuer Rating, JCR Long-term Issuer Rating, Moody's Long-term Issuer Rating, NRA Long-term Issuer International Scale Rating, R&I Long-term Issuer Rating, S&P Long-term Issuer Rating.

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Upper Middle-Income Economies	Angola, Argentina, Azerbaijan, Bulgaria, Bosnia and Herzegovina, Belarus, Brazil, Botswana, Chile, China, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, Gabon, Grenada, Iran, Jamaica, Jordan, Kazakhstan, Lebanon, Lithuania, Latvia, Mexico, Macedonia, Montenegro, Mauritius, Malaysia, Namibia, Panama, Peru, Romania, Russian Federation, Serbia, Suriname, Thailand, Tunisia, Turkey, Uruguay, St. Vincent and the Grenadines, Venezuela, South Africa
Lower Middle-Income Economies	Albania, Armenia, Belize, Bolivia, Cote d'Ivoire, Cameroon, Congo, Egypt, Fiji, Georgia, Ghana, Guatemala, Indonesia, India, Iraq, Sri Lanka, Morocco, Moldova, Mongolia, Nigeria, Nicaragua, Pakistan, Philippines, Papua New Guinea, Senegal, Solomon Islands, El Salvador, Ukraine, Vietnam.
Low-Income Economies	Benin, Burkina Faso, Bangladesh, Ethiopia, Kenya, Cambodia, Mali, Mozambique, Malawi, Rwanda, Uganda, Congo.

Source: own elaboration.

The analysis has been prepared by using event study methods, the goal of which is to verify the response of the rates of return of exchange rates on the countries' notes in the short-term period. The research has been performed for three periods of time by using cumulative rates of returns. The first period relies on the verification of abnormal rates during a pre-event window. This window consists of abnormal rates of return changes from 11 to 2 days before the event. The event period can last four days starting from one day before the event date and ending on the second day after it. Ten days after the event constitute the post-event window. The methodology of event study requires aggregation of abnormal differences in a variable within each event window to construct cumulative abnormal differences (CAD), taking an assumption that no other factors occurred in that time.

For each level of the economy subsamples upgrades and downgrades of credit rating assessments are tested separately. The significance of the impact of the mentioned credit rating changes is verified by using a Student's t-test. A small

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number of observations may weaken the power of statistical tests, suggesting the need to consider both the economic and statistical significance of results.

Findings

The aim of the paper is to analyse how credit ratings changes impact exchange rates. To verify the mentioned aim an analysis according to the direction of the change has been prepared. The results have been presented in **Table 3**. The upgrade of notes influences insignificantly the rates of return of the exchange rates. In the case of a downgrade, exchange rates statistically react significantly before the moment of publication of information about the change of credit ratings. Depreciation of currency rates of return of 0.2 p.p. has been observed. Another situation has been noticed for differences between rates of return. They are sensitive to upgrades. The reaction of the currency market has been stated during the moment of publication. An increase of credit ratings causes appreciation of notes. The difference between the rates of return is 139 p.p. lower. The differentiated results can stem from a large sample of the credit rating agencies and the level of the economic development. As a result, at first the relationship between the credit ratings changes and the type of agencies has been verified.

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Table 3. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates and Differences Between Rates of Return.

Variable	***Rates of Return***		***Differences between Rates of Return***	
	Upgrade	***Downgrade***	***Upgrade***	***Downgrade***
Pre-event Window				
_cons	-0,000202	0,00263*	0,0305	12,64
	(-0.32)	-1,77	-0,02	-1,59
N	667	765	667	765
Event Window				
_cons	-0,00012	0,0011	-1,39*	-6,088
	(-0.28)	-0,74	(-1.68)	(-0.81)
N	667	765	667	765
Post-event Window				
_cons	0,000773	-0,00203	0,731	-5,568
	-1,26	(-1.01)	-1,05	(-0.85)
N	667	765	667	765

Source: own calculations.

An analysis has been prepared for notes given by Dominion, Fitch, JCR, Moody, R&I and S&P. Different reactions of exchange rates on notes given by particular CRAs have been observed. The Dominion credit ratings influence the rates of return during the event window. During the mentioned period, in the case of an upgrade an appreciation of 0.6p.p. of the currency and a depreciation of 0.5 p.p. have been noticed during publication of the information about the decrease of notes. The reaction of the exchange rates has been weaker in the case of S&P notes (for upgrades of 0.15 p.p. and downgrades of 0.4 p.p.). The financial market reacts in this case before the moment of publication information about the credit ratings changes.

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Changes proposed by Moody are insignificant for the currency market. In some cases a sensitivity of exchange rates has been observed for downgrades of notes. The mentioned situation has been presented for Fitch and JCR notes. The currency market reacts toa decrease of credit ratings before and during the moment of publication of the information. In both cases a depreciationon0.39 p.p of the currency has been noticed. Exchange rates are less sensitive to JCR notes. During the event window rates are lower by 1.2 p.p. and the post-event window by 1.7 p.p. respectively.

On the other hand, the rates of return of exchange rates are sensitive to credit ratings changes only for upgrades. The mentioned phenomenon has been observed only during the moment of publication about an increase of notes. The appreciation of the currency is on 0.36 p.p.

The presented findings suggest that the currency market is more sensitive both in the case of the upgrades and downgrades of notes. On the other hand, the reaction is not as strong as in the case of the stock market. The differences between the received results according to the type of credit rating agencies are also smaller. The mentioned situation can result from a few things. One of them can be the size of the economy that has been verified in **Tables 6** and **7**.

The analysis of the impact of the credit ratings changes on the exchange rates depending on the level of the economic development has been prepared in five subsamples: highly developed countries being members of the OCED, highly developed countries out of the OECD, upper developed economies, less developed economies and undeveloped countries. In the whole of the mentioned subsamples a reaction to the decrease of credit ratings has been observed, but the moment and strength of the reaction differs. In groups of high-income economies the currency market is sensitive to the mentioned changes before the moment of publication. A downgrade of notes causes a depreciation of the currency to 0.52 and 0.22 p.p. respectively for high-income OECD and high income non-OECD countries. In the

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case of the upper developed economies a statistically significant impact of the credit ratings changes on the currency market during the event window has been observed.A depreciation of exchange rates to 0.55 p.p. occurs. The strongest reaction has been noticed for the less developed economies. A depreciation of the currency has been higher by0.79 p.p. The less developed economies react during the event window (0.56 p.p.).

The prepared analysis suggests that the reaction of the currency market is faster in the developed economies than in the developing ones. On the other hand, the strength of the change of the rates of return of exchange rates increases with decreasing levels of economic development. It can be connected with investors' confidence.

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Table 4. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates According to The Type of Credit Rating Agency.

Agency	Dominion		Fitch		JCR		Moody		R&I		S&P	
u	U	D	U	D	U	D	U	D	U	D	U	D
Pre-event Window												
_cons	0,00092	0,00373	0,00169	0,00392*	0,00739	-0,0079	0,00075	-0,0022	-0,0005	0,00618	-0,0015*	0,00441*
	-0,17	-0,3	-0,92	-1,86	-1,3	(-0.98)	-0,56	(-0.69)	(-0.25)	-1,46	(-1.79)	-1,85
N	15	14	85	117	9	15	178	191	74	90	306	338
Event Window												
_cons	0.00636**	-0,005*	-1E-05	0.00392*	0,00019	0.0122**	-0,001	3,5E-05	0.00366**	0,00444	-0,0009	-0,0004
	-2,54	(-1.65)	(-0.01)	-1,99	-0,11	-2,49	(-1.26)	-0,01	-2,85	-0,9	(-1.30)	(-0.16)
N	15	14	85	117	9	15	178	191	74	90	306	338
Post-event Window												
_cons	0,00211	-0,0046	-0,0009	-0,0049	0,00024	0.0167**	0,00138	0,00206	-0,0006	-0,0033	0,00116	-0,0038
	-0,55	(-0.93)	(-0.39)	(-1.55)	-0,03	-2,31	-1,49	-0,39	(-0.30)	(-1.02)	-1,28	(-1.21)
N	15	14	85	117	9	15	178	191	74	90	306	338

Source: own calculations.

Table 5. Impact of Credit Ratings Changes on The Differences Between Rates of Return of Exchange Rates According to The Type of Credit Rating Agency.

Agency	Dominion		Fitch		JCR		Moody		R&I		S&P	
u	U	D	U	D	U	D	U	D	U	D	U	D
Pre-event Window												
_cons	0,0259	-0,0323	-2,576	-0,374	0,0288	-0,0162	1,985	-5,319	3,904	15,89	-1,319	27,52
	-0,84	(-0.62)	(-1.37)	(-0.77)	-0,53	(-0.03)	-0,69	(-0.98)	-1,11	-1,17	(-0.63)	-1,59
N	15	14	85	117	9	15	178	191	74	90	306	338
Event Window												
_cons	0,0677	-0,012	-0,971	1,127*	0,0351	0,608	-0,617	-2,369	-1,284	-6,218	-2,095*	-11,2
	-1,21	(-1.21)	(-0.74)	-1,97	-0,75	-1,24	(-0.32)	(-1.09)	(-0.59)	(-1.21)	(-1.65)	(-0.66)
N	15	14	85	117	9	15	178	191	74	90	306	338
Post-event Window												
_cons	0,0261	-0,0158	0,823	0,592	-0,104	0,567	0,38	-5,23	0,33	-5,248	1,066	-8,479
	-0,81	(-0.91)	-0,95	-0,76	(-0.48)	-1,23	-0,62	(-0.97)	-0,08	(-1.34)	-0,96	(-0.58)
N	15	14	85	117	9	15	178	191	74	90	306	338

Source: own calculations.

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Table 6. Impact of Credit Ratings Changes on The Rates of Return of Exchange Rates Depending on The Level of Development of The Economy.

Country Group	Highly Developed OECD		Highly Developed non-OECD		Upper		Lower		Undeveloped	
u	U	D	U	D	U	D	U	D	U	D
Pre-event Window										
_cons	0,00041	0,00521**	-8E-05	0,0022*	-5E-05	3,5E-05	-0,0016	0,00721	-0,0008	0,00364
	-0,28	-1,96	(-0.09)	(-1.81)	(-0.05)	-0,01	(-1.21)	-1,55	(-0.06)	-0,81
N	170	224	72	89	310	273	109	146	4	21
Event Window										
_cons	0,00044	-0,001	0,00042	-0,0006	-0,0006	0.00547**	-2E-05	-0,0033	-0,0061	0.00559**
	-0,49	(-0.37)	-0,57	(-0.82)	(-0.81)	-2,34	(-0.02)	(-0.66)	(-0.49)	-2,49
N	170	224	72	89	310	273	109	146	4	21
Post-event Window										
_cons	0,00114	0,00206	-0,0008	0,00034	0,00095	-0,0029	0,00097	0,0079*	0,00348	-0,0036
	-0,75	-0,69	(-0.68)	-0,28	-1	(-0.65)	-1,19	(-1.84)	-1,11	(-1.01)
N	170	224	72	89	310	273	109	146	4	21

Source: own calculations.

Table 7. Impact of Credit Ratings Changes on The Differences Between Rates of Return of Exchange Rates Depending onThe Level of Development of The Economy.

CountryGroup	Highly Developed OECD		Highly Developed non-OECD		Upper		Lower		Undeveloped	
u	U	D	U	D	U	D	U	D	U	D
Pre-event Window										
_cons	-0,137	2,879*	0,00063	-0,0072*	-0,123	-3,83	0,503	69,28*	6,718	-1,98
	(-0.26)	-1,69	-0,14	(-1.82)	(-0.45)	(-1.01)	-0,06	-1,7	-0,92	(-1.61)
N	170	224	72	89	310	273	109	146	4	21
Event Window										
_cons	0,0935	1,655	0,0012	-0,0023	0,104	-1,334	-8,68*	-32,09	-7,339	1,064
	-0,2	-1,17	-0,87	(-1.33)	-0,31	(-0.88)	(-1.78)	(-0.82)	(-0.97)	-0,51
N	170	224	72	89	310	273	109	146	4	21
Post-event Window										
_cons	-0,196	0,396	-0,0008	0,00142	0,342	-3,902	3,8	-22,21	0,151	-1,95
	(-0.30)	-0,14	(-0.15)	-0,5	-0,87	(-1.03)	-0,95	(-0.66)	-1,52	(-1.05)
N	170	224	72	89	310	273	109	146	4	21

Source: own calculations.

Conclusions

The aim of this paper has been to verify the impact of countries' credit rating changes on the rates of return of exchange rates, taking into account the level of the economic development and the type of credit rating agencies. The following hypothesis has been put: Exchange rates show stronger reaction to countries' credit rating changes in developed economies. The strongest impact of credit rating changes is observed for a downgrade, both in developed and developing economies. The presented hypotheses have been verified by using the event study methodology. The received results suggest that the currency market is more

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sensitive both in the case of the upgrades and downgrades of notes, but the reaction is not as strong as in the case of the stock market. The differences between the received results depending on the type of credit rating agencies are also lower. The reaction of the currency market is faster in the developed economies than in the developing ones. On the other hand, the strength of change of the rates of return of the exchange rates increases with decreasing levels of economic development. It can be connected with investors' confidence.

The received results suggest that in the case of the currency market the size of the credit rating agency is unimportant, but the level of the economy division has got a significant impact. A weaker reaction of the currency market can be connected with the higher volatility of the currency market. The abnormal rates of return can also be connected with the information about the changes of watch lists and outlooks. Finally, the reaction of the exchange rates can be the confirmation of Fama's Theory.

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Introduction

Education is an important component of life because it provides the basic conditions for realization of our desires and lifelong ambitions. Information and communication technologies (ICT) offer the opportunities for expansion of education, especially for groups, which due to material costs or time constraints, are unable to enroll in educational institutions. The participants in these groups are people from rural populations, persons who are excluded from education because of cultural or social reasons, employees and many others (Abu, El-Ala and Others, 2012, p.135).

One of the most promising paradigms of education is e-learning. It mainly refers to the use of networked ICT in teaching and learning, in order to improve education overall. There has been significant growth indevelopment of e-learning systems and increasing interest in e-learning in the recent years (Behrenda and Others, 2011), (Bora andAhmed, 2013). This is certainly due to the huge progress in ICT, as well as rising demands of making learning compatible with the professional and personal development of each person.

E-learning plays a significant role in today's way of living and working, because many learning materials can be accessed from anywhere, at any time and from any number of people. E-learning has a huge impact on the job performance of educators and university students, as well as in lifelong and work-based learning outside the universities (Donnelly and McSweeney, 2009), (Lamba and Singh, 2011), (Viswanath and Others, 2012). E-learning is widely used method in trainings conducted in companies and other organizations, not only for building IT skills, but also for building business skills, as well as solving many fundamental issues in various fields.

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However, despite the benefits offered by e-learning, there are many obstaclesthat occur during implementation. For example, the traditional web based e-learning, constructed and maintained inside the educational institutions or companies, has many financial problems and demands, such as the need of large financial investment, without the possibility of its return (Viswanath and Others, 2012) (Odunaike SA and Others, 2012). Also, e-learning systems often require many hardware and software resources. There are a number of educational institutions and enterprises that cannot afford such investments, so cloud computing is the best solution for them. The implementation of an e-learningsystembased on cloud computing, has its own characteristics and requires a specific approach. Cloud computingis paradigm in which the resources of the IT system are offered as services available to users through network connection, usually the Internet. It is a model for providing IT services that meet consumer needs, charging only for the actual use that is made (Buyya, Broberg and Goscinski, 2011). The purpose of the cloud is to provide same or improved computer services and computer performance for the client, as technology and applications are located in customer's premises. Also, the cloud provides scalability in processing power, low maintenance costs, fewer computer downtimes, more storage space, all that while maintaining sophisticated IT infrastructure that can be used by the client, thereby improving business demand and increasing the competitiveness of enterprises (Dong and Others, 2009). The cost of implementation ofcloud computing is very low because the client does not have to buy or install equipment (Odunaike SA and Others, 2012). Cloud service provider is paid to provide these services and resources.Cloud computing attracted considerable attention as a ready-to-be-used solution that has been helpful in many situations. Thus, cloud computing opens a new idea for further development of e-learning (Madan and Others, 2012).

In this paper a description of the current state of e-learning in the Republic of Macedonia was performed, with a special analysis of e-learning in universities, schools and institutions where trainingsare conducted for the employees. Analysis

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of e-learning in universities and schools is made based on the results obtained from a survey on people who have completed their education or are active students and people who participate in the creation of the learning process (teachers and professors), while the analysis of the use of e-learning in the institutions where trainingsare conducted for the employees is made based on the results obtained from a survey of employees.

1. Examples of Websites Designed for E-learning

In order to deal with everyday challenges, we are in constant search for answers or solutions. Today's access to information is considerably easier and faster with the use of ICT. The rapid development of society, and everyday changes in technology, science and information, demands people to continuously upgrade their knowledge acquired during their formal education (Elumalai and Veilumuthu, 2012). Following this trend of continuous learning, many companies and educational institutions adopt e-learning as a way of sharing knowledge. Many educational institutions worldwide have developed their own platforms for e-learning, which are used in the education of their students (Eom and Arbaugh, 2011). These platforms havecourses developed for various subjects with educational materials and information easy sharable. Beside that, universities develop their own platforms for e-learning, there are many websites that provide free courses which can be followed on the Internet. All it takes is having a computer with internet connection. Below are listed few of the largest sites designed for e-learning.

Coursera[1]is one of the largest educational platforms which cooperates with highly ranked universities and organizations in the world and offers online courses for everyone. This platform's design is based on proven instructional methods verified

[1]https://www.coursera.org/ (accessed 28 June 2016)

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by highly ranked researchers. There are four key ideas for platform development: effectiveness of online learning, deep and thoroughly learning, mutual evaluation andmixed learning.

edX[2] is the only non-profit educational platform founded by Harvard University and the Institute of Technology of Massachusetts (MIT) in 2012.edX[3] provides online learning and numerous online courses of open character. It gives users high quality courses from the best universities and institutions worldwide. Users can obtain an official document or a certificate from the institution signed by the instructor. This certification verifies the achievements of the user and can be used to emphasize his skills.

Udacity[4] is the result of an experiment at Stanford University, where Sebastian Thrun and Peter Norvig have offered their course "Introduction to Artificial Intelligence" online for free. Today, the team of trainers and engineers has increased and seek to change the future of education, filling the gap between the real job skills, adequate education and employment. This team has created online university that offers students skills which arerequiredby employers nowadays, delivers accreditations approved by employers and educates at a price much lower than traditional schools. Students gain real skills through a series of online courses and participation in projects.

Livemocha[5] is the largest worldwide online community for language learning, which combines traditional learning methods with online practice and interaction with linguists from around the world. Since its beginnings in 2007 up to today, it

[2]https://www.edx.org/(accessed 28 June 2016)
[3]https://www.edx.org/(accessed 28 June 2016)
[4]https://www.udacity.com(accessed 28 June 2016)
[5]http://livemocha.com/(accessed 28 June 2016)

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increased the number of its members, which are from different countries in the world. This community was formed to create a world in which humans know more languages in order to be able to exchange practices and experiences and tobe able to work with people from different countries.

E-learning for kids[6] is a global nonprofit organization created in 2004, which is dedicated to provide fun and free online learning for children from 5 to 12 years. Offering free courses in Math, Science, reading and writing, Its vision is to be a source of online learning available from any place for free.

2. E-learning in Republic of Macedonia

2.1. Comparison between Traditional Way of Learning and E-learning

Traditional learning is well-known, widely accepted and validated method of sharing knowledge, which is the basis of the educational system in Macedonia. However, with the rapid development of Internet technology, method which actively began to be used worldwideappears. This methodis e-learning and very fast it occupies an important place alongside traditional learning. E-learning is relatively new method of learning, where students use modern computer technology as a medium for learning. In Macedonia, as a country which actively follows information development and advancement in terms of internet technology, theconditions are met for integration of e-learning in the educational process. In order to compare the traditional way of learning and e-learning, we list the advantages and disadvantages of these two forms of learning. **Table 1** displaysthe advantages and disadvantages of traditional learning and e-learning.

[6]http://www.e-learningforkids.org/(accessed 28 June 2016)

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From the **Table 1** comparison conclusion can be made that e-learning as a new method of learning can complement the traditional method of learning in Macedonia, introducing flexibility in the educational process and rectifying the shortcomings of traditional learning related on physical presence. E-learning is a technology worth investingand to be integrated in the education process in Macedonia.

The use of cloud computing in higher education offers a number of benefits, but there are some risks and limitations associated with its use (Katz, 2010):

Main benefits: access to applications from anywhere, teaching support, user account management, free software or pay per use, openness to the business environment and advanced research, openness to students and new technologies;

Risks: risks related to security and data protection, risk that the cloud provider would stop operating;

Limitations: institutions limitation regarding conditions, not all applications run in the cloud, Internet connection interruptions.

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Table 1: Comparison between traditional learning and e-learning

Traditional learning		**E-learning**	
Advantage	***Disadvantage***	***Advantage***	***Disadvantage***
	Required presence in the classroom, according to classroom timetable	Following Online lectures gives more time for other activities (Donnelly and McSweeney, 2009),(Katz, 2010)	
Doing live discussion with the instructor and classmates. Buildingpresentational and communication skills. Social interaction, making new friends			Online communication and discussion via email, communication dialog, forum (Lack of social interaction, there is no opportunity to meet new friends in person) (Katz, 2010)
	The teacher determines the structure of the teaching plan and the learning time. Teaching is conducted according to existing curricula. Lectures are	The student himself organizesthe plan and time of learning. Learning materials are available online in different formats. Most of the learning process is carried out by the student	

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	usually in large groups and it leads to the inability of the instructor to devote time to each individual	through searching and collecting information from the Internet(Katz, 2010)	
	Motivation and attention of students are on low level because of their weak involvement in the learning process	The motivation of students is high because of their involvement in the learning time managementand learning process (McSweeney, 2009),	
	Travel expenses	No travel expenses (McSweeney, 2009), (Katz, 2010)	

Source: Literature review

2.2. Empirical research on the use of e-learning in the Republic of Macedonia

The survey was conducted in order to determine the current state of e-learning in education, training and professional development in the country. For this purpose, the survey was conducted on three different groups of interests. In the first and second group are people directly involved in the educational process. In the first group are people who have completed educationor are still enrolled in the educational system, i.e. students, while in the second group are people who create

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the learning process, i.e. the employees in educational institutions (professors and teachers). The third group includes employees who use e-learning for training and professional development in order to improve their professional skill set. The selection of the groups was made in order to obtain representative samples and real data, whose analysis will give a realistic picture of e-learning in Macedonia.

For the purposes of this research three questionnaires were made and sent to respondents from three different groups. 100 questionnaires were sent to the first group of participants (students), where 67 respondents replied. 80 questionnaires were sent to the second group of participants (teachers/professors), where 45 respondents replied. 80 questionnaires were sent to the third group of participants (employees), where 28 respondents replied.

2.2.1. E-learning in Educational Institutions

Analysis of data obtained from the survey on persons who have completed education or are still enrolled in the educational system (students)

The questionnaire for the first group of respondents consists of 16 questions, including questions regarding the degree of their current or completed education, according to which respondents were divided into 3 groups, namely: high school students, undergraduate and graduate students. In the text below follows a detailed description of the analysis and graphic representation of the survey.Regarding the question whether they are familiar with e-learning, 47% of the respondents replied positively, 37% of respondents said that theywere partially familiar with e-learning and 16% of respondents replied that they were not familiar with the e-learning. From the total number of respondents who replied that are familiar with e-learning, 78% belong to the group of respondents who have completed or are still in graduate studies, followed by respondents from undergraduate studies (54%) and

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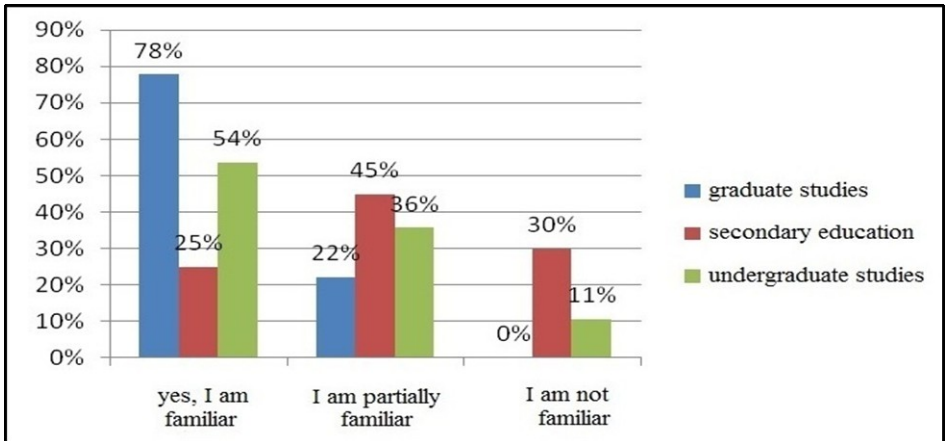
with the lowest percentage are respondents from secondary education (25%). From the respondents who replied that are partly familiar with e-learning, with the highest percentage are those who have completed or are still in secondary education (45%), followed by respondents from undergraduate studies (36%) and finally respondents from graduate studies (22%). From the total number of respondents who answered negatively to the question, the most common are those of secondary education (30%), followed by respondents from undergraduate studies (11%), but none of the respondents from graduate studies responded negatively to this question (**Graph 3.1**).



Graph 3.1: Question results: "Are you familiar with e-learning?"

Source: Data analysis

Regarding the organization of the learning process, the majority (60%) of the respondents said that the learning process was organized in a mixed way -

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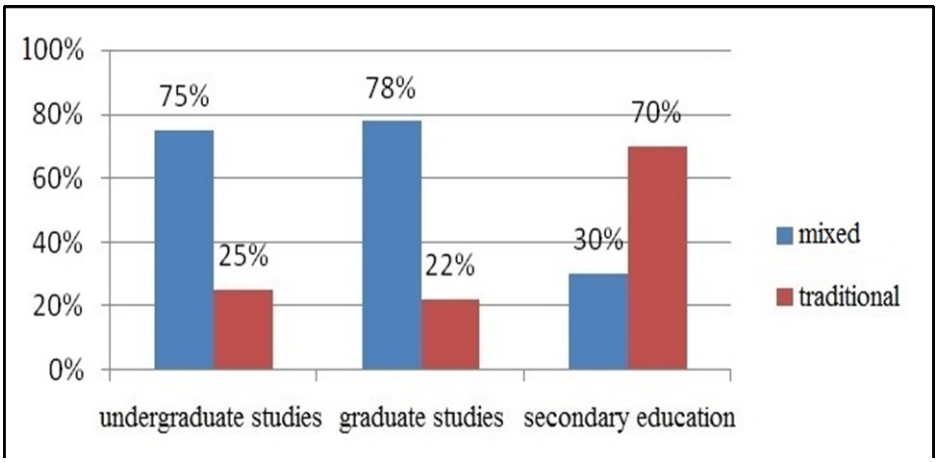
traditional learning, complemented by online communication and sharing of educational content, while the rest (40%) said that it wasorganized in a traditional way in a class room.

The group which chose the mixed way, the highest proportion occupy respondents who belong to the group of graduate studies (78%), followed by respondents from the group of undergraduate studies (75%) and finally the respondents from secondary education (30%). The group whichchose the traditional way, the highest proportion occupy respondents with secondary education (70%), followed by respondents from the group of undergraduate studies (25%) and finally the respondents from the group ofgraduate studies (22%)(**Graph3.2**).



Graph 3. 2: Question results: "How is the learning process organized in your educational institution?"

Source: Data analysis

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From the analysis of the results above, a conclusion can be made that both types of learning processes are present in the educational system. As it can be seen, the traditional classroom approach is more prevalent in primary education, while the mixed approach is more prevalent in undergraduate and graduate studies.

In order to determine whether the educational institutions have a system for e-learning or not, the respondents were asked whether their educational institution has asystem of e-learning,besides the traditional learning system. Respondents were able to choose between two possible answers (yes/no). 65% said that their educational institution has a system of e-learning, and 35% said that it does not. According to the results, an e-learning system is most often to be met in higher education, rather than in the secondary education.

Most of the respondents (90%) who replied negatively on the abovequestion, have also stated that an e-learning system should be introduced in their educational institution and they believe that e-learningcould improve the overall teaching process.The other 10% believe that there are no suitable conditions for implementation of such a system.

The respondents that have stated that there is an e-learning system in their educational institution were asked to replay for what the system is most often used by them and whether the e-learning system is error prone or not.70% replied that the e-learning system is mostly used for file sharing and communication, 16% replied that the e-learning system is actively used during teaching and 14% replied that the e-learning system is rarely used in general.The majority of the respondents (28%) replied that they use the e-learning system mostly for downloading teaching materials in a particular subject/course, uploading home works and projects (21%) and monitoring their success in a particular subject/course(19%). 3% replied that they use the e-learning system for following online lectures also.(**Graph3.3**).

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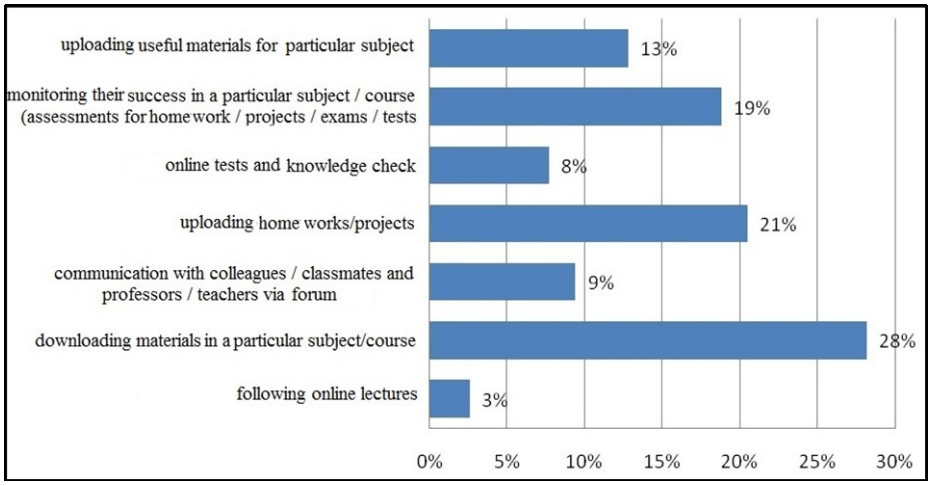

Graph 3.3: Question results: "What is the e-learning system mostly used for?"

Source: Data analysis

Regarding the reliability, even 82% of respondents said that there are often problems when using the e-learning system. The biggest problem pointed was the lack of regular update of teaching materials (47%) and occasional unavailability of the e-learning system (35%). (**Graph 3.4**).

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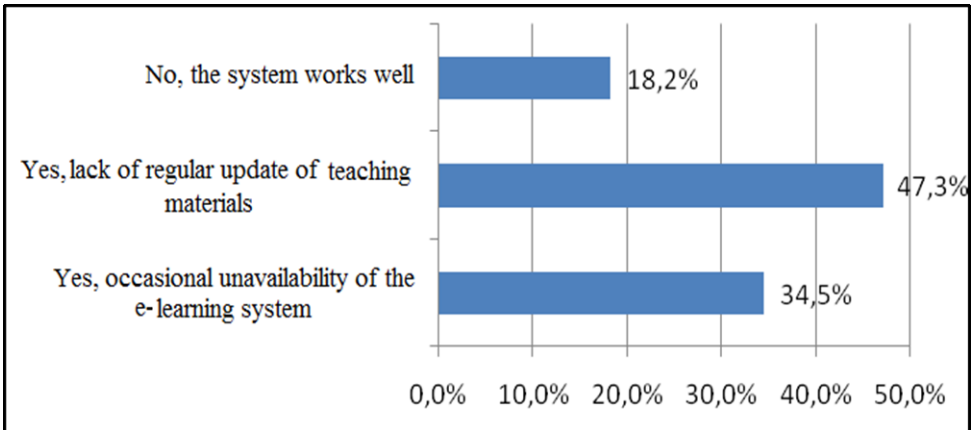

Graph 3.4: Question results: "Are there any problems while using the e-learning system?"

Source: Data analysis

On a scale from 0 (the worst) to 5(the best)40% of the respondents gave a 4 points rating as an assessment, while other results are almost equally distributed around the 4 point assessment (3 points- 31%, 5 points- 21%). *Graph 3.5* shows the assessment results.

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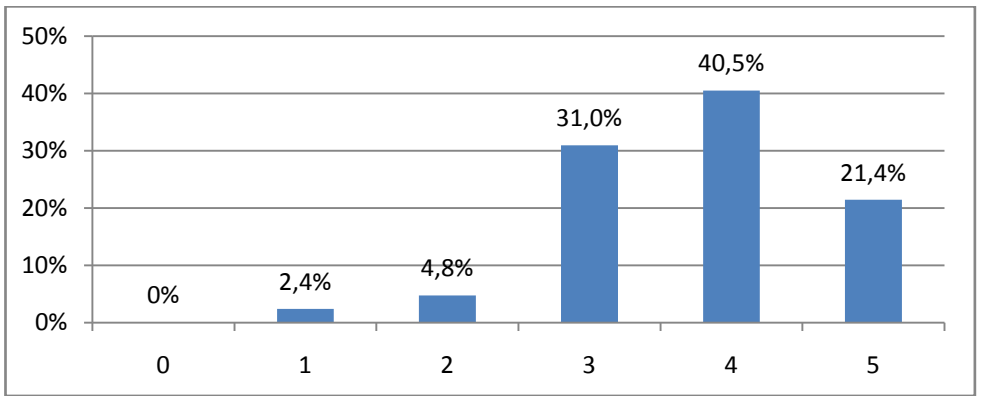

Graph 3.5: Question results: "How useful is / was e-learning during your education?"

Source: Dataanalysis

According to previously presented results it can be concluded that some educational institutions already have an e-learning system, which is mostly used for downloading materials on a particular subject/course. The most common problem when using the e-learning system is of human nature and it is related with thelack of regular update of teaching materials. The second most common problem is of technical nature, thus the system is often unavailablewithout any prior announcements.

Besides the above questions, the respondents were asked a second group of questions regarding individual self-learning beyond the formal education. Asked if they ever individuallyenrolledin a course or lecture over the Internet, 58% replied that they did not, while 42% replied that they did. 83% of the respondents who gave a positive replay have also stated that they liked the overall experience and

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would enroll in a course again, while 17% said that although it was fine, they consider that the traditional way of acquiring knowledge is more efficient. 28% of the respondents replied that the biggest benefit from the individual self-learning is the possibility to self-organize and maintain own learning schedule, 26% replied that the biggest benefit would be cost reduction, 25% replied that it facilitates the learning processand 21% replied that they consider the possibility of self-learning to be the biggest benefit.Regarding the negative sides of e-learning, 42% replied that they consider the lack of social aspect the most negative side of e-learning. Among other disadvantageswere technical deficiencies (22%),lack of some elements of the traditional educational process (22%) and technical incompetence of the educational staff (14%).

At the end the respondents were asked whether the traditional way of learning can be fully replaced by an e-learning. 46% said no, butstated that e-learning can complement the traditional method of learning. 40% believe that traditional learning methods can be replaced by the e-learning methods, but not in all areas of education. Only 14% of the respondents believe that the traditional learning methods can be replaced bye-learning in total (**Graph3.6**).

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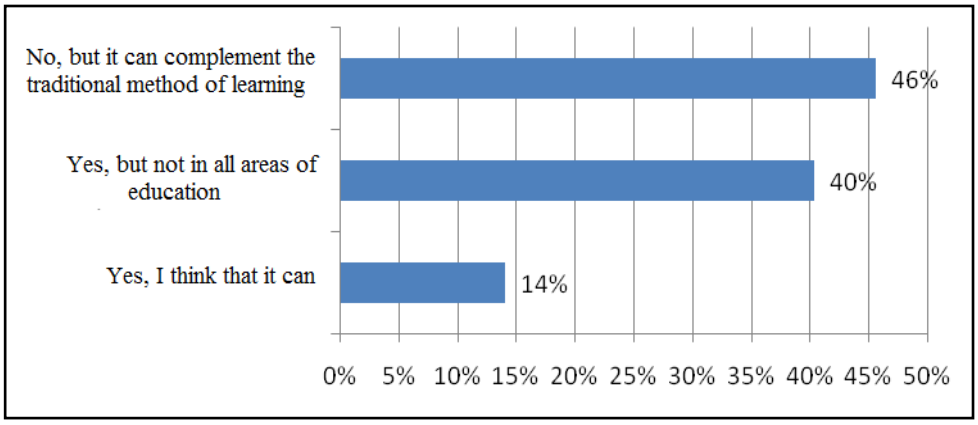

Graph 3. 6: Question results: "Can the traditional way of learning be fully replaced by e-learning?"

Source: Data analysis

Finally the participants were asked a question whether an e-learning is a learning process worth investing in the future, to which the most of the respondents (91%) answered yes, while only 9% answered no.

Analysis of data obtained from the survey on persons involved in the creation of the learning process (teachers and professors)

The survey for the second group of respondents consisted of 19 questions, divided into three groups: questions of general nature, questions related to e-learning in educational institutions and questions related to following individual courses

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online. It the text below is a detailed description of the analysis and graphical representation of the survey results.

The survey has been answered by three different target groups: university professors (44%), secondary school teachers (18%) and primary school teachers (38%).

In order to obtain information regarding the basic conditions needed for smooth implementation of an e-learningsystem, the participants were asked whether their educational institution is located in urban or rural areas, and if there is a stable internet connection in their institutions. The purpose of such question was to determine whether there is a problem with the internet coverage and if the problem is directly related with the location of the educational institution. Surprisingly, very small percentage of the respondents in the primary (35%) and secondary (38%) schools said that there is a stable Internet connection in the institution where they work, regardless of the location of the institution. Even 80% of respondents from universities said that they have a stable internet connection. From the results obtained a conclusion can be made that a stable Internet connection still poses a problem in primary and secondary schools.

All of the respondents replied that they have solid computer skills and that computers are actively used in their workplace. Most of them rated their skills high and stated that they posses excellent computer skills (67%). In the **Graph 3.7**, it can be seen the most common use of computers during their workday.

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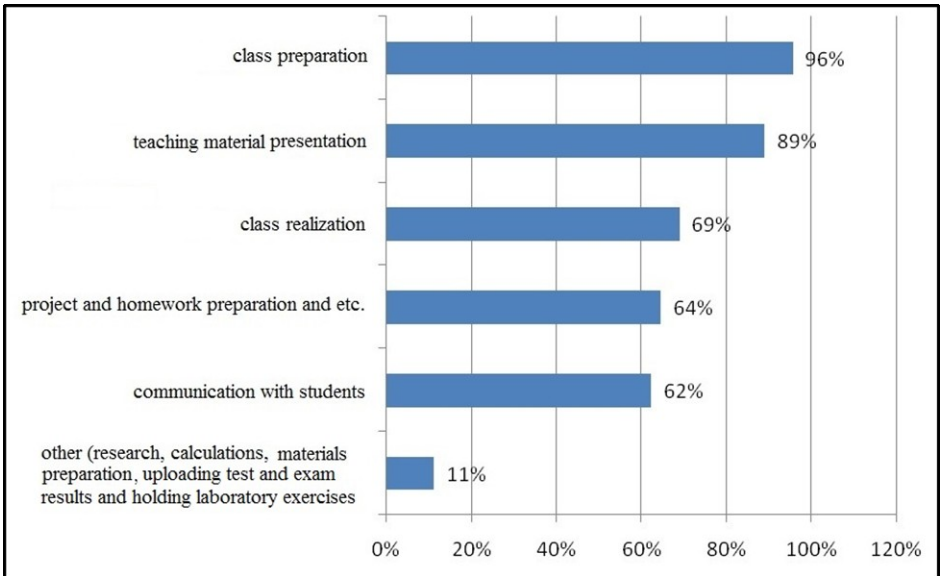

Graph 3.7: Question results: "Regarding your work, for what do you use your computer most of the time?"

Source: Data analysis

Class preparation (96%) and teaching materials presentation (89%) are the most common ways of using computers in educational institutions, while class realization (69%), projects and homework preparation(64%), communication with students (62%) are almost evenly distributed. Besides the above answers,a small percent of the respondents (11%) stated other examples of using computers at work, such as: research, calculations regarding work, preparation of work materials, uploading tests' and exams' results and teaching laboratory exercises.

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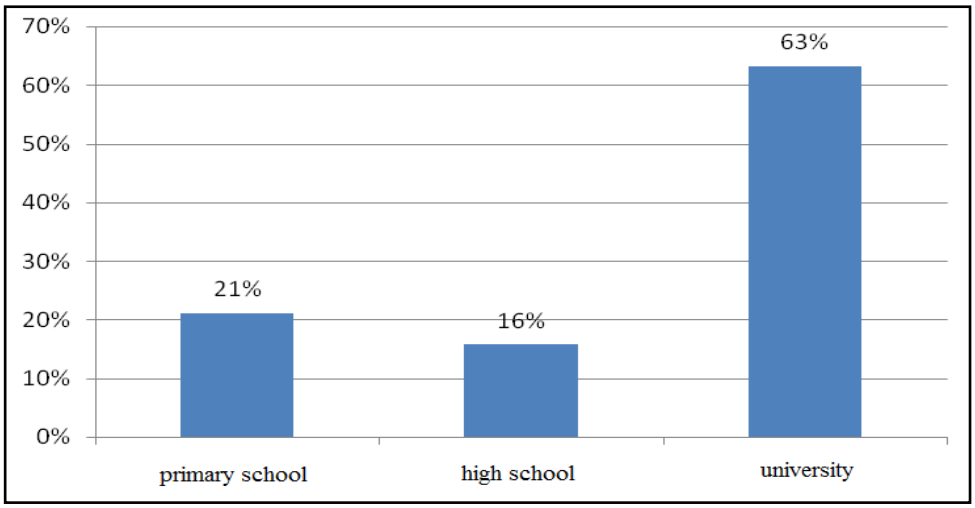
Regarding following a course, seminar or training online, 42% of respondents replied positively and the remaining 58% answered negatively. Those who gave a positive reply are mostly university professors (63%), followed by primary school teachers (21%) and high school teachers (16%) (**Graph3.8**).



Graph 3.8: Question results: "Have you ever followed a course, seminar or training via the Internet?"

Source: Data analysis

Asked about their experience regarding following such training online, respondents from primary and secondary schools had mixed opinions, while most of the respondents from the universities would follow such training again.

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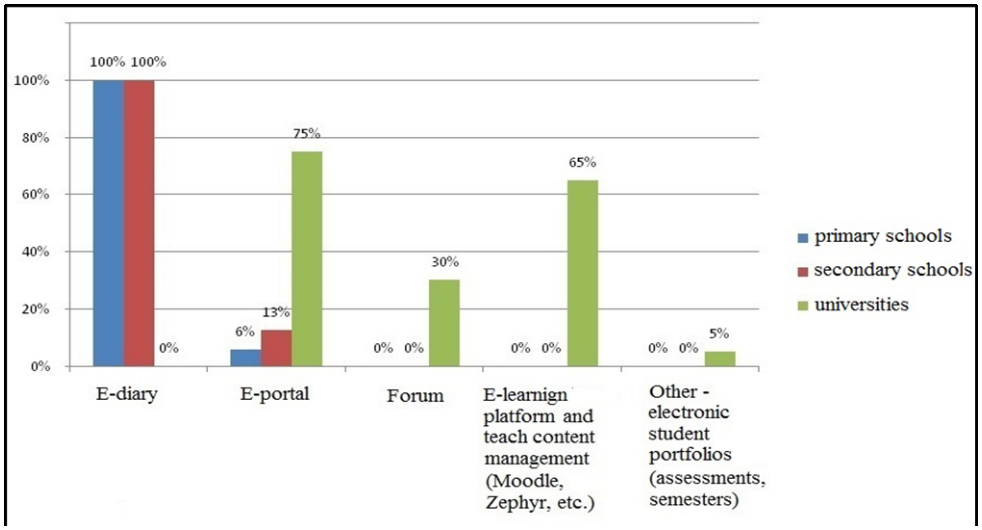
Furthermore, the respondents were asked if they were familiar with e-learning and whether the educational institution they work in has some form of e-learning. All of them replied positively, where 78% replied that they are familiar with e-learning, and 22% replied that they are partially familiar with it. The **Graph 3.9** summarizes the responses of the second question, divided by type of educational institutions.



Graph 3.9: Question results: "Does your educational institution have any form of e-learning?"

Source: Data analysis

According to the graph, in primary and secondary schools the most widespread form of e-learning is the e-diary, while only a small number of schools have e-

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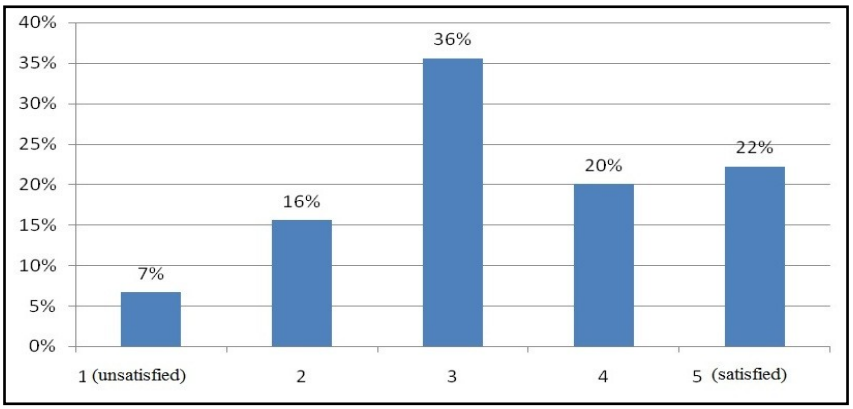
portals. On the other side, almost all forms of e-learning are present in universities (e-portal, forum, e-learning platform and teach content management, electronic student portfolios).

Most of the respondents (51%) replied that e-learning is mostly used forsharing teaching materials, teacher - student communication and internal communication, 27% replied that the e-learning system is actively used in the teaching process (lectures, work at class, etc..) and 22% said that the e-learning is rarely used in the teaching process overall. It can be concluded that in most of the educational institutions, thee-learning system is not fully utilized.

The majority of the respondents rated their e-learning system with average grade 3 (36%). Other ratings are distributed between average grades 5 (22%), 4 (20%), 2 (16%) and 1 (7%). The results can be seen in **Graph 3.10.**



Graph 3.10: Question results: "Are you satisfied with the e-learning system?"

Source: Data analysis

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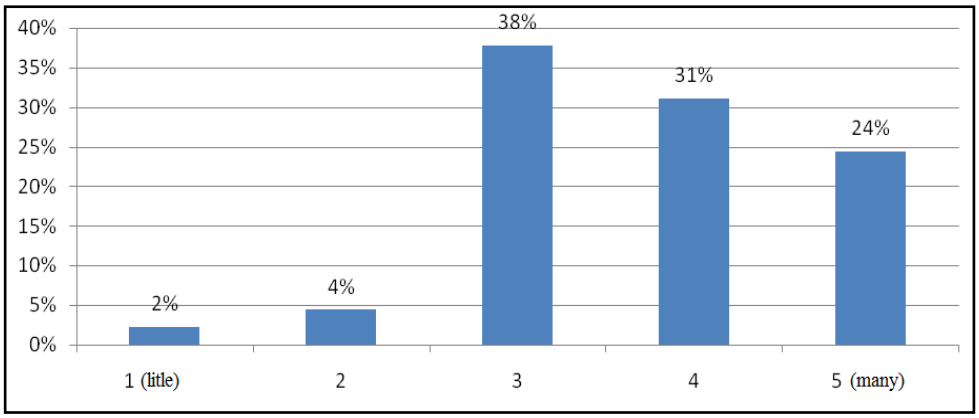
When asked about the most important feature that e-learning currently brings into the educational process, the respondents replied that they consider sharing of teaching materials as one of the most important feature, followed by improved teacher/student communication.

At the end, the respondents were asked to rate the usefulness of current e-learning systemin the educational process. (**Graph 3.11**). Most of the respondents rated it with a grade 3 (38%), followed by agrade4 (31%) and a grade 5 (25%).



Graph 3.11: Question results: "How useful is the e-learning system in the educational process overall?"

Source: Data analysis

At the end of the survey the respondents were asked if e-learning is a process worth investing in the future. All of the respondents gave an affirmative answer.

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2.2.2. E-learning in Training and Professional Upgrade

Analysis of data obtained from the survey on employees that use e-learning for professional and personal development

The questionnaire for the third group of respondents consisted of 14 questions, divided into three groups: general questions, questions related to courses followed at work and question related to following individual courses online. Three age groups were included in this survey: between 23-35 years, between 36-45 years and over 45 years. Most of the respondents belong to the age group of 36 to 45 (43%), second most are in theage group over 45 years (36%) and all others are in the age group 23 to 35 years (21%).

All of the respondents replied that they can use computers, where 50% stated that they possess excellent computer skills, 36% said that they have solid computer skills and 14% said that they have a good computer knowledge. Most of the respondents in the age group of 23-35 (83%) and 36-45 (67%) said that they possess excellent computer skills, while most of the respondents falling in the age group over 45 said that they have good (40%) or solid (50%) computer skills.

All of the respondents also reported that they use a computer to perform their daily job duties. 64% of the respondents stated that they follow or have followed an e-learning course in the past, while 36% replied that they never did. Most of the negative replies are from respondents within the age group over 45 (80%). All of the respondents who have never followed an e-learning course, said that they were not informed that such a course exists.

The respondents who have followed e-learning courses were also asked to evaluate them. The **Graph 3.12** shows the global evaluation of e-learning courses. Most respondents (56%) rated the courses with a grade 4.

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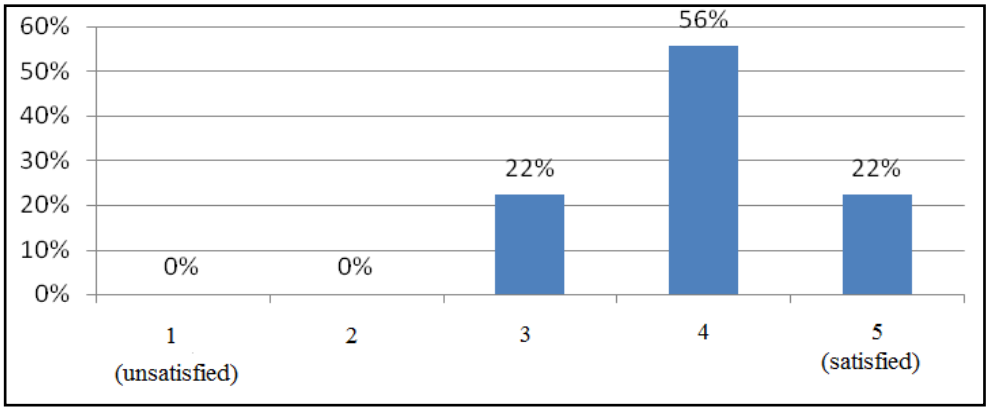

Graph 3.12: Question results "Are you satisfied with the e-learning courses?"

Source: Data analysis

For qualitative evaluation of the user experience while following e-learning courses, participants were able to choose more than one answer. The *Graph 3.13* shows the representation of each of the answers in percentages. It can be see that most of the respondents believe that e-learning courseshelp improving the work quality in general (72%), have sufficient information about a specific topic (56%) and are easy to understand (44%). A small number of respondents (6%) believe that the courses are not informative enough.

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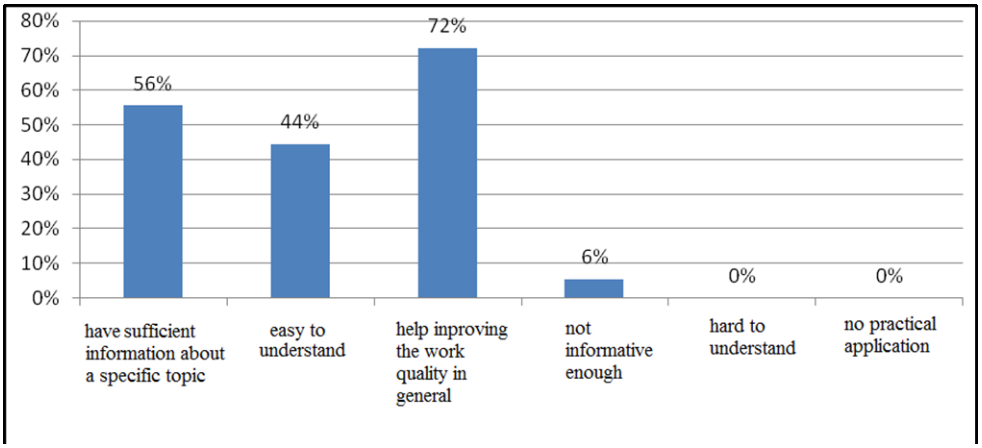

Graph 3.13: Question results "What is your opinion regarding the usefulness of the e-learning courses?"

Source: Data analysis

Asked whether e-learning courses have some advantages over the traditional way of training and gaining knowledge, the respondents stated that e-learning eases the following of the course, allows self-organization and time management and reduces the costs of the following of the course in general (**Graph 3.15**).

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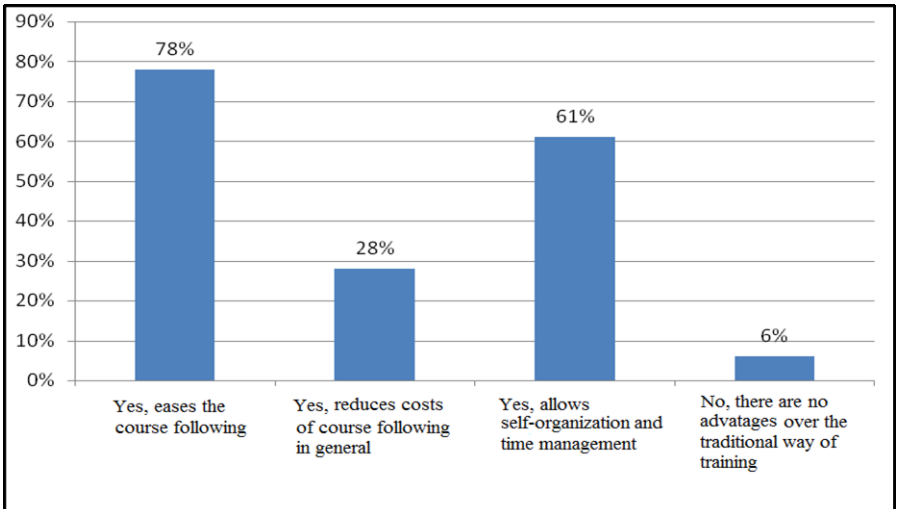

Graph 3.15: Question results "Do e-learning courses offer advantages over the traditional way of learning?"

Source: Data analysis

Most of the respondents (72%) who have followed a course online prefer e-learning over the traditional way of training and would welcome the opportunity of increasing the number of courses related to their line of work.

At the end, all of the respondents were asked whether they have followed a course or lecture online, apart from their work related field. 18% responded positively, where 60% of them said that they liked the overall experience and would follow such a course again, while 40% believe that traditional way of learning is more effective.

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Conclusion

According to the detailed analysis of the available data, a conclusion can be made that there is a positive attitude towards e-learning in general, but its active usage and integration into the educational system is on a low level. Many of the benefits offered by e-learning are partially used in the educational institutions and companies. That is why a joint effort should be made to improve its current usage. The reason for not utilizing the full potential of e-learning is not the lack of computer skills among the respondents, but the unawareness of existence of such a system on a global level and a weak IT structure. Unstable internet connection in primary and secondary schools is a common example of a bad IT structure.

The processed data shows that the respondents are familiar with e-learningin general, but that does not mean that they all have the opportunity to use it actively in professional and formal development. The majority of respondents haveonly had contact with e-learningon a professional level, while a very small percentage have actively followed a courses or lectures as part of informal and individual education and lifelong learning.

However, there is a huge potential regarding e-learning in Macedonia. That is seen in the fact that most of the respondents who have had contact with e-learning, either on professional or private level replied positively about this method of gaining and sharing knowledge. Most of the respondents who have followed an online course consider that e-learning is worth investing in. The institutions should not neglect this fact. They should give their best to respond to the growing demands of the educational community, make changes in the existing educational structure and increase the percentage of e-learning in all parts of the educational system.

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Introduction

In the last quarter of the twentieth century and in the early 21st century entrepreneurship becomes a model for the introduction of innovative thinking, reorganizing and innovating in a wide field of action for achieving goals such as social change and transformation (Steyaert and Katz, 2004, p. 182). This is much more than a simplified perspective on entrepreneurship as a driver of commercial activity and economic growth. Although the economic discourse is dominant in the research enterprise, as a phenomenon that determines the success of cities, regions and countries, entrepreneurship is a more complex phenomenon with its economic, social and cultural characteristics and as such requires a multidimensional approach and better understanding from different viewpoints.

Focusing on fast-growing companies or business billionaires, for example, as an exemplary entrepreneur we fail to consider the entrepreneurial process in the wider social context. When you take broader concept of research and observation, it can be recognized that a community may stimulate growth or create entrepreneurial ventures. Move away from the immediate perception of entrepreneurs as a special case - a special person with special competences or a specific situation in a given time and space, allows the study of entrepreneurship in everyday life - almost everywhere, at any time and on anyone.

In this article we analyze the extent and characteristics of the use of different paradigms and methodologies in the entrepreneurship research. We also present an example of the use of quantitative and qualitative methods in the case of entrepreneurial growth and give suggestions for an alternative approach to research in entrepreneurship by using qualitative methods.

1. Research Paradigms and Philosophical Assumptions

Strong methodological design of the scientific research could be created after defining research paradigm that is congruent with the researcher's beliefs about the

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nature of examined reality (Mills, Bonner and Francis, 2006, p. 26). According to Guba and Lincoln (1994, p. 107), paradigm is the dominant worldview or „basic belief system based on ontological, epistemological and methodological assumptions" of the research. Ontological assumption reflects the nature and the form of reality, and the researcher's perception of what is possible to be known. Epistemological assumption shows the nature of the relationship between the researcher and the research subject, and methodological assumption answers the question about the ways or methods which could be used to examine the reality that is possible to be known (Guba and Lincoln, 1994).

While there are many approaches in trying to classify different paradigmatic frameworks (Burrell and Morgan, 1979; Lincoln and Guba, 2000), more recent discourse in the field of philosophy of science defines four fundamental scientific worldviews: positivism, postpositivism, critical theory and constructivism (Guba and Lincoln, 1994; Lincoln and Guba, 2000; Mäkelä and Turcan, 2004; Ponterotto, 2005).

The primary goals of positivism and postpositivism are to predict and control the natural phenomena. Therefore, this paradigms are focused on verification (positivism) or falsification (postpositivism) a priori hypothesis that can be easily converted into precise quantitative models expressing causal relationships. In the ontological sense they are based on naive (positivism) or critical (postpositivism) realism and assume that researcher and research subjects are independent (Guba and Lincoln, 1994; Ponterotto, 2005). For many years positivism and postpositivism had been considered „the only correct views on science". However, justified criticism of the dominant paradigms resulted in suspicion towards quantification on which they are based and encouraged the scientific community to review the usefulness of qualitative data (Guba and Lincoln, 1994; Charmez, 2008). Therefore, over the past twenty years researchers have gradually been adopted and scientifically legitimized alternative research paradigms, including constructivism (Lincoln and Guba, 2000; Forson and Others, 2014).

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Constructivism's ontology is relativist. According to this paradigm, realities are apprehendable in the form of multiple, invisible, socially and experientially based mental constructions. These constructions are local and specific in the nature, and they are dependent on individuals or groups who create them (Guba and Lincoln, 1994, p.p. 110-111; Mäkelä and Turcan, 2004, p. 3). In other words, the world does not consist of only one objective reality, but of a series of individual, contextually defined realities (Mills, Bonner and Francis, 2006, p. 26). From this point of view the phenomenon should be examined in terms of meaning that is created through the interaction of the researcher and the research subject (literally) in the course of the investigation (Guba and Lincoln, 1994; Mäkelä and Turcan, 2004, p. 3; Henderson, 2009).

Epistemologically, constructivistic approach implies strong researcher's involvement in the research process. Researcher examines the phenomena in their natural environment and seeks to understand and interpret multiple and complex meanings (Gillani, 2014, p.p. 23-26). Therefore, he could not be an objective observer because he is integrative part of the research process (Mills, Bonner and Francis, 2006; Charmez, 2008). Correspondingly, constructivistic methodology is hermeneutical and dialectical and it is usually based on qualitative methodological approaches. Conventional hermeneutical techniques are used in exploring and interpreting the complex constructions, while dialectical interchange enables to compare and contrast them (Guba and Lincoln, 1994; Mäkelä and Turcan, 2004, p.p. 3-4; Henderson, 2009).

2. Entrepreneurship Paradigm and Research Methods

The question we ask ourselves as researchers is: is there a unique entrepreneurial paradigm and which are its characteristics. In the entrepreneurship research community there has long been debate about the content and direction of entrepreneurship as a scientific discipline. These are discussions that question the definitions, concepts and methodologies in entrepreneurship research and, in

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general, this questioning implies critical views of how entrepreneurship is defined and understood (Lindgren and Packendorff, 2009, p.p. 26-27).

As one of the younger paradigm, entrepreneurial paradigm uses methods and theories of other sciences: mathematics procures figures to measure variables as well as techniques of data analysis. Psychology explains the behavior of individuals, sociology interprets the relations between people, economics studies the allocation of resources necessary for entrepreneurial survival and growth. There is also a considerable danger to rely solely on mathematics as "the queen of science" as the only reliable "tool" for the purposes of measurement, analysis and theorizing (Bygrave, 1989, p. 9). Table 1 contains a comparison of history of the two paradigms: mathematical paradigm and entrpreneurship paradigm. Mathematics as a science dates from the time of ancient Greece (Schierscher, 2014). But mathematics is empirically developed and applied before that time in Egypt, Sumer and Babylon (Brückler, 2007). Unlike mathematics, entrepreneurship as a discipline is of recent date, and its theory is still emerging.

Table 1. History of paradigms

	MATHEMATICS	**ENTREPRENEURSHIP**
Origins	6th-5th century BC Tales, Pitagora	18th century AD Smith, Say
Modern	17th century Descartes	20th century Schumpeter
Empirical research	4000 years of application (started in ancient Egypt, Sumer, Babilon, countinuing up to nowadays)	50 years
Theory	2600 years	Still in emergance
Teaching	>2000 years	40 years

Source: Own elaboration.

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Aldrich and Baker (1997, p. 377) stated that within the entrepreneurship research field there are different paradigms, and the proposed three possible paradigms are: a unitary, normal science view, a multiple perspective view and a totally pragmatic view. The first of these paradigm assumes the accumulation of empirically tested hypotheses which are developed through incremental research design, quantitative data and statistical techniques. This paradigm assumes the existence of strong theory to help setting hypotheses that researchers will test. The outcome of this process will be the confirmation or refutation of the results of previous research. The result of applying this paradigm is the convergence of research methods. Completely different approach is the multiple perspective view because it makes possible to apply a variety of theories and methods in different research subfields. The pragmatic approach is focused on benefits of end users such as practitioners and policy makers.

McDonald and Others (2015) in a review of scientific articles published in the top five journals in the field of entrepreneurship find clear evidence of the dominance of positivism, but they also conclude that things are beginning to change in the last fifteen years. Qualitative methods become gradually accepted. Numerous researchers reported approval and satisfaction due to a shift towards more open access to entrepreneurship research in their articles (to name just a few of them: Bygrave, 1989; Davidsson and Wiklund, 2001; Gartner and Birley, 2002; Cope, 2005).

An example of reconciliation of different paradigms is Bourdieu's research framework that can encompass both qualitative and quantitative domain. Using this framework it is possible to simultaneously express both empirical and interpretativistic sensibility through mixed method approach. In this way the implementation of multilevel analysis is achieved in in the same research project to obtain more complex and more accurate representation of social phenomena (Bourdieu, 2011).

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As is shown by so many deductive models produced by economists, which are mere mathematical formalizations – and formularizations – of a commonsense insight, this break with ordinary practice is pehaps never so difficult as when what is to be questioned, such as the principles underlying economic practices, is inscribed in the most ordinary routines of everyday experience (Bourdieu, 2005, p.3).

Bourdieu, who also used quantitative methods in his research emphasizes the bad side of exclusivity and reliance on a single positivist paradigm.

3. Comparison Of Mathematical and Constructivistic Approach in the Case of Enterprise Growth Research

Growth itself is a complex phenomenon, and the nature of the growth process at the firm level shows heterogeneity. Even within the elite part of growing businesses (gazelles), only a small number of those become industry leaders like Microsoft, Google or Facebook.

Within mathematical approach to firm growth research there are two groups of models: stochastic and deterministic (**Table 2**). Stochastic models of firm growth are based on the law of proportional effect. The law in its original form simply states that the expected rate of firm growth in a given period is equal for all firms regardless of their size in the beginning of the period. The law was formulated by French scientist Robert Gibrat 1931. Gibrat's law is very popular among researchers, though it is usually focused on whether the law is proved or not rather than focused on the interpretation of the research. A number of theories that can be broadly classified into deterministic tradition suggests that post - entry performance does not occur accidentaly, but is the result of the specific characteristics of firms.

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Table 2. Empirical models of firm growth within mathematical paradigm

Deterministic models	Predicting growth from a regression relationship
Stohastic models	Analysis of variance – explaining variance in the "amount" of growth

Source: Own elaboration.

Davidson and Wiklund (2013, p.p. 4-5) present a critical review of previous studies on firm growth. Using the positivist paradigm, those studies are generally restricted to trying to explain the variance in the "amount" of growth. Another characteristic is that researchers treat growth as a unified, undifferentiated phenomenon despite the fact of using multiple indicators of growth in their research.

In our previous research (Vuković, Korent and Kedmenec, 2014) we deployed mathematical paradigm in investigating firm growth in the Croatian software industry. In order to examine the validity of Gibrat's law for the constant sample of all surviving companies in this line of business and the possible existence of convergence towards its affirmation over the years, we used the quantile regression method to evaluate Gibrat's growth model for each particular year and the that a company's growth is independent of its size. We concluded Gibrat's law in the case of Croatia's software industry matching previous findings that small companies in the service industries with small efficient scale tend to grow slower than small companies in the manufacturing industry. However, our conclusions were not strong enough to be of particular benefit for practitioners or policy makers. It seemed to be important to broaden this analysis by conducting a qualitative research about the needs and characteristics of different entrepreneurs, because of the existing heterogeneity in resources and strategies at the firm level. **Table 3** contains an overview of "tools" that we used in our two studies with different

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approaches (mathematical and constructivistic) and methodologies (quantitative and qualitative).

Table 3. Research „tools" in mathematical and constructivistic approach to entpreneurial growth

"Tools"	**MATHEMATICAL APPROACH**	**CONSTRUCTIVISTIC APPROACH**
Variables	Precise definitions: age, size: number of employees, annual revenue, assets	Fuzzy definitions: practice, strategy, legitimacy social capital, cultural capital, simbolic capital
Instruments	Accuracy: econometrics	Dubious accuracy: interviews
Population	Distinct: firms as statistical units in official national statistics	Indinstinct: entrepreneurs, owners, founders
Sampling	Random	Theoretical
Language/rhetorics	Formal, impersonal	Informal, personalised

Source: Own elaboration.

Our current research is directed at understanding entrepreneurial phenomena from the perspective of social constructivism. Entrepreneurship research based on social constructivism does not favour functionalistically slanted searches for causality, precise definitions, and statistically constructed generalizations (Pittaway, 2000). As alternative to mathematical approach, the social construction approach explains reality as a social construct, a creation of people (Smith and Anderson, 2007). This implies that the "true" is result of social negotiation. Ontological position (perception of reality) determines entrepreneurial growth practice through intersubjective interpretation and is constructed through social interaction of people (Lindgren and Packendorff, 2009). Although recognized as the essential elements

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of entrepreneurial behaviour, most of the currently relevant entrepreneurial research phenomena (such as internationalization, innovativeness, and firm growth) are extremely complex and so far insufficiently studied (Šmaguc and Vuković, 2016). We examine how the field, habitus and capital of entrepreneurs affect the growth and survival of firms in the software industry and what growth practices are used by firms in the industry concerned.

Epistemologically, social structures are not based on facts but on values (Lincoln and Guba, 1985) . Broad framework of "sociology of knowledge" explains that knowledge is developing, transmitting and maintaining in social situations (Berger and Luckmann, 1967). Epistemological position (view on knowledge) is determined by the knowledge on entrepreneurship field represented in the narratives, discourses, and textual data. In our study we use grounded theory (Glaser and Strauss, 2012; Strauss and Corbin, 2015) which is the most common among qualitative research methods in the field of entrepreneurship. After interviewing the entrepreneurs, the most important part of the work relates to text analysis. In a research based on the grounded theory, data analysis requires the application of coding techniques: open coding, axial coding and selective coding. The aim is sharpening of theoretical concepts and refinement of the theory of entrepreneurial growth through the creation of a typology of entrepreneurs in the software industry. This is achieved by constantly comparing the data and constructs so that the accumulated evidence from different sources converge to simple, well-defined constructs.

Conclusion and Recommendations

Discussions about scientific paradigm are present in all the social sciences, including the field of entrepreneurship. Although the discussions sometimes becomes almost heated debate, there is always effort to avoid a one-sided approach and exclusivity of one paradigm. Due to differences in scientific approach to research areas and the specifics of the research problem, a reasonable approach emphasizes the need for their complementary application. Quantitative approach to

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research of firm growth aims to answer the questions who, what, how, when and why. The answers to these questions should serve the prediction of firm growth. In the qualitative approach the goal is to answer the question how to enable us to understand entrepreneurial process and relations within entrepreneurship field.

We recommend the use of an alternative approach to research in the scientific field of entrepreneurship by using qualitative methods to achieve better understanding of the economic, social and cultural phenomenon of entrepreneurship. However, we would like to mention that the research approach is determined not only by the nature of the research question but also by habitus of researcher. The desirable characteristics of researcher, especially in the research that applies the grounded theory are the following: the ability of returning a step back due to a critical analysis of the situation, the ability to identify the tendency towards bias, the ability to abstract thinking, flexibility and openness to useful criticism, sensitivity to the words and actions of the respondents, a sense of immersion and commitment to the work process.

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Introduction

Car manufacturers, called Original Equipment Manufacturers (OEMs), have production plants in several countries. Many suppliers of these OEMs have their facilities in the same places or near them. Therefore, there are many groups of multinational enterprises. Due to Germany is an important producer of vehicles, which for instance manufactured 5 to 6 million units per year between 2005 and 2014 (OICA, 2015), there are many suppliers with headquarters in Germany. Some of them have evolved into groups of multinational enterprises.

Since the lead author has developed the procedure presented in this paper in one of these multinational suppliers based in Germany, it will be taken the laws and regulations of the Federal Republic of Germany as reference in addition to the international laws and regulations of the Organization for Economic Co-operation and Development (OECD) and those of the European Union (EU). If these multinational companies are associated enterprises, the laws and regulations on transfer prices are applicable.

According to the Foreign Tax Act (AStG, 2008, article 1), an associated enterprise is one that: (i) has a direct or indirect participation (essential participation) in a taxpayer amounting at least to a fourth part of it, or (ii) has a stake in the other company's profit generation or vice versa.
Transfer prices are part of the sales of associated enterprises in each country and therefore have an impact on their bottom line according to the Profit and Loss Plan (P&L) and, consequently, on tax payables. EU member states have been working for years on the harmonization of transfer prices (BMF, 1999, p.1341). This is due, on one hand, to the fact that some EU member states do not consistently apply the OECD Guidelines (OECD, 1995) and, on the other, to the differences in documentation requirements between the countries (European Commission, 2005, p.7).

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The relevant laws and regulations (OECD, 2010) recognise different methods to apply transfer prices. Among the documents used by OEMs and their suppliers there is a cost breakdown, which complies with the requirements of the German Ministry of Finance (BMF, 2005, chapter 3.3.2, p.14). Different OEMs give it different names, such as cost breakdown (CBD) in the Volkswagen Group and price breakdown (PBD) in Mercedes-Benz. In this paper we will use CBD for all these breakdowns.

In order to avoid these international problems the EU asked the OECD to draw up a regulation (OECD/G20, 2015). This regulation is intended to avoid an erosion of the taxable base and the shifting of profits to other jurisdictions.

Based on the automotive industry and the above-mentioned CBD, this research aims to develop a procedure to apportion surcharges and profits among associated enterprises that is as compliant as possible with the laws and regulations on transfer prices. It intends to make an appropriate distribution in light of the functions performed taking into account assets used and risks assumed. The proposed procedure aims at achieving a calculation of transfer prices that results in a situation as close as possible to reality, that is, to what the market is willing to pay for each operation, based on the CBD. The purpose is not only to comply with the laws and regulations in this regard, but also to be able to analyze the results of each production plant.

1. Background

The literature has discussed the possibilities for companies to reduce their taxes using transfer prices. In this regard, Hiemann (2012) proposes three alternatives to minimise tax payables where the solution focuses on complying with the arm's length principle. Huh (2013) optimises tax payables according to the method chosen after comparing the cost-plus method with the resale price method. More

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recently, Gao (2015) develop a model to reduce companies' taxes by using transfer prices, concluding that division managers must adjust transfer prices according to the taxes to be paid in the countries where they buy and sell.

The basic document defining the transfer pricing policy for a whole group at the international level is called "master file" (OECD, 2013, p.8; GAufzV, 2007, article 4), and can be found in the EU Transfer Pricing Documentation – EUTPD (European Commission, 2005, chapter 1.6, 1.7, 4). To implement it, a "country file", or country-specific documentation, is to be drawn up for each country (OECD, 2013, p.9) according to the spirit of the master file and the specificities mentioned above. The purpose of the calculation of transfer prices must be the contribution of appropriate taxes in light of the functions performed taking into account assets used and risks assumed. This statement can be found in the definitions of different transfer pricing methods such as the resale price method, the cost-plus method or the profit split method (OECD, 2010, pp.59-105).

The OECD and EU criteria set forth in the documents mentioned above make it clear that each group of companies must follow the method it chose in its "master file". The company's failure to implement it may lead to such system being rejected by the public administrations of the different countries according to BMF (2005). This may have significant financial impacts due to sanctioning procedures and subsequent retroactive payment of taxes including interests.

The research objectives in the studies mentioned above primarily focus on a profit-sharing scheme design (Gao, 2015). However, the German Ministry of Finance does not accept profit split methods to assess transfer prices (Kaminski, 2001). Bearing in mind that in the chosen automotive industry several important companies, both OEMs and suppliers, have their headquarters and/or delegations in Germany, these methods are to be excluded. Besides, the global profit split method is also excluded, as it is not accepted by the OECD for not complying with the arm's length principle (OECD, 2001).

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Lakhal (2006) proposes an operational profit sharing model for network-manufacturing companies focusing on a mathematical model that simulates the cooperation of different companies not belonging to the same group, such as joint ventures. This model contemplates the cost of materials within the profit split. According to this author, it is a model that helps companies seeking an advance pricing arrangement (APA). It is based on the official procedure of asking binding questions to the tax administrations of the countries involved in a transaction that requires transfer prices (OECD, 1999).

The approach adopted in this paper, consisting in splitting charges and profits in an appropriate manner in light of the functions performed taking into account the assets used and the risks assumed by each member of the group of associated enterprises is, to our knowledge, a novel proposal.

2. Methodological Framework to Calculate Transfer Prices

The laws and regulations analysed do not provide an explicit description of how to apply transfer pricing (TP) to automotive industry suppliers. The explanations refer to all industries in general. The automotive industry suppliers' sector has special circumstances (Sturgeon, 2009). In the case of our research this means that we must adapt the transfer pricing procedure to the special CBD circumstances.
The diagram described by Martini (Martini, 2005) reflects the order of preference of transfer pricing methods according to the OECD. However, this author does not contemplate the hypothetical arm's length principle procedures, that our research considers (**Figure 1**).

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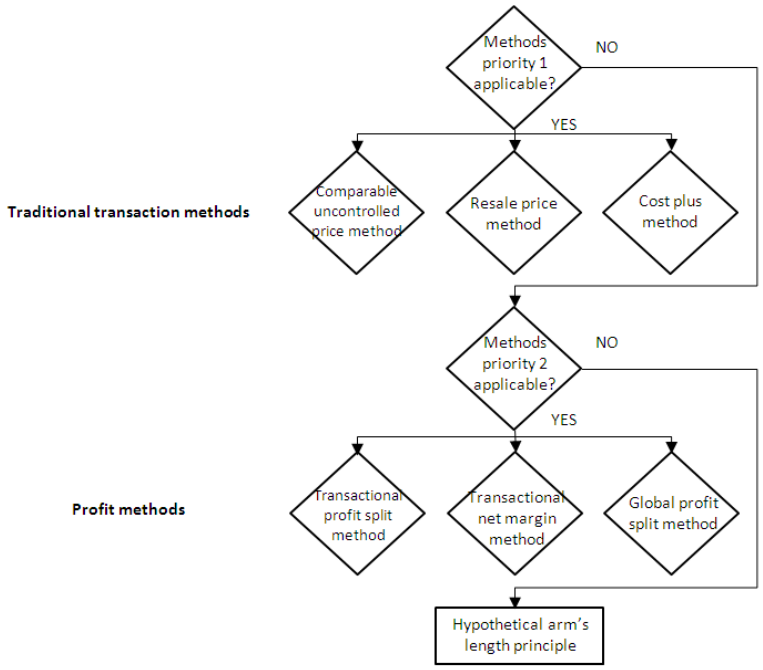

Figure 1 Order of preference of transfer pricing methods (adapted from Martini (2005)

Source: Martini, 2005.

Figure 1 shows an order of preference for methods from top to bottom and from left to right (AStG, 2008, article 1), (BMF, 2005, chapter 3.4.10.3, p. 28-31). The OECD directives express a preference for traditional methods over methods based on determining the profit of the transaction (Sansing, 2014), having adopted the arm's length principle to assess international transfer prices (Pendse, 2012). The

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descriptions of these methods are based on the OECD definitions (OECD, 1995, chapter 3.4.10.2, 1.20-1.27). The purpose is to find the most appropriate method (OECD, 2010, chapter II). The main requirement is to comply with the arm's length principle.

This research is applied to the automotive industry, where suppliers belonging to a group of companies provide products to each other. Given that such sales are not made to third parties, the comparable uncontrolled method is not applicable (Huh, 2013). The method proposed in this paper is based on the Comparable uncontrolled price method (CUP) complying the arm's length principle.

3. Current Situation and Proposed Approach

The main requirement to be met for the apportionment of surcharges and profits among associated enterprises is the arm's length principal, being the comparable uncontrolled price method the preferred method. From these guidelines arises the following question: How can this method be applied to the automotive industry suppliers sector? In order to properly implement this method, it has to be demonstrated that a third party would accept the same conditions/ price for the work that a company of the group is doing for another company of the same group. Within the tender procedure for the supply organised by the OEM, the OEM usually requests quotations for the specified supply from companies around the world and evaluates the different operations to be carried out, thus obtaining a price which takes into account market prices at the world level.

At the final stage of the project, before the award of the contract, the OEM usually identifies several possible suppliers. In order to be awarded the contract, each of these suppliers accepts the CBD. This means that the terms and conditions applicable between the OEM and the awardee are the same that would have been accepted by the rest of suppliers that were at the final stage of the negotiation (otherwise, they would have been discarded during the tender procedure).

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Thus the OEM usually applies the comparable uncontrolled price method at the international level for its projects. Each certified company has its work procedures documented. The tax administration in each relevant country may require the OEM to provide such documentation even by specific projects and verify the procedure. Considering that the certificates are regularly renewed (for instance, once a year), the work procedures should be highly up-to-date.

The procedure shows the OEM's negotiating power, which is important to take into account when analysing market and competition conditions (BMF, 2005, chapter 3.4.10.3, p.28-31). The following explains the proposed method to apportion surcharges and profits in an appropriate manner in light of the functions performed taking into account assets used and risks assumed by each member of the group of associated enterprises. This procedure ensures that each group member's participation in the profits is appropriate according to the above (BMF, 2005, chapter 3.4.12.6, p.46).

Starting from a situation where two associated enterprises carry out two operations (o) in two Production Stages (s): (i) s1, carried out by the company ONE, o1 (Stamping), in a Country A; and (ii) s2, carried out by the company TWO, o2 (Assembly Welding), in a Country B. At Production Stage 1, parts are manufactured which are later assembled at Production Stage 2 to obtain an Assembly. Thus, Table 1 gathers a description of the problem in Production Stage 1 (s1). The values shown in the table, according to the client's CBD, come from the experience of the authors in the automotive industry. The OEM´s includes surcharge for Material Overhead (MOH) and surcharge for Sales and Administrative Overhead (SAOH).

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Table 1 Problem approach in s1

s1: o1 (Stamping), Company ONE of Country A	
External materials consumption	100.00 €
Payments for scrap metal [(a)]	*-10.00 €*
MOH 5 % (on materials consumption without payments for scrap metal)	5.00 €
Manufacture (carrying out "Stamping" process)	20.00 €
SOAH 10 % (on Total 1) [(b)]	11.50 €
Profit 5 % (on Total 2) [(c)]	6.33 €
Sum of Income: Total 2 + Profit	*132.83 €*

[(a)] During the "Stamping" operation, material is transformed (before processing) into stamped material (after processing), producing excess material, which is withdrawn. This withdrawn material is not generally useful to produce. It is collected and sold to scrap metal merchants. Income from this scrap metal is indicated under "Payments for scrap metal".

[(b)] Total 1= Materials consumption + Payments for scrap metal + MOH+ Manufacture

[(c)] Total 2= Total 1+ SAOH

The company that carries out the operation in question is remunerated by the OEM according to the CBD with the sum of income. Considering the above we notice that the value which the supplier can directly influence is manufacture.

On the other hand, at production stage 2 two items are identified: (i) *External*: expenditure in purchases of materials to third parties unrelated to the group of enterprises and their respective surcharges and profit, and (ii) *Internal*: expenditure

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in purchases of materials to group members and their respective surcharges and profit. **Table 2** gathers a description of the problem in Production Stage 2 (s2).

Table 2. Problem approach in s2

S2: o2 (Assembly Welding), Company TWO of Country B		
	External	**Internal**
Materials consumption "s1"	--	132.83 €
Materials consumption "s2"	2.00 €	--
Payments for scrap metal	-0.00 €	--
MOH 5 % (on materials consumption without payments for scrap metal)	0.10 €	--
Manufacture (carrying out "Assembly Welding" process)	--	15.00 €
SOAH 10 % (on Total 1 without internally purchased parts) [(d)]	0.21 €	1.50 €
Profit 5 % (on Total 2 without internally purchased parts)	0.12 €	0.83 €
Sum of Income:	*2.43 €*	*150.16 €*

[(d)] "Internally purchased parts": some operations require parts produced by previous operations, carried out by any member of the group of associated enterprises. These parts are called "internally purchased parts" because they are not bought to a third party but to a member of the group. The SAOH surcharge is not applied to the value of these "internally purchased parts" because it has already been charged in the previous operation. This procedure is also valid for parts from previous operations produced within the same company or production plant.

Company TWO must pay a higher amount (132.83 €) to purchase the material than company ONE (100.00 €) because it already includes the added value of having carried out operation 1 "Stamping". If operation 2 handles a more expensive material than that of operation 1, it means that the remuneration for handling the material must be higher in operation 2 than in operation 1.

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The procedure proposed in this paper tries to solve the problem of inadequate cost sharing within manufacturing processes between associated enterprises through the apportionment of cost between the operations.

4. Model Formulation

This section presents the formulas and nomenclatures used in the proposed model.

4.1. Starting Situation: OEM's CBD

Table 3 presents the nomenclature used for the calculation of the model initial stage, which starts with the CBD.

Table 3 Nomenclature used in the initial stage: CBD

s	Production stage	o	Operation
CM	Cost of materials (value according to CBD)	SM	Payments for scrap metal (value according to CBD)
α	Surcharge factor for MOH	β	Surcharge factor for SAOH
γ	Surcharge factor for Profit	MAN	Manufacturing cost (value according to CBD)

In this initial stage it is necessary to calculate the following parameters:

- Material Overhead, *MOH*, by using the following expression:
$$MOH = CM * \alpha \quad (1)$$
- Sales and Administrative Overhead, *SAOH*, which is calculated as follows:
$$SAOH = (CM + SM + MOH + MAN) * \beta \quad (2)$$

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- Profit, *PR*, calculated as the following expression:
$$PR = (CM + SM + MOH + MAN + SAOH) * \gamma \quad (3)$$
- Sum of Income, *SI*, which follows the equation expressed as:
$$SI = CM + SM + MOH + MAN + SAOH + PR \quad (4)$$

4.2. Apportionment of MOH According to OEM (Before Apportionment) to Obtain New MOH (Internal, after Apportionment)

The next stage consists of the calculation of the following indicators:

- Sum of Basic Value of Materials, *ΣBVMo*, which is the sum of all the basic values of the operations that manipulate materials, expressed as:
$$\Sigma BVM_o = CM_1 + \sum_{i=2}^{n} CM_{i-1} SM_{i-1} + MAN_{i-1} \quad (5)$$
where *n* is the amount of operations that manipulate materials, and *i* is a counter of the number of operations that manipulate materials from 1 to n.
- New MOH (after apportionment), *New MOH$_i$so*, which varies according to the following conditions (in function of *i*):
$$If\ i = 1 \rightarrow New\ MOH_1 = \frac{CM_1}{\sum BVM_o} * MOH_{so} \quad (6)$$
$$If\ i > 1 \rightarrow New\ MOH_i = \frac{CM_{i-1} + SM_{i-1} + MAN_{i-1}}{\sum BVM_o} * MOH_{so} \quad (7)$$

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4.3. Apportionment of the SAOH According to OEM (Before Apportionment) to Obtain New SAOH (Internal, after Apportionment)

In this stage, it is calculated the following indicator:

- New SAOH (after apportionment), *New SAOHso*, expressed as:

$$New\ SAOH_{so} = \frac{SAOH_{so}}{n} \tag{8}$$

4.4. Apportionment of Profit According to OEM (before Apportionment) to Obtain the New Profit (Internal, after Apportionment)

This stage consists of the calculation of the following indicators:

- Total Profit, *ΣPR*, which is the sum of all profit for all operations at all production stages. It is expressed in (9).

$$\Sigma PR = \sum_{i=1}^{n} PR_{so} \tag{9}$$

- Sum of the Basic Values of Profit, *ΣBVPR*, which is the sum of all the basic values of the operations that manipulate materials, expressed as:

$$\Sigma BVPR = \sum_{i=1}^{n} (MOH_{so} + MAN_{so} + SAOH_{so}) \tag{10}$$

- New Profit (after apportionment), $New\ PR_{so}$, which is calculated as follows:

$$New\ PR_{so} = \frac{(MOH_{so} + MAN_{so} + SAOH_{so}}{\sum BVPR} * \sum PR \tag{11}$$

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Conclusions

This paper shows a procedure oriented towards compliance with the relevant laws and regulations using transfer prices to provide each member of a group of companies an appropriate participation in costs and profits. The calculation system proposed facilitates the creation of an analysis tool allowing automotive industry suppliers to apply this procedure to their product range. Practice shows a large amount of products (single parts, assemblies and subassemblies) that must be documented.

By taking advantage of transfer prices as a solution to internal problems or discussions and identifying the processes to be improved, given the use of the same data that were processed to comply with administrative requirements for purposes of internal performance analysis, transfer prices now show they also provide internal added value. The company improves its competitiveness as it reduces its manufacturing costs by improving the said processes and in turn minimises the risk of possible sanctions for failing to comply with the laws and regulations, with all their consequences.

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