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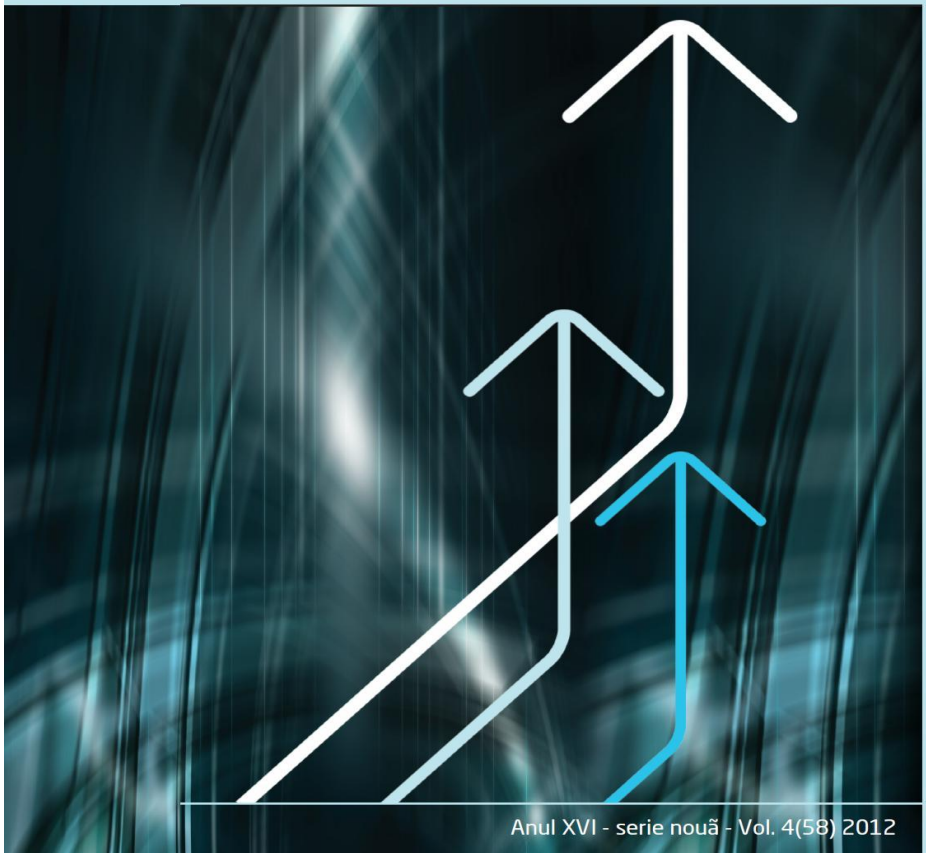

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FINANCIAL STUDIES

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CONTENTS

ABOUT THE FUTURE OF THE INSTITUTION OF THE CENTRAL BANK

PhD Napoleon POP*

Rezumat

Evoluția crizei financiare afectează din ce în ce mai mult viitorul băncilor centrale prin faptul că le forțează, în numele găsirii unor soluții la problema datoriilor suverane, să facă ceva ce până acum părea aproape imposibil. Putem presupune un astfel de viitor, dar pentru moment trebuie să observăm că băncile centrale, mai ales cele care emit monedă folosită ca valută pentru rezerve – de exemplu FED sau BCE – se confruntă cu scăderea puternică a instrumentelor lor financiare (dobânda lor de politică monetară se apropie de zero) şi cu o mărire puternică a balanței lor ca scuză pentru că sunt creditori de ultimă instanță.

În momentul de față, trebuie să discutăm despre efectele negative ale scăderii la minim a eficacității instrumentelor folosite de băncile centrale privite ca instituție şi nu numai ca factor de decizie politică cu o istorie destul de lungă de construire a credibilității şi independenței lor. Ultimul context al măririi balanței lor furnizează argumente puternice despre implicarea lor în politica fiscală, ceea ce le poate afecta credibilitatea într-un moment în care putem spune că problema fundamentală a economiei globale este lipsa de încredere a investitorilor. Acelaşi lucru este valabil şi pentru independența lor, ambele aspecte contribuind la problematizarea viitorului instituției băncii centrale.

Actualele realități, care acoperă deja peste cinci ani de căutări de soluții la criza care încă se manifestă, ne provoacă la a aborda

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problema viitorului băncilor centrale, având în vedere faptul că instituțiile care devin ceea ce noi simțim astăzi ca fiind băncile centrale se găsesc sub o anumită presiune care afectează exact trăsăturilor lor fundamentale care le dau măreția de care suntem mândri.

Abstract

The evolution of the financial crisis is touching more and more the future of the central banks by forcing them, for the sake of solutions to the sovereign debts, to do what in so far appeared almost impossible. We can presume such a future, but for the moment we have to observe that central banks, mainly those emitting money used as reserve currencies – for example FED or ECB – are confronted with a strong depletion of their monetary instruments (their monetary policy interest rates are around zero) and a great expansion of their balance sheet as an excuse for being the lenders of last resort.

At this point, we have to discuss the perverse effect of reaching the minimum efficacy of the instruments used by the central banks regarded as institution and not only as policy makers enjoying a quite long historical building of their credibility and independence. The latest context of the expansion of their balance sheet is giving strong arguments of their implication in fiscal policy, which might ruin their credibility at a time when we say that the core problem of the global economy is the lack of trust of the investors. The same thing is true with their independence, both issues being conducive to the challenge to the future role of the institution of the central bank.

The present realities, encompassing already more than five years of seeking solutions to the crisis still in evolution, incite us to tackle with the outcome for the central banks having in mind that the institutions becoming what we feel today as being central banks are under a certain pressure which is affecting exactly their core features giving to them the greatness we were proud of.

Keywords: central bank, crisis, monetary instruments, credibility, independence

JEL Classification: E52, E58

From the monetary perspective, the global financial crisis determined the reduction of the nominal short-term interest rates in

the developed countries. The monetary policy measures aiming to correct the imbalances of the financial market and to stimulate the economies determined a spectacular increase of the central banks' balance sheets due to the higher issues of reserves by expanding the refinancing operations for the credit institutions. In some Euro Area countries, the fast increase of the public debt increased the interest rate differentials, and this triggered a spiral of adverse effects and expectations, increasing the amounts to be paid, thereby it amplified the increase of debts, and so on.

The financial crisis, by its effects and by the inefficiency of the taken measures, forced us to think about the necessity of ”breakthroughs” from the traditional policies which the period of the “Great Moderations” taught us. Moreover, it seems that everything should be rethought systemically, context in which experts and analysts advance changes of paradigm and a new international order. In this change required by a future less exposed to risks we are still speaking of divergences between the national priorities and a jointly assumed agenda which imposes globalization, we are speaking of the need for a leadership so that, at least within the G-20, the common objectives may be accomplished.

Since a new international order cannot elude changes in the international financial system, which also presumes a monetary system, the question as to how much are the central banks sheltered from these challenges is more than natural. But, since the core subject of this article refers to the central banks, we need to notice that in their obstinacy to fight the suite of crises currently confronting the national states, their mandate is somehow distorted by the conduct of the monetary policy, by the appeal to the so-called non-standard measures, which actually are non-orthodox.

If these measures are preoccupying us nowadays – we may enumerate here the decrease in collateral quality for the liquidity injections, the direct acquisition of state bonds, long-term access of the commercial banks to liquidity through monetary market operations (case of ECB), pre-commitment in setting a level of the monetary policy interest rate (case of FED), pre-commitment in setting a FX market intervention at a specific exchange rate (Swiss Bank) or the quantitative easing (QE) – they cannot be treated outside long-term trends, particularly when we are speaking of the central banks which issue national currencies used as international reserve.

We remind, for the necessity of understanding our demonstration, that there are five conditions for a currency to become acknowledged internationally and thus used by other states too as reserve assets: it must be the product and the symbol of strong economies with an expanded network of externalities and with low financial transaction costs; it must be the exponent of a deep, open and efficient national financial market; it must presume a good quality of the political and macroeconomic governance; it must represent the currency of a state of law in the true meaning of the word, which means the unconditional protection of the private property rights of an investor; it must benefit of the geopolitical influence of a politically-stable issuing state.

Let us retain, for the time being, out of the five conditions mentioned, those which refer to the **state of law** and to **guaranteeing the private property**, because historically, the credibility of any central bank issuing fiduciary currency derives from them. Without credibility we cannot speak of the efficiency of the instruments which a central bank uses and of the expected impact of a particular conduct of the monetary policy.

We are currently confronted with the fact that the central banks whose currencies are international reserve assets reached the **minimal level of efficiency of the instruments** they may use. These central banks used at maximum both the **nominally positive interest rate** (by successive reductions), and the **balance sheet expansion** (by buying bonds issued either by the public or by the private sector) so that they can play the **role of last resort lender up to the limit of credibility.**

Nevertheless, the results of the central banks actions expected by the public opinion, yet during the crisis which still is in progress, are different of their meaning. However, contrary to the most spread perception, it is not the efficiency of the instrument used by the central banks that is questioned, but its more profound causality, the manifestation of an **internal contradiction** more imbedded in the central banks looked upon as institutions. They are evolving slowly for a long time and now are becoming much more visible. We are actually witnessing the unveiling of the **contradiction within the very nature of the institution called a central bank**, the contradiction between **its role** and **its action**. This contradiction, as we will see, is related particularly to the **time horizon** on which the two aspects are defined.

The opposition between the historical core purpose of the central banks and their mandatory monetary policy (e.g. price stability) is more important, because the evolution of the central banks in general, and particularly after World War Two, showed that the inefficiency of the monetary policy instruments can be overcome by a proper and in time reformulation of the economic policies mix in relation with the monetary policy and the definition of new instruments for the implementation of the monetary policy.

Thus, the future of the central banks, as institutions, seems to be less affected by the efficiency of their instruments, but certainly more by the lack of correlation between their **role** of **depositor of the long term growth reserves of an economy** and the necessity of a **conduit** of their policy **encouraging indirectly the sustainable development** by maintaining price stability. We think that the erosion of the central bank credibility about its historic role for the **future development of an economy** (national, or regional, such as the Euro zone) is the major danger for their institutional existence, at least as it is define presently. They may eventually disappear, while other people speak about of their further utility (among whom we cite Mises, De Soto, Cerna).

Institutionalism and the stat of law

The central banks have a history of their institutionalization: they were bestowed a role in the social life, in the broadest meaning. There is a list of thinkers, starting maybe with the British humanist Richard Taverner[1], who argued convincingly that the **history of the institutions determines the modern results of a nation**. On this thing, at least the people working in the central banks, have no doubt, considering that at present central banks function are complying with

[1] *Richard Taverner (1505 – 1575) supporter of the religious reform in the United Kingdom, translated the Bible in English and also wrote the famous book „The Garden of Wisdom". This book is a collection of facts, events and historic jokes which emphasize the wisdom and humanism of the monarchs, philosophers and leaders from antiquity to the contemporary period. The source of these facts and events is Erasmus, the famous teacher and tutor of the future king Henry the VIII. (Source: DeWitt Talmage Starnes „Richard Taverner's "The Garden of Wisdom", Carion's "Chronicles", and the Cambyses Legend", University of Texas Studies in English, Vol. 35/1956, pp. 22-31).*

the **pattern passed in 1844 in the United Kingdom, by Peel' Law**. This is the law which sets the bases for the system of monetary emission from the perspective of a central bank contribution to the long-term development of a nation.

This pattern is properly described in the book coordinated by Angela Boariu – *Functions and role of the central banks*[2] – from which we cite: "The appearance of the central banks in the 17th -18th centuries relied on the existing commercial banks which were entrusted by the governments of the particular states with the role of "banker" of the state (...). In other countries, the central banks were established in order to issue the currency needed to finance wars or in order to increase the monetary stability after the expenditure generated by wars, by issuing governmental bonds. The chronological analysis of the central banks shows that they were established by converting some commercial banks, by the gradual entrusting them with monopoly rights on the emission of currency and by accepting the responsibility of lender of last resort", aspect to which we will revert.

Maybe the most important event of the world economic history – beside the industrial revolution - took also place in the United Kingdom. However, this was the result of another revolution – the *Glorious Revolution* – which shattered and resettled the British institutions in 1688, after James the Second of England was overthrown. This change in the British society brought along a novelty which gave England the opportunity to become world power – **the state of law**, by the introduction of the British Parliamentary democracy, in opposition with the monarchical voluntarism. The state of law ensured that all the subsequent institutionalizations, which presumed the separation of state administration from the will of the monarch, became credible by predictability of the law enforcement.

The state of law allowed England to become the **first sovereign state** which could borrow no matter how much, even when the level of the public debt reached 260% of the GDP, as it was the case immediately after 1815. The reason resides in the fact that the **promise that the British state will pay its debt was credible because the very British state was built on the principle of**

[2] *Source: http://www.scribd.com/doc/48182080/Functiile-si-Rolul-Bancilor-Centrale. Document retrieved on 15 September 2012.*

protecting the private property rights. De facto, this means that it was forbidden not to pay the debts, and the **institutional guarantor** of this promise – I owe you – was the Bank of England, established in 1694, not too late after the moment of the Glorious Revolution. This is the major significance of the long-term institutional credibility of a central bank, beyond the reputation of the day to day actions, **the Bank of England being built on the principle of the state of law**.

Central bank independency

Anyone who wishes to understand the way in which the banking system works should read "Lombard Street" by Walter Bagehot (1826 – 1877), editor of "The Economist". The criticism which Bagehot made to the activity of the Bank of England was rather aggressive, but the repeated crises of liquidity after 1846 were motivating his opinions. The convincing analysis built up by Bagehot brought at least **two new notions** which entered in the technical vocabulary and started to feature the current activity of the central banks: lender of last resort and central bank independence.

Peel's Law from 1844 had forced the **central bank to make a clear division between the resources and activities of the departments** in charge with the emission (including the administration of bank's gold reserves) and **the pure commercial activity of the bank** (discounting). This division of responsibilities was intended to allow the efficient intervention of the bank in moments of *solvency crisis* or of *economic difficulty* (offer shocks, as they are called today).

However, this specialisation of the various departments from the Bank of England was not enough to help it during the *liquidity crises,* as a different situation to solvency crisis. At that time, it was not the bankruptcy of trading companies or of local banks seen as the failure of an economy and/or of the policy lead by the Bank of England. It was rather the **decrease of the gold reserves of the Bank of England**. The volume of the gold reserves was essential because they counted as the basis for crediting and they allowed the **long-term development**.

Thinking of the numerous liquidity crises which affected the City after the 1844 implementation of the Bank of England Law, **Bagehot proposed that the Bank of England to be turned into a last resort lender,** relying on its gold reserves. Bagehot's words ***„lend freely at***

***high rates"*, remained famous, but these loans required **good quality collateral**. The interest rates had to be so high, that they would deter the debtors which didn't really needed liquidity. Until today, the central banks are last resort lenders, as Bagehot proposed.

This measure would have been superfluous, however, if the Bank of England has not had the real power to impose the interest rate without any influence from outside the institution. In other words, Bagehot also set the **principle of the central bank's independency**, which is so important today for the conducting and the stance of the monetary policy.

Individual prudency

Prudence in the action of a central bank can be overlooked in maintaining its credibility in its institutional role towards the nation and the reputation of accomplishing this role. The establishment of any individual bank, of the National Bank of Romania (BNR) included, **viewed the future of the nation**, as it had happened with the Bank of England, almost two centuries before. The most important name in BNR history is probably that of Eugeniu Carada, because his name is strongly linked at least with **two important activities** of our central bank: the **credit development in national currency** as a necessity for the progress of the nation and the simple and clear **regulation**.

Consequently, Eugeniu Carada, as most of the people who contributed with their political support for the establishment of BNR, saw in this institution an **instrument to develop the nation** (it is not an accident that the name of the institution is the National Bank of Romania, not just the Bank of Romania). One of the methods used for the long-term development of the country, as properly emphasized by the Parliament speech of Brătianu, was the introduction and stimulation of the credit in the national currency.

Could this be done anyhow, without the qualified oversight of the debtors, as we call it today? Carada, who dedicated his life to this institution after its establishment, did an extraordinary thing for that time: he was visiting at least once a month the top four branches of BNR (Iaşi, Brăila, Galați, Craiova). The purpose of those frequent visits was to check personally, once more, as well as BNR headquarters in Bucharest, the **quality of the companies involved in the discounting operations of BNR**.

Carada was doing a thing which the commercial bankers of our days completely forgot, with serious consequences for all of us. The regulations existed at that time too, but they had the advantage of being simpler and clearer. However, Carada knew that regulation by itself (or over-regulation, bad regulation or the populism) was not enough for the **individual prudency**: the banker had the responsibility to know closely his debtors.

The exemplification of the attention paid to prudence aspects by BNR history reveals the present day mystification of the power of the banking regulation extended to the entire international financial system, in which a written text, irrespective of the level of coercion it imposes, is worthless without the honest involvement of the enforcing entity.

The inter-generations contract

The idea of an institution whose financial role is to ensure the **continuity of the inter-generation development using the reserves of the state of law** (the reserves of precious metal included), has not appeared by accident during the generation of Bagehot or Carada. That generation had been exposed to the democratic ideas of the promoters of the economic liberalism, such as Edmund Burke (1729 – 1797), a great politician and speaker, outstanding representative of the conservative liberalism.

Burke, one of the most critical analysts of the 1789 French Revolution was saying that the **true contract within a society is not that between the sovereign and its subjects** (as Rousseau considered), **rather a contract between generations**. For Burke, only such a contract can ensure the state of law which is the guarantor for the public goods. His reflection regarding the will of the people is famous: *"I venture to say no war can be long carried on against the will of the people"* – having this connotation of the contract between generations.

Within this context of philosophical approach, we may notice that after the 2007 financial crisis, the measures adopted in order to avoid the economic collapse increased the public debts to unsustainable levels. The governments were not able even before the crisis to take measures to decrease the public debt in a convincing manner, while the decisions adopted presently only **push the burden of the debt of**

the present generations on the shoulders of the next generations.

The problem is even more complicated as the debt considered by the markets is not the sum of all public debts. The debt is much larger because the governments were never asked to publish the current value of the future liabilities resulting from paying the pensions, social assistance and health care systems.

The palliative used by an increasing number of countries – stating that the simple principle of a balanced budget should be enacted even in the fundamental law, as the Constitution – does not solve the basic problem of the unsustainable level of the public debt. **The core problem is that pushing the public debt towards the future generations only breaches their right of property**, which also touches the perception towards the state of law. Which is the real debt of state today which borrows at the expense of the future generations?

Over-regulation

The answer of the national and international authorities to the financial crisis of 2007 tends to be **reduced to the increase of the amount of regulation**, although the most regulated part of the financial system, before the crisis, was the banking one.

One of the most famous and contradicted professors of economic and financial history of our days is Niall Ferguson (born 1964). He argues that over-regulation is not the key to the problem unveiled by the 2007 crisis, rather the contrary. For instance, Ferguson says that even if the *Glass Steagall* Act (actually the *Banking Act of 1933*, which was limiting the right of the commercial banks to run activities of securitization or affiliation to securitization companies, replaced by the *Gramm-Leach-Bliley Act of 1999*, during the presidency of Bill Clinton) would have been in force at the onset of the financial crisis, the Lehman Brothers would still have gone bankrupt in 2008.

Following the same line of arguments, Ferguson says that the large international banks (of systemic importance) still are and had been over-regulated before the crisis too, but they went bankrupt anyhow (aren't we speaking today of banking crises?), while the hedge funds, among the few still unregulated areas, next to the *credit default swaps* (CDS), had little to suffer.

What Ferguson means is that **regulation is not always in agreement with the activities it has to keep in order**. On the contrary, too many regulations within a complex system, such as the global financial system is today, **regulation itself becomes a source of systemic risk**, according to the law of the unintended consequences.

The financial system turned extremely complex, both in terms of markets and institutions, and in terms of operations and instruments, particularly after the 1970 years. The lesson of the impossible planning learnt by the people who experienced the fall of the centralised economy, should also be transmitted to the people sustaining that over-regulation is the solution to the stability of the global financial sector. The purpose of regulation (improvement by simplification and clarity or over-regulation and increased costs) still is an open issue for the G-20, despite the consensual directions of action. It is the field of theoretical and practical debates which are still far from finishing, because they impede the interests of some financial centres that cannot be dissociated from the interests of the states where they are located.

Is the nature of the central bank institution adrift?

The historic review of the central bank's basics and of the financial environment basics, leaping back into history and then back to the present, necessarily draws attention on the doubts whether a central bank may someday cease to be an **independent, efficient and credible institution**.

Accepting the existence of increasing sovereign debts raises a lot of questions, concerns and even worries, by the multitude of witnessed facts and reaction to these facts. The most debatable case is, maybe, that of the European Central Bank which, from the onset of the financial crisis until now, "amazes" either by excessive conservatism or by looseness circumscribed to some political ideas/pressures, depending on the discourse of the former president (Claude Trichet), or of the present president (Mario Draghi).

The **independency of the central bank is endangered by the necessity for fiscal activism**, imposed in a way by politics. The salvaging of the financial sector presumed expanding the central banks balance sheets so that they indirectly are involved in fiscal policy. Furthermore, the persistence of the large public debts and of

the low economic growth seems to prompt the central banks to maintain the interest rate at a low level, but this didn't help the economy to start again. Therefore, the central bank policy is no more quite independent.

Furthermore, the **central banks also became surveyors** of the financial system, their mandate being completed – not necessarily by law, but by opinions – with that of the financial stability and macro-stability which forces another type of coordination, different from the traditional mix of policies. This means involving them in an activity of over-regulation, in which the **exertion of the role of regulator and controller at the same time will induce new systemic risks**. This might decrease the **efficiency** of the core central bank activity.

The involvement of the central banks in over-regulation poses one more risk. The recent years have shown that few of the bank employees have been found guilty for cheating the trust of their clients (breach of contract) and even fewer were sentenced to specific terms behind bars. Bob Diamond (former Barclay's official) will probably not be convicted; he may just receive a smaller package of benefits from his contract with Barclay's. The **fail to enforce the provisions of the state of law by enforcement of the law** (exemplary punishment of the culprits) may cause the central banks to lose **credibility**.

Strategy of monetary policy

The post-WW2 evolution of the theory and practice regarding the role of the monetary policy and of the instruments of monetary policy shows a significant mutation. The central bank no longer plays a direct role in the economic growth, but only for the macroeconomic stabilization, in ensuring the support for the future sustainable economic growth. Its instruments are no longer strictly related to amount of credits (to the monetary aggregates), but to the price of money (interest rate). Hence, a change in the concern for the mechanism and transmission channel of the main monetary impulse given by the price of money, the monetary policy interest rate.

There are at least two currents of opinion regarding the grounds for changing the central bank role and implicitly, its mandate. The first one, the standard one, shows that this evolution occurred through a natural process of learning from mistakes. Thus, the international monetary system set by the Bretton Woods agreements eroded with

the international consolidation of the US economic and military strength (due to the interests generated by the position of the USA, the US dollar) could no longer be the basis for the fixed exchange rates. The reason for this was that the US decision-makers no longer could take decisions strictly on the basis of the economic criteria: the geopolitical and geostrategic criteria also had to be taken into account. The new volatilities triggered by the increasingly complex interdependencies between states also changed the mandate of the central banks.

Then, the monetary policy get out from the shadow of the fiscal policy (*the fiscal dominance*) and the economic adjustment done on the basis of the signals given by the aggregate offer replaced the adjustment determined by factors of the aggregate demand. Finally, the central banks became the **leading actor of the economic stabilization** with the main mission of **preserving price stability** and thus alleviating the multiple volatilities.

The other current shows that the gradual transition of the central banks to limited responsibility of the price stability by inflation targeting was done on pragmatic grounds: pressure of IMF adjustment programs for the external imbalances. The reason of this argument is that IMF researches were sure that using econometric models, which were, nevertheless, insufficiently developed and tested, the decrease in the inflation volatility would have diminished GDP volatility too, an effect which increases the probability to recover IMF loans given to the states in difficulty, in other words a better preservation of IMF resources by their further borrowings.

Inflation targeting has, however, more subtle and profound implications **regarding the time horizon** of the central bank's policy and the **pace** it imposes to the economy. The modifications mentioned above cut short considerably this time horizon (at least shorter than two years). **The main problem of the shorter time horizon is related to savings** or, more precisely, to the decreasing perception that the central bank is the main source for the future development.

There is a lot of talk about the mismatch between the time horizon of the deadlines for savings and of the loans, particularly in terms of ensuring the crediting resources. If the internal saving is not enough, the external saving may be used, through lines of financing. In all cases, regarding either the stimuli of the monetary policy or its

instruments or the transmission channel, we encounter the predominance of the short term.

Stimuli of the monetary policy

The first proof that the time horizon of the central banks' activity shortened much more, in the case of the central banks applying explicitly inflation targeting, is the enumeration of the factors which determine/mobilise the intervention of the central banks. In principle these factors are **the inflation expectations, inflation as such and the movements on FX market**.

In principle, the most "tangible" perception of the public and of the business environment regarding the **inflation expectations** is somehow around an interval of 3 months; this may be the time horizon for which the public at large may forsee most accurately all its activities.

Following the same idea, the most tangible representations of the public at large about the **inflation rate** are for an interval not exceeding six months; probably this is the past period for which the public at large has the "correct" memory of its economic activities.

In the case of the **dynamics of the FX market**, the perceived time interval is even shorter, maybe even less than one month. For instance, IMF calculated that, for Romania, the longest time interval across which most of leu depreciation reaches the prices is of 3 weeks, and the public perception verifies this time horizon through the reactions to the change of the exchange rate of the leu (unfortunately almost exclusively depreciation).

Monetary policy instruments

The analysis of the whole set of instruments available to the monetary policy is directed towards the same goal of shortening the time horizon. Before passing to inflation targeting, the economic theory considered that the monetary policy instrument was a specific amount of monetary mass which resulted from an exogenous relation built by the central bank. Actually, what the central banks were doing in an obscure manner before adopting inflation targeting and in a transparent manner after inflation targeting was adopted was to set the cost of the overnight credits on the monetary market. This interest rate is sued for the monetary market operations and its signal is given by the interest rate as main instrument of monetary policy.

The minimum reserve requirements, the other important instrument of the central banks, don't contribute to the prolongation of the time horizon of the monetary policy because they play their role within the span of a month. The interval at which the central bank verifies their establishment is no longer identical with that of the proof of their permanent existence during the required period of time.

The transmission channel of the monetary policy

The central banks have expectations regarding the lag of the monetary policy instruments, being concerned with the fluidity of the transmission channel and with the way in which the impulses are received by the real economy via the commercial banks. The main mechanism by which the monetary policy influences the real economy is the interest rate, but via the banking and financial sector.

In principle, the statistics show that most credits have maturities equivalent to the medium term (1-5 years), but the behaviour of the debtors from the company sector is to renegotiate the credits in order to fit the conditions of the monetary market. In this way, both the aggregate offer from the real economy and the balance sheet assets of the banks are pushed to get oriented financially towards the short term, less than one year.

On the other hand, the saving behaviour of the companies is getting to be limited to a horizon no larger than 6-9 months, because the credits can be renegotiated annually. Furthermore, the saving behaviour of the households is limited to the period of one year because of the short time horizon of the economy.

There are two consequences of this interference of the short horizon of the monetary policy within the saving behaviour. First, the households, in their quality of labour offer, are no longer interested in making investments from their own medium-term savings, but instead we witness the propensity not to save anymore. Second, the economic progress, which depends much on innovation, is threatened at each short-term cycle. The reason is that the company sector doesn't have enough medium and long-term deposits for the research-innovation activities.

Interactions of the monetary policy

In accomplishing its role of macroeconomic stabilization, the central bank acts (or should act) next to the fiscal policy through the

policies mix. In other words, the redistribution from the budget must be balanced by the revenues obtained through taxation and inflation.

The fiscal policy time horizon is of one year because of the law of the budget which also is annual. Despite the multiannual European budgets, the fiscal year remains the basis of the fiscal policy. On the other hand, as shown above, the monetary policy has time scale effect shorter than one year, practically three-month cycles. Therefore, the economic policies induce an annual volatility in economy by their very nature.

The monetary policy interacts permanently with the real economy and assumes, via the exchange rate, signals external to its area of influence. In the case of this interaction, the frequency of the modifications increases with the economic openness. Or, it has been shown that the influences of the exchange rate mobility to this interaction have a time horizon of less than one month.

Central bank's policy

The time horizon in which the instruments available to the bank are set in action forms the time horizon of the overall policy of a particular central bank. There are at least three reasons why the central bank's policy focuses on the short term.

First, the role, mandate and instrument available to the central bank lead toward a monetary policy on the short term. Second, the influence of the monetary policy both through the transmission channel and through the interaction with the other policies or with the real economy focuses on the short term. Third, the responsibility of the central bank is defined on a short time, one year, because the objective of the central banks using the inflation targeting strategy is to achieve a particular level of inflation over one year, even if the target is communicated two years earlier.

Conclusions

The two parts of this article aimed to show that the **central banks are increasingly closer to a moment of crisis in their existence.** The crisis comes from the fact that **their institutional role is to support the long-term development of an economy**, while **their actions through the monetary policy denotes a short-term concern**.

Two extreme scenarios can be foreseen for the evolution of the central bank institution. One extreme, boosted by the present

pressure of the need for answers to the crisis of the sovereign debts and by the resumption of the sustainable economic growth, is the change of the institutional role of the central bank, its possible "contraction" to an appendix of the fiscal policy, with the only responsibility of the **public debt management.** The other extreme would be the resumption of **their initial role as guardian of the future saving**, but this entails finding a new way of controlling the current inflation.

Reality shows that the extremes are not the scenarios with the highest odds of turning real; hence, the **central banks will actually drift** along the current crisis, with a more difficult mandate of price stability, financial stability and public debt manager. But, even this presumed evolution may **erode rapidly the credibility of the central bank institution**, which came from the fact that **they were the guarantor for the state of law**.

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MONETARY POLICY IN THE CONTEXT OF THE EUROPEAN SOVEREIGN DEBTS

PhD Adina CRISTE*

Rezumat

Criza datoriilor suverane în Europa a generat pentru politica monetară a Băncii Centrale Europene (BCE) o serie de provocări legate de menținerea stabilității prețurilor şi de încurajarea activității de creditare a economiei, într-un mediu destul de incert, cu investitori precauți şi în condițiile în care sustenabilitatea fiscală a statelor din zona euro este profund afectată.

Lucrarea tratează problematica efectelor în plan monetar generate de criza datoriilor suverane din zona euro, pornind de la descrierea pe scurt a evoluției pieței obligațiunilor suverane europene începând cu perioada realizării proiectului zonei euro. Particularitățile mecanismului de transmitere a politicii monetare provocate de efectele crizei datorilor suverane pun în evidență anumite constrângeri ale politicii monetare în etapa actuală.

Articolul se înscrie în sfera problematicii complexe legate de procesul integrării monetare şi a funcționării zonelor monetare optime.

Abstract

The crisis of the sovereign debts in Europe challenged the monetary policy of the European Central Bank (ECB) to maintain price stability and to encourage the credits for economic activities under the conditions of a rather uncertain environment with precautious investors and under the conditions of faltering fiscal sustainability of the Euro Area member states.

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The paper approaches the issue of the monetary effects generated by the crisis of the sovereign debts within the Eurozone starting with a brief description of the European sovereign bonds market, starting with the period before the euro project implementing. The particularities of the monetary transmission mechanism caused by the effects of the sovereign bonds crisis reveal specific constraints of the current monetary policy.

The article is subject to the complex issues related to the monetary integration process and the operation of the optimum currency areas.

Keywords: price stability, monetary transmission mechanism, sovereign bonds

JEL classification: E44, E52, H63

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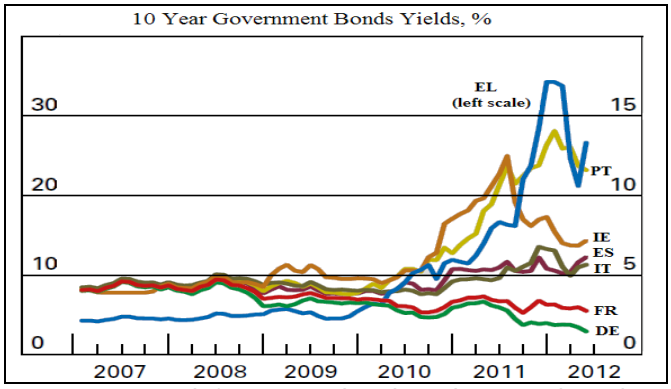
From the monetary perspective, the global financial crisis determined the reduction of the nominal short-term interest rates in the developed countries. The monetary policy measures aiming to correct the imbalances of the financial market and to stimulate the economies determined a spectacular increase of the central banks' balance sheets due to the higher issues of reserves by expanding the refinancing operations for the credit institutions. In some Euro Area countries, the fast increase of the public debt increased the interest rate differentials, and this triggered a spiral of adverse effects and expectations, increasing the amounts to be paid, thereby it amplified the increase of debts, and so on.

1. The evolution of the sovereign bonds market in the Eurozone countries

Overall, the Euro adoption generated excessive imbalances, which show a poor allocation of the resources. This established an environment favourable for the propagation of the *shock of*

uncertainty, in the autumn 2008 (the Lehman Brothers bankruptcy) and for the start of the sovereign debts crisis starting with 2009.

Figure 1
Evolution of the interest rate for the long-term governmental bonds in Eurozone countries



Source: Bank for International Settlements (2012)

Until the period of preparing the Euro project (until 1996), the interest rates for the bonds issued by the European governments were divergent due to the manifestation of the two types of risks: the currency risks (due to the circulation of the national currencies) and the risk related to the payment of the sovereign debt. After the adoption of The Stability and Growth Pact and before the Lehman Brothers bankruptcy (between 1996 and 2008), these interest rates have converged due to the expectations for eliminating the currency risk, which created false expectations regarded the low investment risk. Practically, the elimination of the depreciation risk determined the undervaluation of the risk for default of the sovereign debt. The trend of the interest rates' convergence has been maintained after the Euro adoption, despite the differences between countries in terms of economic fundamentals and fiscal position. The explanation of the similar yields of the bonds issued by the national governments lies in the expectations of the investors during a period of low macroeconomic volatility (period also known as the "Great Moderation") which excluded the possibility of extreme events causing the incapacity of a country from the Eurozone to refinance its debt. This favourable period also determined a low level of the risk aversion and low risk premium for the different categories of assets. The development of the market for the Euro denominated bonds,

together with the expansion and diversification of the currency reserves probably have created a false perception for a perpetual increase of the demand for sovereign bonds.

After the Lehman Brothers bankruptcy, a new period of diverging interest rates for sovereign bonds has started, due to the different revaluation of the risk default for debt issued by the different European governments. Practically, the *uncertainty shock* has fragmented the financial markets of the Eurozone, as shown by the increased differential of the interest rates, while the European political context, with the disputes and delays regarding the salvaging plans initiated by the Euro Area authorities, maintained the differences of the interest rates for the government bonds.

The differential of the interest rates for the sovereign bonds during the financial crisis reflects the way in which Euro Area is working. After giving up to the monetary policy sovereignty, the tensions from the financial markets have actually passed to the market of the sovereign debts, and the currency risk existing before the Euro adoption was replaced by the sovereign risk. In other words, the interest rates differential available before the Euro adoption was determined by the fear for exchange rate depreciation of national currencies, while the present interest rates differential is caused by the fear for sovereign debt default.

Overall, the factors which generated and fuelled the crisis during this period are a combination of frail economic fundamentals and market distortions determined particularly by the procyclic character of the financial market functioning[1].

[1] *It was noticed in time that the functioning of the financial market is procyclical, due to its tendency to exaggerate the perception of the risk one way or another, further amplifying these trends. Thus, during the "optimistic" periods, the risk appetite is high, the economic conditions are favourable and the assets price tends to be high, while the risk is low. This trend probably led to an excessive convergence of the yields for the bonds denominated in Euro during the period before the Euro adoption. During the unfavourable periods, with a higher risk aversion, the rate of the economic growth (GDP growth rate) decreases and the assets price tends to decrease. Somehow or another, the investors will amplify the trends. Such procyclical behaviour also affected the market of the sovereign bonds during the period of the current crisis. The use of the sovereign bonds as collateral has also produced adverse effects on other segments of the financial market (for instance, financing of the financial institutions).*

The sovereign debt crisis in the Eurozone has intensified after the second half of 2011, when the official creditors compelled the private sector to get involved in the reduction of the Greek debt burden as condition for new credits. Besides the higher incertitude of the bond investors, the economic growth of the Eurozone was not spectacular, so that the Eurozone governments found it difficult to strengthen their financial position in the near future. The tensions manifested during this period generated a feeling of incertitude regarding the bank exposure to the sovereign credit risk and the incapacity of the governments to support vulnerable banks. The credit default swap premium of the European banks increased suddenly as a consequence of the deteriorating the perception on the bank reliability. The price of the shares issued by the credit institutions from Eurozone has generally decreased, stronger in the countries with sovereign debt problems (Spain, Greece and Portugal), while the financing conditions from the banking system have been deteriorated further when the deposit holders started to withdraw their savings from the Spanish, Italian, Greek and Irish banks. The market for unsecured debts closed for many banks from the Eurozone, while the cost of loans on the interbank market increased significantly not only for the Euro, but also for the US Dollar and the Pound Sterling.

The political initiatives from this period (resuming the program of governmental bonds acquisition, higher use of the Eurozone stabilisation fund and increased crediting capacity of this stabilization fund) tried to alleviate the intensity of the crisis, but they didn't generate the expected results. The effects were on the short-term because of the investors distrust in the capacity of the governments to apply the measures of fiscal consolidation agreed with the European partners. However, in late 2011, the announcement of the fiscal compact to limit the deficits of the structural budgets[2] had a stronger and a more sustained effect of reducing the yield of the sovereign bonds.

[2] *The European fiscal compact is part of the Treaty on stability, coordination and governance of the Economic and Monetary Union (finished in January 2012). The purpose of the treaty was to consolidate the fiscal discipline throughout Europe by imposing sanctions and by a strict budgetary-fiscal monitoring of the member states.*

2. The European crisis of the sovereign debts and the monetary transmission mechanism

Given the strong financial fragility and the mistrust with respect to both the debt payment capacity of some Eurozone member states and the measures to support them by the other member states, the investors imposed higher interest rates for the sovereign bonds from the vulnerable countries. If the risk premium would exceed a specific limit, they would reduce the exposure to the issuers of such bonds. The financial instability disturbs the monetary transmission mechanism altering the transmission of the monetary policy stance upon the financing conditions.

The government bonds play a key-role in the transmission of the monetary policy towards the real economy through the interest rate channel. During the favourable periods, when the government bonds are considered risk-free and liquid instruments, a change of the monetary policy interest rate influences the yield of these bonds. These long-term changes are transmitted to some extent to the yields of the bonds issued by companies and to the interest rates of the bank loans, thus ensuring the transmission of the monetary policy to financial markets.

However, since the end of 2008, there was a change in this relation. The behaviour of some sovereign issuers started to be dominated by high and volatile risk premiums, as an effect of the contagion phenomena and as an exaggerated reaction of the markets. Such effects tend to go beyond the influence of the monetary policy framework. The changes of the monetary policy behaviour no longer play the leading role in determining the evolution of the government bonds yield. Thus, the monetary policy signal transmitted on the real economy is disturbed.

The government bonds have been an important source of guarantee for the credit institutions, being used to credit other banks and in the relations with ECB.

A significant share of the financial assets from the balance sheets of the commercial banks in the Eurozone represent bonds issued by their own governments, being considered low-risk securities. The financial turbulences, however, produced a differentiation of the risk level as a response to the investors' perceptions regarding the vulnerability of the economy of the issuing country. As a reaction to the uncertainty shock, the investors used the "flight to quality" approach, generating even so higher gains as the higher is the share

of bonds issued by the countries with solid economy in the total financial assets of the bank. The increase of the interest rates differentials for the sovereign bonds may determine a phenomenon of polarization in the monetary area, thus increasing the risk of political divergences between countries, entailing a deeper crisis.

The price of the government bonds from the vulnerable countries has decreased significantly, with the downgrade the country risk level. The exposure of the banks to the government debt has thus a direct adverse impact on the assets from the bank balance sheet, and implicitly on their net wealth. Such situation increases the risk of a disordered disintermediation that may produce a credit crisis within the banking system. In other words, the increase of the sovereign risk influences directly the banking risk. In turn, the banks confronted with a higher banking risk have higher refinancing difficulties and this will increase the burden over the governments. Such vicious circle between the perception of the sovereign risk and that of the banking risk affects the credits for the real economy.

When the banking sector represents the main financer of the economy, as it is the case of the member states of the Euro Area, it is expected a decline of the economic activity and these expectations could become self-fulfilling: as soon as the companies and the households expect a slower growth, they also expect the public budget to be affected, as the revenues decrease. The pessimistic scenario might also increase the risk premium for the government bonds which, correlated with the private debt, reflect directly in the interest rates paid by the private sector. Even if the interest rate policy will remain close to zero, the economic activity will not be stimulated. Such a phenomenon has occurred in the Euro Area. The conjuncture of the increasing interest rates has created pessimistic expectations regarding the economic activity in the European countries.

Another reaction to the significant decrease of the price for the sovereign debts is the increased consumers' propensity to save for precautionary purpose given the adverse expectations regarding the lending activity of banks. Such behaviour counteracts the potential measures for monetary policy easing applied for stimulating the consumption.

Since 2011, the cost of bank credits for companies increased suddenly in Spain and Italy. It coincided with an increasing of the interest rates for sovereign bonds issued by Spanish and Italian governments, against the German reference.

These trends show practically the break or disruption of the relation between the monetary policy decisions and the financial market, damaging the monetary transmission mechanism.

3. Constraints of the monetary policy within the Euro Area

The constraints of monetary policy within the current European conjuncture refer to the "narrowing" monetary space under many aspects:

- Increased burden for monetary policy regarding the economic stability, given the narrow space of the monetary policy to use the interest rate, which is near zero;
- Increased inflation pressure, raising the uncertainty regarding the ability of the central bank to maintain price stability, given the intervention of central bank for the payment of the sovereign debt using is balance sheet assets. Such a circumstance would hit the credibility and the independence of the central bank. At the Euro Area level, there is presumably no monetary dominance; therefore the price stability objective has priority over the general objective of avoiding the state of default, which eliminates the risk of losing this independency.[3]
- Increased risk perceived about the public debt, which affects the proper functioning of the financial markets and the transmission of the monetary policy, as shown above.

The financial turbulences and the incertitude existing during the first stage of the crisis from the interbanking market generated liquidity problems even for the solvable banks. In such uncertain environment, the use of the conventional instruments of the monetary policy is no longer efficient to correct the blockages from the financial markets. In this situation, the European Central Bank implemented non-standard measures to ensure the liquidity in the damaged segments of the market and in order to restore the proper adequacy of the monetary transmission channels. Due to the insufficient information for evaluating the need of competitors' liquidity, the credit institutions from Euro Area started to accumulate large amounts of liquidity and to refrain from taking loans from the interbank market.

[3] *It remains to be seen the "price" of maintaining this monetary dominance. Practically, in the view of the central authority of the Euro Area, the central bank independency is more important than the risk of default for sovereign debt of the member states.*

The banks were under pressure that the liquidity problems could turn into default, and the monetary policy started to focus on holding reserves rather than on the nominal interest rates. In such circumstances, the risk of disorderly deleveraging leading to a credit crunch in banking sector of the Euro Area increased significantly, in early 2012 (European Commission, 2012).

When the interest rate of the monetary policy reached or is close to its minimum level (zero), the stimulation of the economic activity can be achieved by applying some measures of the monetary policy. According to Bernanke and Reinhart (2004), there are three such measures:

- Reassuring the investors that the short-term interest rates will remain lower in the future than they currently expect and this creates favourable expectations;
- Modifying the securities supply in the market place by changing the composition of the central's bank balance sheet;
- Increasing the size of the balance sheet beyond the level needed to set the short-term policy rate at zero. This is a strategy of *quantitative easing* (QE). The manner of QE implementation differs from country to country, depending on the specificity of the interactions between the banking system and the monetary authority and on the main targets of the monetary policy.

At the European level, QE policy meant an expansion of the **refinancing operations of the central banks from the Eurosystem, by providing liquidities, large amount of credits (unlimited), at flat interest rates.**

During the second part of 2011, as the tensions from the financial markets increased, the ECB decided to resume the application of nonconventional measures of monetary policy, such as the *Securities Markets Programme*, broadening the range of assets accepted as eligible collaterals in its refinancing operations in order to secure the following objectives:

- Reducing the maturities on the monetary market;
- Loosening the financing conditions for the credit institutions and for the companies;
- Encouraging the banks to maintain or even to develop the credit activity to the private sector;
- Improving the market liquidities on important segments of the private debt securities.

Cecioni, Ferrero, Secchi, (2011) stated that the unconventional measures of monetary policy contributed to the support of the financial intermediation in the Euro Area by ensuring the refinancing of the solvable credit institutions and by restoring the trust between the market players.

4. Some conclusions

The very manner in which the Eurozone is designed to function represents one of the main causes of the current sovereign debts crisis, by giving up on the independent monetary policy, so that the tensions from the financial market actually migrated towards the market of the sovereign debts, and the currency risk existing before the Euro adoption was replaced by the sovereign risk. While before the Euro adoption the gap between the interest rates was determined by the fear of exchange rate depreciation, as the national currencies were still circulating, during the current period this gap is determined by the fear of the sovereign debt default.

The increase, or at least the maintenance, of the interest rates differentials for the sovereign bonds between the Eurozone countries may determine a phenomenon of polarization in the monetary area, thus increasing the risk of political divergences between countries, entailing a deeper crisis.

The misbalances generated by the current crisis of the sovereign debt from the public and private sector have implications on the financial stability and implicitly on the management of the monetary policy.

The monetary policy constraints are determined on the one hand by the narrowing of the monetary "space" of manoeuvre, and on the other hand by the fact that the price stability, the fundamental objective of the European Central Bank, can no longer be considered enough to ensure the financial stability.

The unconventional measures implemented by ECB during the crisis didn't distort the general framework of the monetary policy strategy, but completed it, noticing the relation of complementarity with the interest rate policy during financial crisis.

The sovereign debt crisis, as Goodhart was noticing during the 1990 years (Goodhart, 1997), is another proof for the fact that the break of the relation between the fiscal authority and the monetary authority – the two key-elements that define the political authority of a state – determined by the establishment of the Economic and

Monetary Union, affects the position of the sovereign debt market of the participating countries.

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THE THEORY OF INTERNATIONAL FINANCIAL CONTAGION

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Rezumat

Contagiunea financiară este un proces complex şi multidimensional, fără a exista însă o definiție larg acceptată şi o metodologie precisă de măsurare. Contagiunea a devenit ideea centrală a tot mai multor studii deoarece este percepută ca o problemă, fiind deseori asociată crizelor financiare. Rațiunea pentru care este aplicată diversificarea internațională a portofoliilor de investiții în vederea protecției împotriva riscului de țară, nu mai are aceeaşi valoare, corelațiile dintre piețe estompând în bună măsură beneficiile sale. În acest articol ne propunem să prezentăm modalitățile în care subiectul contagiunii financiare internaționale a fost abordat.

Abstract

Financial contagion is a complex and multivariate process, with no widely accepted definition and an accurate measurement methodology. Contagion became more and more the central idea of research studies because it is perceived as a problem, and often associated with financial crises. The reason for that international diversification of investment portfolios is applied to protect against country risk, is no longer valid, correlations between markets largely vanishing its benefits. In this article we intend to present the ways in which the subject of international financial contagion was approached.

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Keywords: contagion, financial markets, financial crisis

JEL Classification: G01, G15,

Introduction

As a consequence of an increasing correlation of international financial markets and of the problems posed by economic recessions, drop in stock prices, sovereign debt insolvency, an increasing attention has been paid in academia, but also in practice, to the phenomenon called contagion. The concept, borrowed from epidemiological terminology where contagion is immanent associated with disease and even death, often assumed that those who entered the crisis through contagion, it was not because of them.

Some authors question the existence of international financial contagion itself (Karolyi, 2003), while others suggest that the issue of contagion was one of the most debated subjects after the Asian crises (Rigobon, 2002).

Contagion became more and more the central idea of research studies and our intention is to present the ways in which the subject of international financial contagion was approached in time.

Definition debate

If the majority agrees with the existence of the contagion phenomenon, we do not have yet an agreement regarding a widely accepted definition of the term (Forbes and Rigobon, 2001, Dornbush et al., 2001, Corsetti et al., 2002) and the best methods of measurement. In most cases, contagion is considered to be present when is observed an increase in correlations between indicators after the appearance of a market shock.

A benchmark for the definitions' variety of the term contagion is the three options offered by the World Bank (broad definition, restrictive definition, very restrictive definition). We mention here only the *restrictive* definition of the World Bank: „*Contagion is the transmission of shocks to other countries or the cross-country correlation, beyond any fundamental link among the countries and beyond common shocks."*

In their study, Eichengreen et al. (1995, 1996) argue that contagion refers to the association of in excess earnings of a country with in excess earnings of another country, having been removed

fundamental links influences. This definition is closely related to the "*true*" contagion, as it is defined by Calvo and Reinhart (1996), appearing in the absence or after excluding traditional shocks and all possible interconnection channels.

The same authors discern between this type of contagion and that driven by fundamentals, such as trade or finance. Further, Kaminsky şi Reinhart (2000) observed that "*true*" contagion is affiliated with herding behaviour (rational or not). From another point of view, the coincidence of having extreme returns in different countries is an evidence of contagion (Bae et al., 2003).

Even if we consider that it is an agreement on a definition, the measurement of the contagion phenomenon can be relative because it is very difficult to specify an appropriate mix of fundamentals (financial, real economic, political), and most of the times they are selected according with the analysed problem.

In time, it was made a distinction between contagion and interdependences. Unlike contagion, interdependence is reflected in the fact that the simultaneous movement of the market is not much stronger after a shock affecting a country or group of countries.

What is analysed when studying contagion?

Usually, in the research papers is analysed the spread of market disturbances (exchange rates, stock prices, sovereign spreads and capital flows), and in most cases these are observed around the crisis. One methodology consists in measuring the market correlations during tranquil times, and then in testing if these correlations increased after a shock occurrence, using a cross-market correlation coefficient.

One of the first studies using this methodology is the seminal work of King and Wadhwani (1990), appeared immediately after the American stock market crash from 1987. The subject was the correlation between US, UK, and Japan markets, that according with the authors increased considerably after that crash. After the publication of this research, other authors increased the number of studied markets and also test for contagion after other economic and financial crisis. The conclusion of the research papers using this kind of methodology generally admitted that the correlation coefficient increased after the important crisis and accordingly, the contagion phenomenon exists.

Some papers are concentrated instead on long run relationship between markets. Longin and Solnik (1995) look upon seven OECD countries for a period of thirty years, between 1960 and 1990, and compare the correlation between US and the other markets over this period.

Measuring co-movements in exchange rates, stock prices, sovereign spreads and capital flows it is also a common technique to test for contagion.

A smorgasbord of econometric methods was used to test for contagion on financial markets. They may by simple correlation coefficients between divers markets, GARCH models or other alternative methods. The extreme value theory was applied by Longin and Solnik (2001) and Bae, Karolyi, and Stulz (2003). Markov switching models were utilized by Ang and Bekaert (2002) and more recently by Gallo and Otranto (2008). When contagion is seen as a nonlinear process, copulas functions are proposed for studying its effects (Rodriguez (2007).

According with Forbes and Rigobon (2001), the studies that do not take into account the heteroscedasticity are biased and „recent empirical work that adjusts for heteroscedasticity, endogeneity, and/or omitted variables finds *no contagion, only interdependence*".

Another topic of contagion research is the transmission channels of contagion (macroeconomic and political environment, common lender, financial and trade linkages, geographical distance etc.). According with some authors, the channels that engender contagion in 1990s recently showed a similar potential (Didier et al., 2008). From the other point of view, down from the beginning of 2000s, “not only the exact causes and channels of contagion are not known, neither are the precise policy interventions which can most effectively reduce it” (Dornbusch et al., 2000). If some authors identified some evidence regarding the transmission of crisis through some specific channels, is even harder to assess the magnitude of every element.

Between the identified transmission channels, a special attention was paid to the role played by the common lenders, usually international commercial banks. As suggested by Kaminsky and Reinhart (2000), the common lender and the trade put some things straight on the past crisis, explaining some „historical pattern of contagion”.

The financial contagion was approached through the trade channel. This was sustained by the increasing role of the financial sector for the trade performance and for price assessment and by the financial innovations and deregulation. Nowadays, the investments are rather based on information from the financial sector than on information specific to commodity markets. Therefore, the financial investors bring some extra volatility on commodity markets that finally decrease the efficiency of the hedging instruments.

Many research studies connected with international financial contagion are close related with the gains of international portfolio diversification. Once the correlations in the financial markets are increasing in times of crisis, the rational of risk reduction true international diversification is humbled.

Beyond the economic fundamentals

Although the classical economic elements explained largely the financial links, these explanations are not complete and researchers are attempting to discover unknown factors that could be important for the international contagion.

Therefore, psychological issues were approached to complete the explanations. The term of *emotional contagion* which finally conduct to *emotional convergence* was introduced in the early 1990s when Schoenewolf (1990) defined it like „a process in which a person or group influences the emotions or behaviour of another person or group through the conscious or unconscious induction of emotion states and behavioural attitudes". People automatically and continuously incline to synchronize their emotions with others through various instruments.

As suggested by Țiță (2008), emotional contagion entails, in addition to similar emotions, and complementary emotions, some of them visibly opposed. This raises the term "contra-contagion" that could be borrowed in finance to describe the behaviour of those who are "intimidated" by the "aggressive" actions of some investors.

There is considerable literature attempting to understand the issue of contagion analysing the herding behaviour that is considered to be, by some authors, a key factor.

The self-fulfilling crises only occur because economic agents believe that they will occur and consequently withdraw their investments, believing that others will do the same. An overview of

such crisis models is well made by Obstfeld (1996) and Krugman (2000) that describe the crisis in Southeast Asia from this perspective. According to the study by Goldstein and Pauzner (2004), the process that generates contagion in a self-fulfilling crisis is the wealth effect.

Even if it is known that cultural elements play a very important role for economics, they are not used very often in these analysis, but recently appeared some research papers that are investigating the link between culture and financial contagion. Hofstede's cultural dimensions are most used perspective when measuring culture. Lucey and Zhang (2009) investigated the link between cultural distance and co-movement of stock returns; for them, the relation is in inverse proportion: countries that have smaller cultural distances have also higher linkages.

Conclusion

The financial contagion is a complex phenomenon that does not have a generally agreed definition or measurement methodology. This topic was more and more studied because is associated with problems. As a consequence, in the financial architecture emerged new regulations regarding foreign ownership restrictions, exchange rate convertibility, hedge fund disclosure or the free flow of global capital in general.

Many countries have been affected by the financial contagion and a lot of research has been done on this subject, but the full story has still to be discovered.

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THE STUDY OF FISCAL SUSTAINABILITY FOR THE CASE OF OVERINDEBTED EUROPEAN COUNTRIES

PhD Andreea STOIAN*

Rezumat

Studiul de față are ca scop analiza sustenabilității politicii fiscale în țările Uniunii Europene considerate a fi cele mai afectate de actuala recesiune economică şi de criza datoriei publice: Portugalia, Irlanda, Italia, Grecia şi Spania. În acest sens, este utilizată funcția de reacție fiscală care ne arată atât viteza cu care guvernul răspunde unor şocuri ale datoriei publice, cât şi mărimea reacției de răspuns. Folosind date anuale din perioada 1995-2013, rezultatele indică crearea condițiilor ca politica fiscală să fie sustenabilă pe termen lung doar în cazul Italiei şi al Portugaliei unde observăm o reacție directă şi imediată a soldului primar ca răspuns la creşterea datoriei publice. Spre deosebire de aceste două țări, în cazul Irlandei semnalăm o reacție indirectă, în sensul că o creştere a gradului de îndatorare va determina reducerea surplusului primar. Pentru cazul Greciei şi al Spaniei, testele statistice nu validează relația dintre soldul primar şi datoria publică, dar observăm faptul că politica fiscală a Spaniei reacționează prompt şi în sensul aşteptat la creşterea ratei dobânzii la datoria publică.

Abstract

This study aims in analysing the fiscal sustainability for the case of European countries most affected by the economic downturn and sovereign debt: Portugal, Ireland, Italy, Greece and Spain. For that purpose, we apply fiscal reaction function which indicates the speed and the size of government response to shocks on public debt. We use annual data ranged on 1995-2013. The results show that only for the cases of Italy and Portugal governments managed to fulfil the

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conditions for a sustainable fiscal policy. For these countries, the response is positive and immediate. On contrary, for Ireland we detect a negative reaction in the sense of a decreasing primary surplus to the increase of public debt by 1 p.p.. For the cases of Greece and Spain, the results are not statistically significant and we cannot conclude whether fiscal policy is sustainable or not. But we can emphasize a positive reaction to the increase of public debt cost in the case of Spain.

Keywords fiscal policy, fiscal sustainability, fiscal reaction function, primary balance, public debt

JEL Classification *:* E62, H62, H63

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1. Introduction

Fiscal sustainability still represents a debated issue and the economists put a focus on it due to the sharp sovereign debt crisis. The recent financial crisis and the current recession that hot worldwide went to an increase of budgetary deficits and of public debt. Therefore, efficient fiscal policy is required to be introduced for quick and positive response to shocks on public debt in order to absorb them and to avoid transforming them into systemic risk. Fiscal solvability is one of the main issues that government has to overcome. In that sense, Rădulescu (2012) indicated that financial markets hadn't paid enough attention to public finance imbalances before 2007, but they are doing right now by lending high priced money. Hence, Câmpeanu and Gyorgy (2009) indicated that government should introduce fiscal policies that manage to create primary surplus in order to achieve fiscal sustainability. Also, Câmpeanu (2011) emphasized the importance of using the best fiscal and budgetary tools to overcome the current challenges that governments have to overcome within a very fragile fiscal context. Braşoveanu Obreja and Braşoveanu (2012) showed that choosing

the most appropriate composition of fiscal adjustment could lead to a sizeable reduction of budgetary deficit but also to economic growth. They indicated that fiscal adjustments based on decreasing government spending are successful and expansionary.

Therefore, the aim of this study is to examine fiscal sustainability for the case of those European Union countries which are facing various difficulties generated by increasing public debt and economic recession. The countries considered for this study are Portugal, Ireland, Italy, Greece and Spain further refereed as PIIGS. We use fiscal reaction function to analyse the speed and the size of government response to shocks on public debt. For that purpose, the paper is structured as follows: Sections 2 and 3 describe the arithmetic of fiscal sustainability and the methodology used. Section 4 reports the empirical results and the discussions and Section 5 consists of concluding remarks of this study.

2. Mathematics of fiscal sustainability

The main stream of literature studying fiscal sustainability did not come to a conclusion when defining this concept. For instance, Blanchard (1990), Blanchard, Chouraqui, Hageman and Sartor (1990) and Horne (1991) considered that fiscal policy is sustainable when public debt does not explode and converges towards its initial level, nor governments are forced to adjust fiscal policy by increasing taxation or cutting government spending, monetize fiscal deficit or repudiate public debt.

The arithmetic of fiscal sustainability starts from the public debt dynamic equation (see in that sense, Hamilton and Flavin, 1986; Wilcox, 1989; Blanchard, 1990; Horne, 1991; Trehan and Walsh, 1991; Chalk and Hemming, 2000). Thus, government issues public debt (B_t) to finance primary deficit of primary expenditures (G_t) and government revenues (R_t), interest payment from time *t-1* (iB_{t-1}) and public debt from previous period (B_{t-1}):

$$B_t = G_t - R_t + B_{t-1} + i \cdot B_{t-1} = G_t - R_t + (1+i) \cdot B_{t-1} \quad (1)$$

Considering the variables above as ratio-to GDP, equation (1) re-writes:

$$b_t = g_t - r_t + \frac{1+i}{1+y} \cdot b_{t-1} \quad (2)$$

where:

i = interest rate on public debt;

y = GDP nominal growth rate.

In order to assure fiscal solvency, government has to fulfil inter-temporal budget constraint (IBC) which indicates that current public debt should equal the discounted value of primary balance and the discounted values of terminal public debt:

$$b_t = -E_t \sum_{k=0}^{\infty} \left(\frac{1+i}{1+y} \right)^{-(1+k)} (g_{t+k} - r_{t+k}) + \lim_{k \to \infty} E_t \left(\frac{1+i}{1+y} \right)^{-(1+k)} b_{t+k+1} \qquad (3)$$

Fiscal policy is sustainable when IBC and transversality condition described by equation (4) is achieved:

$$\lim_{k \to \infty} E_t \left(\frac{1+i}{1+y} \right)^{-(1+k)} b_{t+k+1} = 0 \qquad (4)$$

Equations (3) and (4) suggest that the government to run a sustainable fiscal policy it should service its payments by only generating primary surplus in the future avoiding public debt rollover. Many authors argue that fulfilling IBC represent only a necessary condition to achieve fiscal sustainability (e.g. Horne 1991). In that sense, Croce and Juan-Ramon (2003) stated that fiscal sustainability implies meeting inter-temporal budget constraint excluding the adjustment of fiscal policy.

3. Methodology

We investigated the existing literature studying fiscal sustainability and found two main empirical approaches: (i) econometric methods which consists in unit root tests, tests of co-integration, Vector Error Correction Mechanism, fiscal reaction function (e.g. Hamilton and Flavin, 1986; Wilcox, 1989; Trehan and Walsh, 1991; Bohn, 1998, 2005, 2006), and (ii) accounting approaches including derived indicators such as the primary gap which is the differential between primary balance and the primary balance that satisfies inter-temporal budget constraint and tax gap representing the first difference between that taxation rate which fulfils IBC and the current taxation rate (e.g., Blanchard, 1990; Pasinetti, 1998). European Commission - Directorate-General For Economic and Financial Affairs (2011) identified two more recent

approaches: a surveillance method which aims in early signalling fiscal vulnerabilities generated by large public debt, and a stochastic approach which starts from the hypothesis that a probabilistic analysis is more suitable that a deterministic one.

This study aims in investigating fiscal sustainability using *fiscal reaction function* which was firstly introduced by Barro (1979). It based on the public debt dynamic model described by equations (1) and (2). Rearranging equation (2) we find another from of it:

$$\left(b_t - b_{t-1}\right) \cdot \frac{1}{1+y} = p_t + \frac{i}{1+y} \cdot b_{t-1} - \frac{y}{1+y} \cdot b_t \quad (5)$$

where:

p_t=primary balance as ratio to GDP.

Considering equation (5), we argue that fiscal policy is sustainable when government manages to stabilize public debt to a constant ration, and $b_t = b_{t-1}$. Hence, equation (5) becomes:

$$p_t = \frac{i-y}{1+y} \cdot b_t \quad (6)$$

Based on equation (6), fiscal reaction function is can be re-written as follows:

$$p_t = f(b_t) + \varepsilon_t \quad (7)$$

where:

ε_t = error term.

Basically, fiscal reaction function allows the study of how primary balance changes when changes of public debt occur. The expected reaction is an increase of primary surplus when public debt-to-GDP ratio increases by 1 p.p., or at least a decrease of the primary deficit if this is the case. Moreover, the speed of reaction should be immediate, also indicating a more flexible fiscal policy that could be sustainable in the long run. The primary balance should adjust quickly to shocks on public debt. Therefore, the government spending and revenues should have a high elasticity.

We found large debate concerning the speed of government response to shocks on public debt. it is considered that fiscal policy is sustainable when the fiscal reaction function suggests an immediate

and positive response. But, many authors argue that interest payments to public debt are delayed compared to the moment when government issues bonds. Therefore, they consider acceptable a delay in fiscal reaction function (Greiner, Koeller and Semmler, 2005). Moreover, there are many other delays occurring that make fiscal policy to have a slower reaction. For instance, McConnel and Brue (1996) identified at least three types of delays: (i) recognition delay which refers to the time between the moment when economic recession starts and the moment when public administration is aware; (ii) administrative delay represented by the period between the time when government decides to act (to adjust fiscal policy) and the time when policy measures are introduced; (iii) operational delay which refers to the time between the moment when the Parliament approves fiscal adjustments actions and the moment when they have an effect on economy (on output, unemployment, prices). Considering all these argues, we can accept a delay of reaction nut it depends on the frequency on data that we use for analysis..

The author who studied fiscal sustainability by using fiscal reaction function also considered a set of control variables to check for the robustness of the government response to shocks on public debt. Hence, they took into account variables for the business cycle (Barro, 1979; Greiner, Koeller and Semmler, 2005; Kirchgaenssner and Prohl, 2006; Celasun, Debrun and Ostry, 2007; Burger, Stuart, Jooste and Ceuvas, 2011; Gosh, Kim, Mendoza, Ostry and Quareshi, 2011); lagged primary balance to capture an inertia effect of fiscal policy (de Mello, 2005; Kirchgaenssner and Prohl, 2006; Celasun, Debrun and Ostry, 2007; Burger, Stuart, Jooste and Ceuvas, 2011); temporary government spending (Barro, 1979; Kirchgaenssner and Prohl, 2006); lagged indebtedness ratio and squared and/or cubic public debt-to-GDP ratio (Bohn, 2005; Greiner, Koeller and Semmler, 2005; Gosh, Kim, Mendoza, Ostry and Quareshi, 2011); inflation rate, interest rate fiscal rules, dummy variables (de Mello, 2005; Greiner, Koeller and Semmler, 2005; Kirchgaenssner and Prohl, 2006; Gosh, Kim, Mendoza, Ostry and Quareshi, 2011). Consequently, equation (7) can be re-written as follows:

$$p_t = f(b_t) + Z_t + \varepsilon_t \quad (8)$$

where:

Z_t: set of control variables.

4. Database and empirical results

The aim of this paper is to study the sustainability of fiscal policy for those countries of European Union which confront great difficulties emerged from the economic recession and increasing public debt: Portugal, Ireland, Italy, Greece and Spain. Given their current situation we consider useful to show how governments react to shocks on public debt. for the beginning, we present the dynamic of principal variables implied by the model of fiscal sustainability: public debt-to-GDP ratio, primary balance-to-GDP ratio, the implicit interest rate on public debt computed as ratio between current interest payments and public debt from previous period, economic growth rate calculated as GDP nominal growth rate, public debt growth rate and the gap between implicit interest rate and GDP growth rate. All of these variables influence public debt dynamic and, therefore, fiscal sustainability in the long run.

Analysing annual data ranged on 1970-2013 for public debt-to-GDP ratio, we found that averages values indicate indebtedness ratios below GDP. Greece has the highest ratio (see Table 1):

Table 1

Descriptive statistics for public debt-to-GDP ratio

Indicator	Ireland	Spain	Greece	Italy	Portugal
Mean	69.16807	41.23550	73.69245	89.42993	54.28637
Median	65.94655	42.71360	76.55360	100.3389	54.01580
Maxim	120.1529	87.03290	168.0005	123.4884	117.1216
Minim	24.71090	11.80650	15.74000	37.24510	13.48930
Standard deviation	28.32860	20.72724	44.83777	27.14035	23.44167
Skewness	0.071721	0.067523	0.284239	-0.434636	0.849200
Kurtosis	1.791209	2.116430	2.133025	1.707161	4.157568
Jarque-Bera	2.716546	1.464713	1.970492	4.449625	7.216893
Probability	0.257104	0.480775	0.373347	0.108088	0.027094
Obs.	44	44	44	44	41

Source: own calculations based on annual data spanned on 1970-2013 for public debt-to-GDP ratio provided by Ameco

We can observe the case of Greece that records the highest indebtedness ratio and standard deviations which indicates large variations and possible difficulties in stabilizing public debt to a constant ratio.

The results reported in Table 2 also indicate which country recorded indebtedness ratios larger than GDP and their frequency.

Table 2

Frequency of the indebtedness ratio

Country/Range	Standard deviation	Obs.	Country/Range	Standard deviatio	Obs.
Ireland			Italy		
[20, 40)	4.626727	8	[20, 40)	NA	1
[40, 60)	6.037915	10	[40, 60)	5.487812	11
[60, 80)	4.573662	8	[60, 80)	5.397146	3
[80, 100)	5.565997	12	[80, 100)	5.986827	7
[100, 120)	3.410100	5	[100, 120)	5.471858	16
[120, 140)	NA	1	[120, 140)	1.252209	6
Spain			Portugal		
[0, 20)	1.567879	11	[0, 50)	12.87587	15
[20, 40)	7.526293	7	[50, 100)	10.41050	23
[40, 60)	6.878370	17	[100, 150)	4.755036	3
[60, 80)	2.704925	7			
[80, 100)	4.307765	2			
Greece					
[0, 50)	9.416709	16			
[50, 100)	17.92975	15			
[100, 150)	14.46654	10			
[150, 200)	*3.733008*	*3*			

Source: own calculations based on annual data spanned on 1970-2013 provided by Ameco

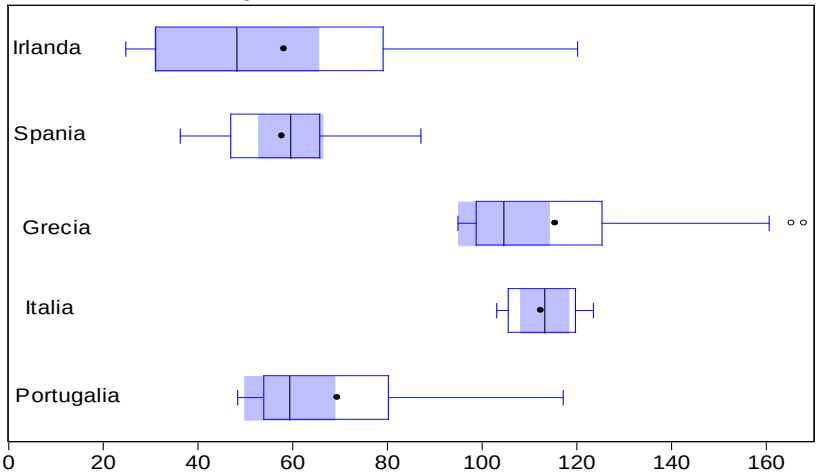
Italy record the highest frequency of 50% of indebtedness ratios larger the GDP. Then, it comes Ireland that has a frequency of 41%, followed by Greece 26%, Portugal 7% and Spain which has no public debt-to-GDP ratio higher than GDP.

Resizing the analysed period and focusing on the period after the Treaty of Maastricht was introduced, we notice that excepting Ireland which reported only for 3 time indebtedness ratios larger than GDP, for the rest of the countries under investigation, we notice that large public debt-to-GDP ratio recorded after 1995 when the convergence criteria which limits this ratio to 60% of GDP became fully operational.

Studying the boxplot of indebtedness ratio for the case of PIIGS on annual data extracted for 1995-2013, we observe that Greece has the highest exposure and outliers indicating extreme values of public debt-to-GDP ratio larger than 160% of GDP (see Figure 1):

Figure 1

Boxplot for the indebtedness ratio



Source: own calculations based on annual data spanned on 1995-2013 provided by Ameco

Excepting the case of Spain which hasn't recorded yet any indebtedness ratio larger than GDP, the rest of the countries had high public debt-to-GDP ratios. The figure also suggests that Greek government has difficulties in stabilizing public debt compared to the case of Italy which had indebtedness ratios larger than GDP for the period investigated but the variations were small indicating a more severe control of public debt.

Blanchard (1990) defined fiscal sustainability when indebtedness ratio does not explode and it comes back to its initial level. Starting this definition, Pasinetti (1998) considered that fiscal policy is sustainable when public debt-to-GDP ratio at time *t* should be lower than the ratio at time *0*:

$$\left(\frac{D}{Y}\right)_t \leq \left(\frac{D}{Y}\right)_0 \tag{9}$$

when:

D = public debt in nominal terms;
Y = GDP in nominal terms.

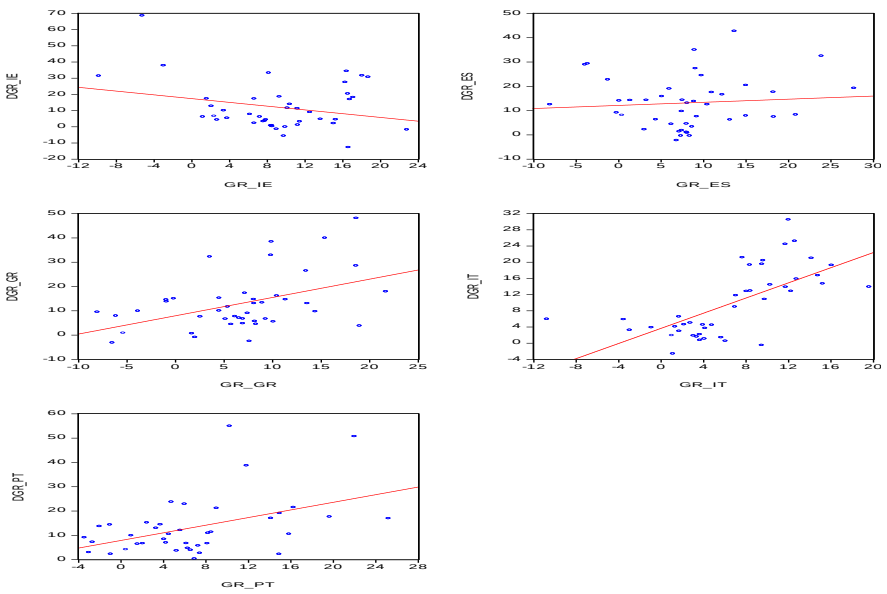
If we consider the growth rate of public debt, θ, and GDP growth rate, y, then for the fiscal policy to be sustainable in the long run the public debt growth rate should be lower than GDP growth rate.

$$\frac{\theta}{y} \cdot \frac{D}{Y} \leq \frac{D}{Y} \tag{10}$$

Studying the correlation between θ and y, we found that excepting Ireland which has a negative relationship, for the rest of the countries investigated we noticed a positive correlation (Figure 2):

Figure 2

Correlation between GDP growth rate (y) and public debt growth rate (θ)



Source: GDP growth rate (y) was calculated as relative variation of nominal GDP. Public debt growth rate was calculated as relative variation of nominal public debt. We used annual data of nominal GDP and public debt extracted from 1970-2013 provided by Ameco

We also observe that Italy had the highest public debt growth rate while for the case of Spain the GDP growth rate was much larger than public debt growth rate.

Studying the distribution of the gap between the GDP growth rate and public debt growth rate (see Table 3), we found that more than half of its values are negative, hence suggesting a public debt growth rate larger than economic growth rate.

Table 3

The distribution of the gap between GDP growth rate and public debt growth rate

Country/Range	Obs.	Country/Range	Obs.
Ireland		Italy	
[-100, -50)	1	[-20, -10)	8
[-50, 0)	23	[-10, 0)	22
[0, 50)	19	[0, 10)	12
Spain		[10, 20)	1
[-40, -30)	2	Portugal	
[-30, -20)	4	[-60, -40)	1
[-20, -10)	7	[-40, -20)	2
[-10, 0)	12	[-20, 0)	26
[0, 10)	16	[0, 20)	11
[10, 20)	2		
Greece			
[-30, -20)	5		
[-20, -10)	9		
[-10, 0)	15		
[0, 10)	12		
[10, 20)	2		

Source: own calculations based on annual data spanned on 1970-2013 provided by Ameco. GDP growth rate was calculated as relative variation of nominal GDP (y). Public debt growth rate was calculated as relative variation of nominal public debt (θ). When y- θ<0, then y< θ.

Portugal recorded the highest frequency of negative gap (72%), followed by Italy (70%), Greece and Ireland (67%), and, respectively, Spain (58%).

Now, considering equation (3), when interest rate on public debt (*i*) is larger than GDP growth rate (*y*), then governments should generate primary surplus to run sustainable fiscal policy in the long run for the fulfilment of the solvency constraint, which could imply significant financial efforts to achieve this goal. Therefore, it could be

less costly to issue government bonds on an interest rate below the economic growth rate.

Studying the gap between (*i-y*) on annual data extracted for 1995-2013, we notice that excepting Ireland, the rest of the country considered for this analysis issued government bonds on a cost larger than economic growth rate (see Table 4):

Table 4

The distribution of the gap between implicit interest rate on public debt and GDP growth rate

Country/Range	Obs.	Country/Range	Obs.
Ireland		Italy	
[-20, -10)	3	[-10, -5)	1
[-10, 0)	10	[0, 5)	15
[0, 10)	4	[5, 10)	2
[10, 20)	2	[10, 15)	1
Spain		Portugal	
[-5, 0)	9	[-4, -2)	1
[0, 5)	8	[-2, 0)	4
[5, 10)	2	[0, 2)	6
Greece		[2, 4)	5
[-5, 0)	6	[4, 6)	2
[0, 5)	6	[6, 8)	1
[5, 10)	6		
[10, 15)	1		

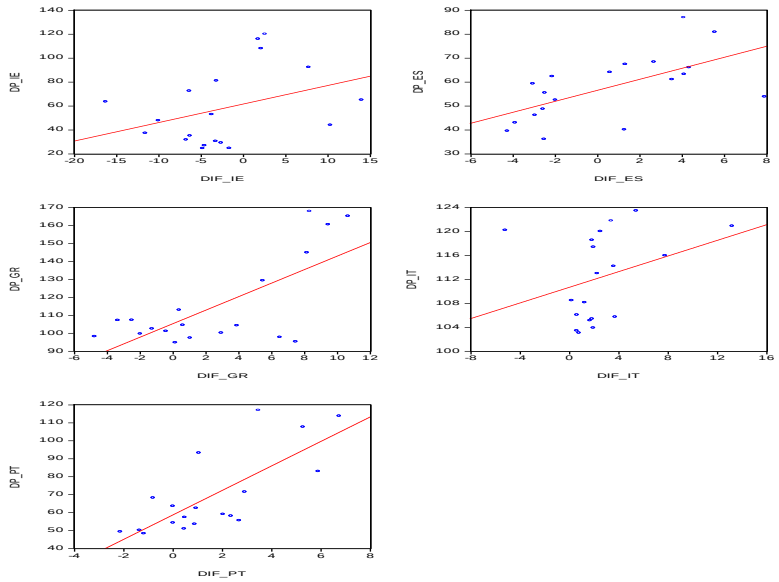
Source: own calculations based on annual data spanned on 1995-2013 provided by Ameco. GDP growth rate was calculated as relative variation of nominal GDP (y).The implicit interest rate on public debt was provided by. When i-y<0, then i<y

For the case of Italy the gap was positive for 95% of the values recorded, followed by Portugal (74%), Greece (68%), Spain (53%) and Ireland (32%). We can discuss this situation considering what Escolano stated in his paper of 2010. He argued that the negative discount factor (*i-y*)/(*1+y*) from equation (3) describes the 'modified golden rule' which emerges from the efficiency of economic growth process and from agents' preferences for current consumption. Moreover, he also suggested that the modified golden rule can be validated for developed and stable economies which reached to a steady state in the long run. On the other hand, issuing government bonds on a cost larger than economic growth rate for undetermined time could be arguable due to a high public debt service generated by high interest rates. Also studying the correlation between this gap and

indebtedness ratio we found positive relationship suggesting that public debt-to-DP ratio increased while the interest rate on public debt became higher than the economic growth rate (see Figure 3):

Figure 3

The correlation between the gap of implicit interest rate on public debt (*i*) and GDP growth rate(*y*) and indebtedness ratio



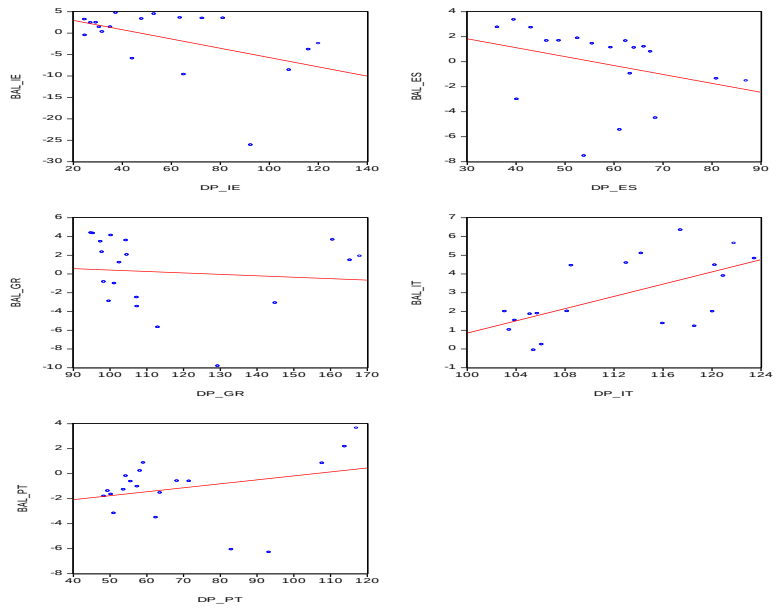
Source: own calculations based on annual data spanned on 1995-2013 provided by Ameco

To sum up for the moment, we found that the countries considered for analysis had high public debt-to-GDP ratios after introducing the convergence criteria form the Treaty of Maastricht, the public debt growth rate was higher than GDP growth rate for most of the data observed and that the implicit interest rate on public debt was also larger than economic growth rate for most of the cases. Given this context, we can state that PIIGS could confront large difficulties in achieving fiscal sustainability in the long run. Therefore, it is required for the government to be able to generate primary surplus to service its future payments. Therefore, we also analysed

the correlation between public debt-to-GDP ratio and primary balance on annual data ranged on 1995-2013. We noticed a negative correlation for the case of Ireland, Spain and Greece and a positive relation for the case of Portugal and Italy (see Figure 4). If Spain and Ireland could have run such correlation considering the decreasing indebtedness ratio in the case of Ireland and relatively small public debt-to-GDP ratios in the case of Spain, this is not the situation for the case of Greece.

Figure 4

The correlation between indebtedness ratio and primary balance



Source: own calculations based on annual data spanned on 1995-2013 provided by Ameco. Primary balance is calculated as first difference between government revenues and primary expenditures cyclically adjusted

Hence, we believe that studying fiscal sustainability based on fiscal reaction function will provide useful insight regarding how governments response to shocks on public debt. We estimate fiscal reaction function described by equation (8) by OLS for individual countries under investigation. We use annual data extracted for 1995-2013. The principal variables implied by model are: cyclically adjusted

primary balance (*p*) and public debt-to-GDP ratio (*b*). Then, to check for the robustness we use control variables: inflation rate (*r*), implicit interest rate on public debt (*i*) and industrial production (*ip*) as proxy for the business cycle. The results are reported in the table below:

Table 5

The results for fiscal reaction function

Country	Variable	Coefficient	Std. Error	t-Statistic	Prob.	R^2	F-statistic
Ireland	b	-0.108395	0.052503	-2.064529	0.0546	0.218283	4.746998
	constant	5.138004	2.043463	2.514362	0.0223		
Spain	b	0.135678	0.084523	1.605229	0.1344	0.865582	19.31840
	i	0.875588	0.191364	4.575502	0.0006		
	r	0.382021	0.280712	1.360897	0.1986		
	ip	0.424626	0.082727	5.132848	0.0002		
	constant	-53.64951	11.98349	-4.476951	0.0008		
Greece	p(-1)	0.846968	0.171439	4.940355	0.0002	0.647830	13.79655
	b	0.032351	0.022340	1.448124	0.1682		
	constant	-3.776715	2.638019	-1.431648	0.1728		
Italy	b	0.163211	0.049983	3.265327	0.0046	0.371318	10.04069
	constant	-15.47478	5.391188	-2.870384	0.0106		
Portugal	p(-1)	0.461589	0.158534	2.911607	0.0107	0.362204	4.259237
	b	0.050733	0.018448	2.749978	0.0149		
	constant	-3.992879	1.190817	-3.353060	0.0044		

The results reveal the particularities of governments' response of each country. The expected reaction is positive in the sense of increasing primary surplus or at least in decreasing primary deficit to an increase of public debt-to-GDP ratio by 1 p.p..

In the case of Ireland, the response is negative. The increase of public debt by 1 p.p. goes to a decrease of the primary surplus/increase of the primary deficit by 0.01 p.p. This reaction could be argued considering the decreasing trend of public debt for the period analysed. For the period ranged on 1970-2015 we observed a negative correlation between the public debt growth rate and the economic growth rate and for the period 1995-2013, the gap between the implicit interest rate on public debt and the GDP growth rate was negative for 68% cases implying a cost of public debt lower than economic growth rate. Given this context, the results suggest that Irish government run a more flexible fiscal policy and didn't aim in

adjusting it to shocks on public debt. But starting 2008 until 2013, the indebtedness ratio increased by almost 3 times its standard deviation. In this situation, if government does not adjust fiscal policy and fiscal reaction function remains unchanged, Ireland will confront difficulties in fulfilling the solvency constraint.

For the case of Spain, we observe that indebtedness ratio is not statistically significant, hence we cannot state whether it has an influence or not on the primary balance. But, the results show a positive correlation between industrial production and primary balance. Thus, we may conclude that Spanish fiscal policy is pro-cyclical which could be harmful given the current context of economic recession. We also noticed that primary surplus positively responses to the increase of the cost of public debt. In that sense, Doluca, Hübner, Rumpf and Weigert (2012) showed that Spain and Italy are the only European Union countries which confront major difficulties generated by the cost of government bonds which is the largest since the formation of euro area. Spain is the only country among PIIGS which still has indebtedness ratios lower than GDP, even if the public debt growth rate is higher than economic growth rate. Therefore, we suggest that a more flexible fiscal policy adjusting to the dynamic of public debt would be useful to face the possible increase of public debt as a result of the deep economic recession.

Greece, the country which confronts the largest public debt-to-GDP ratio, runs a fiscal policy which does not react significantly to shocks on public debt. The results indicate that indebtedness ratio is not statistically significant. We observe only an inertia effect generated by past fiscal policy. Greece will definitely need a more flexible fiscal policy which should react properly to shock on public debt. For the moment, the adjustment of fiscal policy would require substantial financial resources which would create a large burden on population.

Italy and Portugal are the only countries for which the results reveal and immediate and positive response of the government to changes in public debt-to-GDP ratio. The size of the reaction differs accordingly to the size of the indebtedness ratio. In the case of Italy, an increase by 1 p.p. of the indebtedness ratio goes to an increase of primary surplus by 0.16 p.p. while in the Portugal's case this increase is only by 0.05 p.p..

The results indicated by our analysis are consistent to some extent with the results found in the existing literature. The possible distinctions are due to different investigation methods or database used for analysis. Hence, Afonso (2000) using unit root and co-integration tests for annual data spanned on 1968-1997 found that fiscal policy is not sustainable for the case of countries considered for investigation in our study. Ricciutti (2003) indicated that for Italy's case that fiscal policy is sustainable after conducted an investigation for 1861-1998 period and applying unit root tests. Marinheiro (2005) also revealed the fiscal sustainability for the case of Portugal for data ranged on 1903-2003.

5. Concluding remarks

Given the current macroeconomic context characterized by a deep economic recession, a healthy and flexible fiscal policy plays an important role in overcoming these difficulties. This study aimed in investigating fiscal sustainability for the case of European Union countries which have a poor economic situation: Portugal, Ireland, Italy, Greece and Spain. For that purpose, we used fiscal reaction function which gives important details about the speed and the size of reaction. We used annual data spanned on 1995-2013. The results show particularities of governments; response of each country under investigation. Hence, for Ireland's case we found a negative response to shocks on public debt which can be argued considering the decrease of public debt-to-GDP ratio. But for the last years, the substantial increase of the indebtedness ratio can generate difficulties for the Irish government if it doesn't adjust fiscal reaction function as for the inter-temporal budget constraint to be fulfilled. For the case of Spain and Greece the results are not statistically significant, hence indicating no influence of public debt-to-GDP ratio on primary balance. But these results can be discussed separately. For instance, Spain has low indebtedness ratios compared to the rest of the PIIGS countries. In that sense Carballo-Cruz (2011) suggested that the difficulties which Spain has to overcome emerged rather from the private debt and high unemployment rate than from sovereign debt. Spanish fiscal policy also reacts to the increase of the cost of public debt. Greece, which has the most difficult situation, runs a fiscal policy which does no response to shocks on public debt. Therefore,

adjustments should be carried out. Stoian and Alves (2011) suggested as the most convenient scenario the stabilization of public debt. Italy and Portugal are the only PIIGS countries for which the results indicate a positive and immediate reaction of fiscal policy to shocks on public debt. The size of the reaction differs accordingly to the indebtedness ratio. Therefore, we can conclude that for the case of these two countries, governments meet the conditions to run a sustainable fiscal policy in the long run.

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INCREASED FINANCING FOR THE PROJECTS FOR ENVIRONMENTAL PROTECTION

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Rezumat

Prezentul studiu porneşte de la realitatea că finanțarea proiectelor orientate spre protecția mediului este o direcție relativ recent abordată în România, comparativ cu alte state europene. Mecanismele de finanțare a protecției mediului pot fi descrise, prin focalizarea pe statutul lor actual, pe obstacole şi oportunități, pe potențialul viitor şi pe provocările cu care se confruntă, evidențiindu-se o serie extinsă de mecanisme cu potențial considerabil pentru amplificarea finanțării protecției şi conservării mediului. Însă problema care rămâne este dacă aceste mecanisme vor fi suficiente pentru a genera finanțarea adecvată pe termen lung, în scopul implementării proiectelor şi programelor de protecție a mediului.

În acest context, se impun schimbări majore asupra modului în care este conceptualizată, înțeleasă şi utilizată finanțarea, iar în acest sens, o serie de măsuri vor juca un rol din ce în ce mai important în satisfacerea nevoilor de finanțare.

Abstract

This study starts from the fact that the financing of projects for environmental protection started rather recently in Romania compared to other European states. The mechanisms for environmental protection financing can be described by focusing on their current status, on obstacles and opportunities, on their future potential and on their challenges. This will show a wide range of mechanisms that have a considerable potential to enhance the long-term adequate financing of the environmental protection and preservation. However, the problem that remains is whether these

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mechanisms will be enough to generate the adequate long-term financing with the aim to implement the programs and projects for environmental protection.

Within this context, major changes in the manner in which financing is conceptualized, understood and used are required, and there are several measures that will play an increasingly important role in meeting the financing needs.

Keywords: financing per project, investments interventions, investments for environmental protection

JEL classification: Q 56

Financing the projects for environmental protection and preservation aims both enduring and allocating those financial resources, stable and sufficient on the long term, in a proper form and rhythmically, in order to cover the costs required for environmental protection and to ensure an efficacious and efficient management of the protected areas.

Financing per project presumes that the future flow of funds is the element that justifies the requirement for resources invested in the project. The task of the financing body is to organise the cash flow in such manner that it meets the financing needs of the project, while presenting interest for the agencies, lenders and investors willing to invest in the project.

The organisation of project financing may propose the use of a variety of financial instruments such as indebting instruments; equivalent actions and instruments; aids and donations; intermediary financing through instruments that are mainly in the form of debts; beneficiaries, suppliers and customers-buyers; debt payment collaterals.

The projects are financed within *various assemblies of institutions, instruments, areas, geographical and territorial structures, policies and regulations, groups of interest and participants, entities and forms of financing, financing mechanisms etc.* They form quasi networks with configurational, compositional and interactional characteristics that may provide, within favourable systemic conditions, flexibility, adaptability, self-organisation and differentiation.

The *initial priority* is to **identify the potential sources of financing**, the efficiency of the potential methods of financing varying with the type of project and its objectives.

Financing the environmental investments is a recently approached direction, after Romania accessed the European Union. This financing supports sectors such as: environmental infrastructure, ecosystems, renewable energy, clean technologies, biodiversity, water shortage, sustainable towns, transportation etc.

The development of environmental investment projects is a necessity in order to achieve the protection of the clean environment, particularly of some sources of raw materials; this can be accomplished by developments in science and technology, by ensuring the direct access to non-polluting technologies that save energy and matter.

These investment projects must take into consideration the general principles of the strategy for environmental protection:

- Conservation, protection and improvement of the environmental quality;
- Protection of human health;
- Defence against natural disasters and accidents;
- Prudent and rational use of the natural resources;
- Highest cost-benefit ratio;
- Promoting international measures to deal with the regional environmental issues;

It is important to identify the main environmental aspects and to show the possible environmental benefits or improvement that might be included in the investment projects: cleaner productions, less wastes; less greenhouse effect, lower consumption of energy; preservation and improvement of the biodiversity.

The environmental aspects become important and may have a significant impact on it.

The following factors are to be taken into consideration:

- Emissions into the air;
- Spillage into the water;
- Soil contamination;
- Use of raw materials and of natural resources;
- Other problems regarding the communities and the environment.

After having settled the environmental priorities we may focus on the financial and human resources and on the most serious environmental issues, while observing the improvement in public health and in the state of the environment. The next step is to make am hierarchy of the environmental aspects.

Several criteria are to be considered when determining this hierarchy:

a. Is human health affected?

The public health must be protected and it must have priority.

b. Is the environment affected?

The nature and the biodiversity have to be protected, preserved and restored, as essential conditions for life sustainability and for a sustainable development.

c. Is there agreement with the legal requirements?

Following the accession to the European Union, additional criteria have been added in order to *prioritize* the measures that are beneficial for the public health/environment.

The area is expanding because over the past 5-6 years we passed from the stage of acquiring to the stage of recognizing the importance of accumulating funds for the projects in environmental investments.

The main factors that will determine the *expansion* of the concerns *for the financing of environmental projects* regard:

- Privatization of the industry, which will determine the monitoring of the way in which the environmental legislation is enforced;
- Limiting the access to subsidies from the state budget;
- Implementing the systems of environmental management in enterprises.

The *necessity of investments* through projects of environmental protection in Romania also starts from the flaws detected in the specific environmental actions, because the level of the environmental actions didn't produce the expected results: *the running actions* hold a significant proportion, followed by the *accomplished actions* and by the *actions accomplished in advance* (much less); also present are the *delayed, cancelled* or *failed environmental actions* (in a proportion almost equal to the proportion of the accomplished environmental actions)

The projects need to be planned, which presumes the following stages:

1) Possible manifestation of undesirable environmental effects;

2) Estimation of the cost of the different methods of intervention and select the methods with the best cost to benefit ratio;

3) Order the investment projects function of the probable appearance of the environmental risks and environmental impact;

The experience shows that the projects for environmental protection may be organised and run efficiently according to an overall coherent plan that includes the priorities resulting from the integration of the scientific, technical, economic and social information, while designing and measuring the influences on all the resources. Each country has to formulate its environmental priorities, which are different from one country to another.

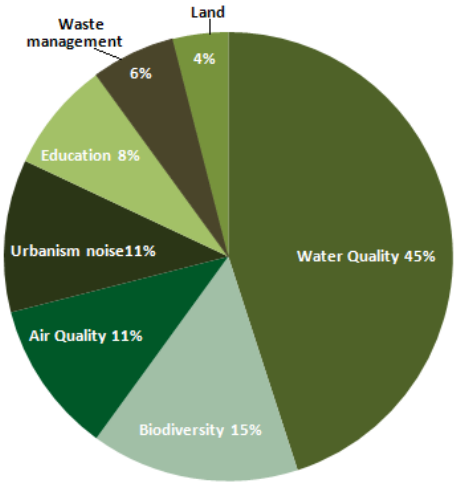
Prioritization becomes necessary when the environmental problems overlap the economic and social problems; this is the key to the successful environmental strategies and policies.

It is not easy to achieve a balance between the different considerations. The variety of factors that have to be considered is large and the available data is often doubtful. They are complementary and must be applied simultaneously:

- The elements of economic policy with beneficial environmental effects will be supported, as much as possible;
- Policies clearly targeting environmental protection will be adopted; a system of incentives and environmental protection institutions will be established;
- The environmental protection expenditure will focus on those projects that ensure the highest cost to benefit ratio;
- Modest resources will be allocated to the programs whose expected cost to benefit ratio is expected to be high, but which runs on the long term.

The investments specific to environmental projects must be carried out within an organised framework based on the planning of activities depending in the priority areas of intervention. Thus, the proposals of environmental protection to be financed in Romania are grouped according to the specific environmental areas (see the chart below).

Chart 1
Distribution of the environmental protection projects by specific environmental areas



Source: National Agency for Environmental protection (ANPM)

Within the context of the stringent need to defend the environment from the socio-economic activities with a major risk on the environmental factors, the ***environmental investments*** of the specific priority programs must be reconsidered towards the accomplishment of priority objectives regarding the:

- Defence against natural disasters and avoiding as much as possible their occurrence;
- Arrangement of the hydrographical basins in order to rehabilitate the existing water sources;
- Eco-efficient management of the forestry areas;
- Ecological reconstruction by afforestation works on the degraded lands;
- Establishment of forest belts;
- Ecological reconstruction and preservation of the environmental biodiversity;
- Development of the environmental institutional capacity.

The identification, drawing, administration and allocation of the financing sources for the environmental projects are in full agreement

with the requirements for the preservation of the environmental quality and decrease of the adverse effects of the human, economic and social activities.

The sources of financing for the environmental investment projects fall into two categories: internal sources and external sources.

For Romania, the main internal sources are represented by the **state budget** and the **own resources**.

The external sources of financing for the environmental investment projects, identified by the Ministry of the Environment, as being the most suitable partners for the loans with EU co-financing are the international financial institutions that grant loans for the environmental projects in the form of **foreign credits**:

a. Fund for Social Development of the Council of Europe;
b. European Bank for Reconstruction and Development (EBRD);
c. European Investment Bank (EIB);
d. World Bank through the Global Environment Facility (GEF);
e. United Nations Development Program (UNDP);
f. Bilateral donors.

The most important bilateral donors for the environmental investment projects in Romania are:

• **Denmark**. The projects financed by this country were used to develop sectorial strategies for harmonization with EU requirements on the “air quality and climacteric changes” and “control of industrial pollution and risk management” and for the continuous assistance in the transposition and implementation of EU legislation on air pollution;

• **Netherlands** provides assistance through MATRA program which involves technical assistance for the promotion of a modern and efficient environmental legislation, implementation of the legal provisions regarding the environmental fund; financing strategies for the international environmental investment projects; establishment and monitoring of the systems specific to the extra-budgetary incomes used by the territorial inspectorates for environmental protection, implementation of the environmental instruments;

• Other external donors: Japan, Switzerland, Sweden.

After its accession to the European Union, Romania benefitted until 2013 of about 30 billion Euros allocated through the following funds:

1. European Regional Development Fund;
2. European Social Fund;
3. European Cohesion Fund;
4. European Fund for Agriculture and Rural Development.

On this occasion, the interested institutions from Romania have the possibility to draw non-reimbursable funds with the precise purpose of financing the environmental investment projects.

Because it was noticed that the financing sources are not enough, a mechanism for self-financing of the environmental projects was designed, which to ensure the main additional resources that were required. These main sources for self-financing are:

- Fees for the release of environmental agreements and licences;
- Technical expertise regarding the laboratory analyses;
- Technical counselling.

The main subjects of the projects for environmental investments in Romania regard the:

• Control of pollution in agriculture;
• Preservation of the biodiversity;
• Sustainable preservation and management of the ecosystems;
• Establishment of IT systems for defence in case of natural disasters;
• Reduce the greenhouse gas effects by improving the energy efficiency.

Presently, this financing supports sectors such as the environmental infrastructure, the ecosystems, the renewable energy, the clean technologies, biodiversity, water shortage, sustainable towns, transportation etc.

The positive results to be obtained should be much above the environmental damages in case no action is taken; there also are some benefits so important that they cannot be evaluated, such as improving human health, maintaining ecosystem biodiversity; the intense manifestation of the concern for environmental protection is a major necessity for survival and progress, being a problem of interest for the economic and social evolution.

Financing the projects of environmental protection must ensure that the progress of the project uses cheap, readily accessible and safe financial resources; it must also allow covering all costs, the commercial and financial operations associated to the different aspects of the projects.

The future environmental protection in Romania must be punctual, distributive, correlative and multiplicative, in an extended and prospective spatial and temporal vision; in a very brief period we will have to understand the reality of an already over-polluted environment that can only accept decreasing amounts of noxious pollutants.

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CAPACITY TO FINANCE ENVIRONMENTAL INVESTMENTS OF A POLLUTER

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Rezumat

Evaluarea riscurilor finanțării proiectelor de investiții de mediu, având ca fundamente identificarea, interdependența, analiza şi prospectarea efectelor acestora, se impune deoarece eludarea, abordarea individuală sau dimensionarea eronată a acestora ar putea avea consecințe nefavorabile şi neprevăzute în ceea ce priveşte eficiența strategiilor şi politicilor în domeniul protecției mediului.

Această cercetare are scopul de a identifica, pe baza unei analize ştiințifice, metodologice şi empirice, raportată la conceptele, principiile şi argumentele impuse de teoria economică, riscurile asociate finanțării proiectelor de investiții de mediu, precum şi alternativele, din perspectiva dezvoltării durabile, de:

(1) evitare şi de internalizare a costurilor de finanțare;
(2) evitare şi de internalizare a externalităților de mediu.

Abstract

Risk evaluation of financing environmental investment projects presumes the identification, interdependency, analysis and prospecting of their effects. This is necessary because the elusion, individual approach or improper sizing of these investment projects may have unfavourable and unpredicted consequences on the efficiency of the strategies and policies of environmental protection.

This purpose of this research is to identify, through scientific, methodological and empirical analysis of the economic concepts,

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principles and arguments, the risks associated to the sustainable financing of environmental investment projects in terms of:

(1) Avoiding and internalising the financing costs;
(2) Avoiding and internalising the environmental externalities.

JEL classification: Q56

Keywords: financing risks, financing through projects, investments for environmental protection

Introduction

Apparently, there is no direct or strong relation, between the dynamics of the demand and the production recipe of a product – e.g. a good (not service) – manufactured through a polluting production process. The direct relation is only apparently missing, upon a superficial analysis, because it is closely related to the financing of a project of investment, for instance the expansion of the production capacity of the polluting factory – which aims to decrease the amount of pollutants released (into the air, water or soil).

To start with, the analysis must be set within its natural settings pollution became a problem only after, and because, its *amplitude* and the amplitude of its *effects* draw the attention due to the entailed difficulties. The, almost mathematical, relation between these two terms, the classification of a reality as negative element and it amplitude, where the first is function of the second, clearly highlights the economic and social substrate of the need for risk assessment related to the financing of the investments for environmental protection.

It is a fact that what is produced, and for *whom* – through economic activities whose deleterious environmental effects cause worrying – is the "raw material" for the ecology, the object of activity of the ecologists and the matter of concern for this paper. However, this real background of the ecology cannot be described in terms of a contradiction because it is a binomial – even an unsustainable one on the long-term; the two dynamics that describe it are integrated within a single reality, the real economy, they are not individually autonomous.

The financing capacity of a polluter depends on the demand for its products

Environmental protection should be achieved with the maximal efficiency by the society to its direct and concrete benefit; in these terms

pollution is a harmful objective existence in a subjective plan, in other words, in the social plan. For a polluter, the financing of an investment project concomitantly with the financing of its efforts for environmental protection is more so difficult, in any economy, as the society aims to limit its financial potential because – and against – its production capacity.

In purely social terms, the polluter manufactures a production which is too large to fit the long-term requirement of the population, at least the population in the neighbourhood of the polluter; the production relying on an intrinsically polluting process pollutes more with the increase of production scale.

However, in purely economic terms, and drafting a *status quo* of the market (in a specific state from a real economy) and of the existing products, each polluter, as distinct unit and the whole polluting industry, are indispensable to the people, to the consumers, because they produce goods and services needed by the consumers.

These goods and services are produced concomitantly with the pollution of the environment. However, this relation is, hopefully, not indissoluble: the economic (industrial) products can be produced presently only using polluting processes and production means; optimistically, they might be produced, also presently, without pollution, but at (much) higher costs.

The problem is that there is no contradiction, a recoil effect, which while preserving a component – the production of the socially expected outcomes, may discard the second component (it is not desirable to discard the economic activity/reality which affects by pollution). In other words, the problem of pollution, of financing the investments, while intensifying the efforts towards environmental protection, cannot be treated as a willingly environmental protection because it cannot be solved in the same manner.

More clearly, we cannot approach it in a similar manner: the industries, and not just them, but all the polluting economic activities – produce (practically) all the consumer goods and services on the market; on the short term, halting the production of the polluting factories, to give just one example, would be similar to living a subsistence life.

On the other hand, however, the difficulty of financing the investment projects on the background of an active environmental protection will be judged with conceptual-mathematical instruments. We will not use a true mathematical tool but we will input the basic variables of the

microeconomic processes into several inequalities, sufficiently precise and concrete, as to delineate the limit beyond which it is impossible to go.

Our previous analysis is related directly to the following inequalities and this has solid justification: the, supposedly positive, utility of a polluting production as it is the case here – produces the effect that not just the whole society, but the management of the polluting company too, or maybe primarily it, cannot conceive *caeteris paribus*, the variant of a strong decrease of production.

The available models, supplied by the literature, show precisely how much a polluter moves off the borders of the sustainable economic growth (environmental and macroeconomic), the size of production being one of the two poles. More clearly, the society, more precisely the state, must finance one way or the other, the actions of removing the pollutants from the environment. A "typical" polluter:

a) Has a production (Q) which is larger than the *optimal production* (Q^*) – from the social and macroeconomic (e.g. budgetary) points of view, thus also producing a very large amount of pollutants;
b) Calculates a (much) lower marginal cost than the real one[1], which is detrimental both the real economy in which it operates and the state, because it doesn't include the marginal cost of the production and release of pollutants into the environment and their subsequent removal from the environment.

In conclusion, capacity of a polluter to finance its own investment projects (if the polluter decides to modify the above parameters so as to be in agreement with the environmental requirements) follows strictly the path established by the adjustment of the production size and of the marginal costs.

This can be observed immediately from the following two inequalities, where we note with Q_0 and C_{mg_0} the initial production (the „very polluting"

[1] *Algebraically, if we note with* C_{mg} *the marginal cost calculated and recorded by the polluting enterprise, and with* C_{mg}^* *the optimal marginal cost – also from the social and macroeconomic points of view,* $C_{mg} \ll C_{mg}^*$.

one), and the initial marginal cost, and with Q_1 and C_{mg_1} the adjusted size of these two indicators:

$$\begin{cases} Q_1 = Q^* < Q_0 \\ C_{mg_1} \gg C_{mg_0} \end{cases}$$

It is not difficult to notice that on these economic bases the financing capacity of a polluter – which took the necessary measures to pollute just as much as it is allowed – to bear itself as much as possible the depollution activity, is drastically reduced, under the conditions in which the product which it manufactures is demanded much on the market.

Financing the investment projects vs. maximization of the polluter's profit

The classical target of any company operating within a market economy – profit maximization – is rather difficult to be achieved by a polluter which acts in agreement with the social requirements, and not only, for the reorganisation of its (polluting) production flow with the view to reduce drastically the polluting emissions.

However, this objective of profit maximization cannot be omitted from the strategic plan of a polluter since that particular company has to be profitable in order to function for a long period; at the same time, it needs financial funds which it can earn by financing the investment funds.

As it is known, funds allocation for an investment project involves three basic decisions:

A. Budgeting the capital;
B. Financing;
C. Dividend policy.

Dealing more with the risks of the *major* financing of the investment projects and less with the outcomes of the (successfully) implemented investment projects – possibly talking about the profit sharing policy, about the secondary and indirect financing by the payment of small or null dividends available to the company after the ***profit has been assured and shown in the accountancy books*** – we are more interested by the previously mentioned two decisions and will therefor go into detail with them.

The microeconomic theory, validated by the practice of economic life (under market conditions, at least), says that a company may produce (provided it sells completely or much of the production from each production cycle) and function successfully if the marginal income is higher than the marginal cost. Hence, the risks of financing for a polluter have both a financial form and content and an actually economic property.

Looking in detail to the impact of these microeconomic variables, when the marginal income *starts to decrease* in relation with a moment of reference (when $V_{mg} > C_{mg}$, V_{mg} being the marginal income) while the marginal cost *starts to increase*, until the moment when these two variables are equal, this is the limit of the efficient functioning of the firm.

This also is the limit of the financial efficiency, meaning that if the marginal cost keeps increasing while the marginal income at least remains constant, the company starts to produce with losses.

All these principles function, in average, only against the polluter, with a single exception, e.g. if the polluter decides to change the production process and strategy in order to control its polluting emissions by re-technologization and by cutting down the production.

In order to be synthetic, we will describe these risks[2], the most important and numerous ones which we grouped so as to highlight their identical economic and financial substrate; however, there is one more risk, not actually typical, "just" a major risk (which is not related exclusively to the financing of an investment project for environmental protection).

These risks are:

(**Α`**) **Risk of payments cessation (bankruptcy)**

(**Β`**) **Risk of taking (too) expensive loans**

(**Γ`**) **Risk of underfinancing** (regarding the actual financing of the investment project)

(**Δ`**) **Risk of bearing an average cost[3] which is higher than its minimal (theoretical) value**

(**Ε`**) **Risk of bearing much of/completely the marginal cost**

Adding to these is the

(**Σ`**) **Risk of unprofitable acquisition/merger**

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[2] For the content of the risk concept in economics and for its typology, see Eatwell, J., Milgate, M., Newman, P., The New Palgrave: A Dictionary of Economics, The Macmillan Press Limited, 1996.

[3] Cost of procuring the financial funds.

We consider that for any company operating within a market economy the financial loss is the extreme benchmark of the financial loss because this is the state which the company can no longer leave because it cannot cover the loss by its existing means (own or borrowed).

The risk of a permanent financial loss, in other words the bankruptcy risk is one of the risks of financing the projects for environmental protection. The financial risks of an (ex) polluter which "ecologizes" its activities and processes as much as possible are highly variable and directly proportional to the size of the marginal cost, on the one hand, and with its capacity for (self)financing, on the other hand.

In the practice of financing the activity of a company, its investment projects included (with a decreasing "ecological" production and with a much higher marginal cost than before the decisions for the *actual* environmental protection), it is really difficult to decide going on with the production just on the basis of the increasing marginal income.

One cause relies in the current technological reality that, at least to some extent, the less/non polluting technologies do not guarantee the (exponential) increase of the marginal income of the company using them: the dynamics seems to be rather opposite. This is what we called the **risk of bearing much of/completely the marginal cost**.

On the other hand, the exception mentioned above is the possible situation of monopoly of the polluter, which is quite often in such cases. If the polluter is a monopoly in its area of activity it may undoubtedly adopt *de facto* the stance of economic agent which invests only in the investment projects related to environmental protection, under the conditions mentioned previously, since it can do this if the market, the consumers of its products accept the effects of this decision, i.e. forcing the consumers to assume – by increasing the price of the product – the entire increase of the marginal cost.

If we admit the equivalence one unit of product – one (more) unit of pollutant expelled into the environment, a polluting company is asked to reduce drastically the polluting emissions if this happens when the extent of the damages due to pollution is maximal at the moment of the highest economic efficiency – at least since it is represented by the volume of production.

Reverting to the investments strategy of a (former) polluting company we must say that ensuring the budget for the capital presumes the exact

quantification of the financial resources of the company, both its own resources and the borrowed ones. This allows calculating precisely the necessary proportion of each type of financial resource within the mix of financial resources used for a specific project of investments.

The substrate is economic-financial: the management can decide the implementation of a very important investment project, basic for the future of the company, or which will allow expanding the activity and thus the financial power of the company, but this claims an important financial sacrifice. This sacrifice is a long-term one if the cost of the borrowed financial resources is high. This may bring a risk which cannot be neglected, the **risk of taking (too) expensive loans**.

On the other hand, if the own resources of the company have a (much) lower cost than the external resources, a particular project of investments which is less important for the company or which runs while not having enough financial resources to cover the cost of the exogenous financial sources, must be financed as much as possible from own sources provided they are available in sufficient amounts to finish the investments project and that it doesn't fail due to underfinancing. This brings about another risk, the **risk of underfinancing**.

The actual financing, as distinct decision within the process of funds allocation for investment projects, has a precise and hardly attainable objective, which enables the financial dynamics to be sustainable indeed. This is materialised in the procurement of financial funds for the investment projects (for environmental protection) at the lowest average cost. In other words, all measures have to be taken so that the risk of procuring financial funds whose average cost is higher than their minimal value (that can be obtained in practice) doesn't materialise.

This objective is a double one because the financial funds procured at the lowest average cost entail a lower rate of their yield[4]; the rate of yield is usually expressed as the percent increase *above* the *cost of investment* at moment t_0 (the initial moment, against which the specific financial dynamics is compared). Anyhow, a major risk of the companies investing in environmental protection is the **risk of bearing an average cost**[5] **which is higher than its minimal (theoretical) value**.

There is a relation between the capacity of the company to materialise profit maximization and the need for proper financing of the investment

[4] *This rate of the yield is used to calculate the actual cost of the project.*
[5] *Cost of procuring the financial funds.*

projects for environmental protection making use of a special type of investment project.

This special type of investment project is the investment in another company or companies, by buying them or by merging with them. The company, particularly if it is a monopoly, may wish to reach the stage of scale economy, which may also be beneficial for the environmental protection, particularly if there is an acquisition on the vertical (companies supplying raw materials or which clean up the pollutants from the environment and which restore the environment).

If such project of investments materialises, this may increase significantly both the operational efficiency of the resulting company and the quality of activity coordination. It will also increase the financial efficiency because the double financing will disappear: activities which the company was doing and simultaneously paying before the acquisition/merger, as well as similar or identical activities which the polluting company had to externalise.

One of the positive consequences – at least on the short term – of the acquisition/merger is the expansion of activity. This can bring benefits by decreasing the global financial risk for the company by:

(1) Obtaining (possible) fiscal advantages;
(2) “Free” acquisition of a stock of liquidities.

The potential benefits are as important as possible; however if, after the merger, the company which bought or merged with another company is in a precarious financial situation it may miss these potential benefits because of the **risk of unprofitable acquisition/merger**.

Several risks, typical or not, have been identified for the company which finances projects of environmental protection, compelled by the circumstances, by the state institutions or just aware of the environmental damages that it causes.

A graphical representation can be drawn up, a diagram of the risks, whose structure is precisely fundamented by the evaluation of the company costs (cost of depollution included) versus the risks of financing the economic processes of the same company. This is a quasi-mathematical expression of the risk function of the costs incurred by the company.

Not to let it remain a purely literary abstraction, the risk is approximated by the quantification of its inexistence and of its effects, in

other words, by what the company can obtain by avoiding the economic and financial risks.

Put differently, we presume the continuous deployment of efforts so that the company growth harms the environment as little as possible. The costs include every expenditures incurred by the company, not just the costs associated to the depollution activity.

The diagram looks like this:

	C (cost)	*max.*				*min.*
Q (production)						
Minimal production ⇔ Maximal risk		(**A`**)	(**Σ`**)			
			(**B`**)			
					(**E`**)	
Maximal production ⇔ Minimal risk				(**Δ`**)		(**Γ`**)

It is also interesting and relevant, for the manager of the (former) polluting company included, to make a connection between the risk confronting the company, irrespective of its severity, and the quality, structure of its liabilities.

The liabilities consist of own capitals and debts. The liabilities of a company depend on the size of the company and on the cost of its investment projects whose financing has to be secured.

A basic principle of financial technique, recently discovered or rediscovered after the 1933 crisis, expresses an obvious truth: the short-term credits **cannot** finance large investment (projects) spanning over (several) years, because such utilizations cannot be paid from the results of the investments because of the different periods of the credits and

because the long-term investments cannot become, on the short-term, cash-flow sources.

A polluter which considers playing this role at the minimal level, or a former polluter (industrial or other economic branch), can allocate important funds for the investment projects from its own capital (shareholders contributions).

In this case, however, on the long term, the dividend policy is necessarily directed towards the shareholders by not allowing the company to accumulate important financial reserves; within its liabilities, the polluting company may establish a volume consisting of own capitals, as large as the management decides, but it will not be allowed to use this capital for long-term projects, as one might think.

The need to ground de investment decision particularly on long-term debts is more than justified by the following variables:

1. Number and amplitude of the investment projects needing large funds (may have at least two running simultaneously);
2. The productive, industrial activity of a (large) company whose projects are directed towards environmental protection necessarily runs on the long term;
3. The financial requirements of the depolluting activities and of the related activities usually require important financial funds and often run on the long term.

The risks of financing environmental protection projects must be evaluated from various perspectives; the financial perspective is important for the long-term development of the company and is relevant for decision-making process of the management and for the acceptance of these decisions by the shareholders.

Conclusions

The importance of some indicators such as the marginal income and the marginal cost, next to the advantage of the monopoly, proves that the economic sector of activity of the company is very important. The production type of the company is crucial for the financing of the environmental protection projects.

It is also important to know if, or for how long, the product is competed on the market by products with role of replacers.

The analysis of the – typical or less typical – risks confronting the company which invests in environmental protection projects is a subject of

fundamental research; a cybernetic or purely information structure of it will be required in the future.

In conclusion, complex effects on the company liabilities appear in relation with the risks of financing the environmental protection projects; these risks are interconnected within a network of economic variables by which they are influenced and which they also influence.

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