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Factors Determining a 'Safe' Level of Public Debt

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Abstract

Since 2008, the world economy has been facing consequences of the global financial crisis. One of them is rapid growth in public debt in most advanced economies, which resulted from an overoptimistic estimate of fiscal situation before the crisis, declining government revenue and increasing social expenditure during the crisis, costs of the banking system restructuring, countercyclical fiscal policies, etc.

For this reason, many governments are trying to determine a 'safe' level of fiscal deficit and public debt. However, this is not an easy task. There is no single standard of fiscal safety for all economies. Besides, a globalized economy and irregular business cycle make it difficult to find out in which phase of the cycle a given economy is at the moment, while this is essential to assess fiscal indicators.

Historical experience shows that default risk may materialize at different levels of public debt, sometimes seemingly very low. In fact, a 'safe' borrowing level is country-specific and depends on many factors and often unpredictable circumstances. However, given the tense situation in global markets, the 'safe' level of public debt is lower than it used to be a decade ago. Another argument for a cautious approach concerns a highly pro-cyclical nature of such measures as the fiscal deficit to GDP or public debt to GDP ratios.

Lessons of the latest crises also indicate importance of more accurate estimation of countries' contingent fiscal liabilities, particularly of those relating to the stability in the financial sector. If looking into the future, a correct estimation of other contingent liabilities, particularly those related to social welfare systems (implicit debt of the public pension and health systems) are of primary importance in the context of the ageing society and population decline. These liabilities far exceed official statistics on the public debt in some counties. As a result, such statistics does not present an adequate picture of the nation's public debt and actual fiscal burden that will be imposed on the shoulders of the following generations of taxpayers.

Key words: public debt, fiscal deficit, fiscal policy, public finance management, general government, fiscal rules

JEL codes: E62, H62, H63, H81

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Marek Dabrowski

Factors Determining a 'Safe' Level of Public Debt

Introduction

Financial crises related to excessive state's indebtedness have a long history going back to the very beginning of such organization of societies. They had different forms depending on the degree of monetary and financial system development: lowering silver or gold content in coins (*currency debasement*), printing paper money not backed by gold/silver reserves or outside the accepted issue norms, refusal to repay the obtained loans or government bonds (classic default), etc.[1]

In many instances, the government which is unable to respect its liabilities transfers them to other parts of the financial system, especially to the central bank and commercial banks, through the so-called quasi-fiscal operations (QFO) (see Section 1.2) what leads to currency and banking crises. However, such crises are in fact of budgetary nature, i. e., based on the inability of government to live within its financial means.

It is evident that public debt crises have always led to various negative consequences in the economic, social, and political life. The bankrupt government cannot efficiently perform its main functions, i. e., provide public goods. Worse, sometimes it is ready to resort to expropriatory measures against citizens and businesses, violating the basic property rights and economic liberties, in order to get out of the financial hole, which is confirmed by many historical episodes (for example, in France before the 1789 revolution or in Argentina in 2001–2002).

Depending on its particular scenario, default may result in high inflation or hyperinflation, depreciation of national currency, banking crisis, loss of the personal savings, impoverishment of the large sections of society, undermining public confidence in the government, internal political destabilization, decrease in the country's credit rating and its external political prestige for years to come.

Repeatability and chronic nature of sovereign debt crises resulted in growing interest of analysts in finding both their real causes and the mechanism of their emergence and cross-country transmission, the so-called *contagion* effect. In this paper, , attempts have been made to determine the level of public debt which would help to avoid the risk of sovereign default. Simultaneously, as the public debt of many countries is partly held by non-residents, there is a question of the extent to which external sources of borrowing create an additional risk factor.

The above questions has become particularly important after beginning of the global financial and economic crisis in 2007–2008 and its subsequent European phase, which started in early 2010 with the *de facto* Greece's sovereign insolvency. As a result, during just few years, public debt indicators of many developed countries sharply deteriorated and doubts as to their future solvency appeared.

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[1] The most interesting and comprehensive analysis of the history of financial crises, including public debt crises, is offered by Reinhart and Rogoff (2009).

In most of emerging market and developing economies (EMDE) public debt indicators today are not as dramatic as in developed countries. However, the experience of developed countries shows that the unfavorable external shock may quickly deteriorate the situation. Moreover, the history of financial crises in the 1980s and 1990s convincingly demonstrates that the danger of sovereign default in EMDE may occur at much lower public debt levels than in the developed countries. If a considerable portion of their public debt is held by non-residents, their vulnerability to external shocks grows additionally.

The aim of this paper is to analyze the acceptable level of public debt and the acceptable proportions of internal and external borrowing based on international experience[2]. However, we should start our analysis with definition of the public debt in accordance with present-day international standards GFS and ESA-95 (Chapter 1). Unfortunately, these definitions do not include some large-scale public financial liabilities, especially those related to the public pension systems, public healthcare systems, and implicit public support of the stability of financial, especially banking, systems. These liabilities are analyzed in Chapter 2. At the next stage of our analysis we will deal with different measures of public debt (Chapter 3), sources of public debt financing and their comparative advantages and disadvantages (Chapter 4), as well as the factors that determine the dynamics of public debt to GDP (Chapter 5). In Chapter 6 we will discuss the critical level of public debt at which a risk of sovereign default may occur, and in Chapter 7 the international experience of fiscal rules in respectto the level of public debt. Finally, Chapter 8 offers conclusions for macroeconomic policy.

1. Definitions of Public Debt

The analysis of acceptable level of public debt, especially in cross-country comparison, requires its clear and unambiguous definition. Otherwise we will compare incomparable and give ambiguous recommendations.

Definitions of public debt in individual countries may differ as result of the tradition/inertia of national methodology, technical problems in collection and aggregation of a certain type of data or a conscious attempt to present the fiscal record of the country in a more favorable way than it really is. In turn, such attempts of 'creative' fiscal accounting are caused by the desire to get around the constitutional and legal limits of fiscal deficit and public debt (see Chapter 7), submit an artificially 'dressed up' fiscal reports to international organizations (for instance, the IMF) or mislead financial investors.

The critical elements in the definition of public debt relate to:
- Entities included into general government
- The moment of recording government revenue, expenditure and and liabilities
- Contingent liabilities

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[2] This paper is a modified and updated version of the report 'Determining the Possible Limit of Public Debt and Acceptable Correlation Between Domestic and Foreign Debt' written in 2013 in the Russian language in the framework of the project of the Russian Presidential Academy of National Economy and Public Administration 'Evolution of Approaches to the Organization of Government Expenditure Funding: Tax and Debt Policies'. The author would like to express his gratitude to RANEPA for the opportunity to work on this theme. At the same time, the author accepts the sole responsibility for the content and professional quality of this research work and for presented opinions, conclusions and recommendations.

1.1. GFS and ESA-95 Standards

Two most popular international methodologies of government finance statistics include:
- GFS — Government Finance Statistics of the International Monetary Fund (IMF), the version of 2001, modified and supplemented in the subsequent years — see GFSM (2013);
- ESA95 (European System of National and Regional Accounts) — see ESA95 (2013).

In principle, methodological approaches to the statistics of public finances in both standards are similar. Differences concern technical details that have no direct importance for our analysis (see Bjorgvinsson, 2004).

Figure 1.1: The Public Sector and Its Main Components

[1] Includes social security funds.
[2] Alternatively, social security funds can be combined into a separate subsector, as shown in the box with dashed lines.
[3] Budgetary units, extrabudgetary units, and social security funds may also exist in state and local governments.
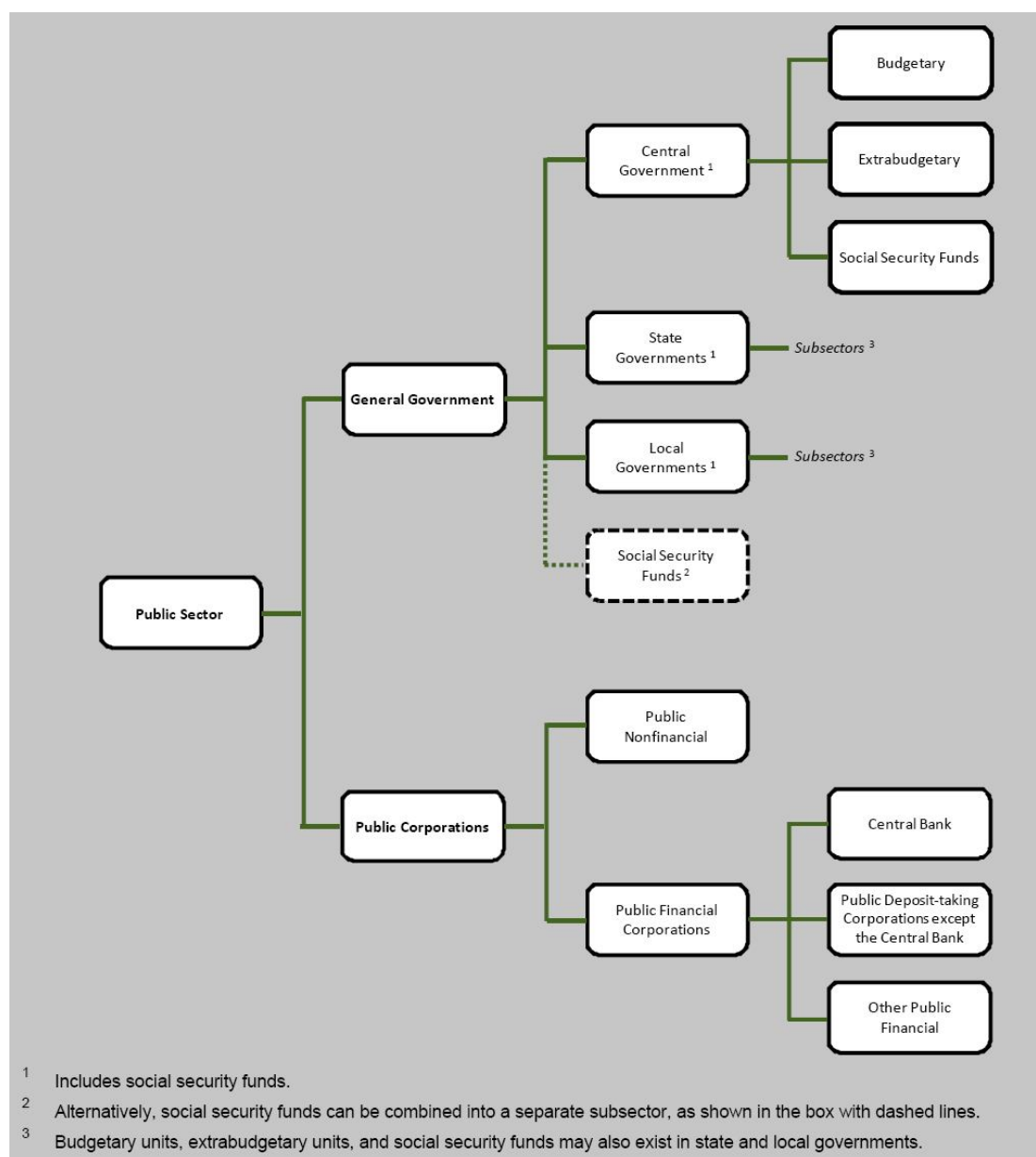
Source: GFSM, 2013, Chapter 2, p. 16

1.2. General Government

Determination of boundaries of general government (GG) is essential in both methods, despite institutional specifics of individual countries. Exactly these specifics make cross-country comparison of separate GG components either difficult or impossible. For example, the role of the central budget in the federal state is totally different than in the unitary country. The same concerns regional and local budgets, extrabudgetary funds, autonomous state agencies/ units, pension and medical insurance funds, etc. Only the application of the widest possible statistic aggregate, such as GG, makes the cross-country analysis possible.

A clear definition of GG limits is also important to prevent 'creative' fiscal accounting. To improve artificially their fiscal indicators (for instance, fiscal deficit and public debt), many governments move some expenses and liabilities off the state budget, to either extrabudgetary funds or different kinds of public agencies and units. In principle, the broad definition of GG should catch all these funds and organizational entities.

In accordance with GFS standards (see GFSM, 2013, para. 2.69, p. 16), the GG '…*consists of resident institutional units that fulfill the functions of government as their primary activity, and includes all government units and all nonmarket nonprofit institutional units (NPIs) that are controlled by government units.*'. It means that GG includes the following components (Figure 1.1):

- Central/federal government
- Regional governments/governments of federal entities in case of federal states
- Local authorities (municipalities, communes, counties, regions, districts, etc.)
- Pension funds, medical insurance funds, and other social insurance funds at all governmental levels
- Budgetary units and extrabudgetary funds and organizations at all governmental levels

In accordance with GFSM (2013), there is also a broader definition of public sector (PS) which includes all GG units and public corporations. As shown in Figure 1.1, the second category includes nonfinancial public corporations and financial public corporations which, in turn, consist of public deposit-taking corporations except the Central Bank (i.e. commercial banks), other public financial corporations and the central bank of the state.

1.3. Quasi-Fiscal Operations outside GG

Despite the broadly defined boundaries of GG, many governments try to get around them by involving the units outside GG in the process of implementing the government policy and its specific goals. As a result, the related state expenditures and liabilities are moved beyond the GG fiscal statistics. Such practices are called in literature as quasi-fiscal operations (QFO).

In most cases, QFO are performed by public sector organizations which are outside GG, i.e., the central bank, state commercial banks and other state financial institutions, as well as nonfinancial public enterprises, especially in energy and transportation sectors.

The largest potential for conducting QFO lies in the monetary, credit and exchange rate policy of central banks, state commercial banks, and other financial institutions[3]. For example, they can grant credits to targeted groups of economic entities, sometimes obviously insolvent at the preferential interest rate (i.e. below market level). Other measures include the support for

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[3] See Mackenzie & Stella, 1996 for overview of different forms of QFO in public financial institutions.

insolvent banks by the central bank (under the pretext of providing liquidity to them), selling currency at an official exchange rate (in the multiple exchange rate system) to the government and selected groups of enterprises, serving public debt on non-market conditions, etc.

However, nonfinancial public enterprises are also often involved in QFO. For instance, state owned energy companies must supply energy and gas at the price rates below their cost-recovery level, including buyers in permanent arrears (Paczynski et al., 2009). The same pertains to public transport enterprises (for instance, railway transport) and public utilities enterprises.

Several years ago, QFO seemed to be a 'childhood disease' of transition economies and some developing countries, whose scale would gradually decrease (Markiewicz, 2001; BIS, 2003).

However, with the start of the global financial crisis of 2008–2009, the popularity of QFO returned in an unexpected location, i.e., in advanced economies, where central banks implemented various 'non-orthodox' measures to stimulate the economy and support the financial system. Among other things, they include the intensive purchase of various types of securities in the secondary market, sometimes of doubtful quality.

For instance, the US Federal Reserve System (the Fed) implemented the subsequent rounds of the so-called quantitative easing (QE). Its interventions aimed to improve the liquidity and quality of the assets of commercial banks have led to accumulation of a large stock of mortgage backed securities (see Taylor, 2010). In fact, it was a hidden form of banks' recapitalization without the use of budgetary funds.

Two large US federal corporations of housing development, *Fannie Mae* [4] and *Freddie Mac* [5], also considerably deteriorated the quality of their assets during the crisis, which will require, sooner or later, additional budget support.

In turn, the European Central Bank (ECB) was involved in buying treasury bonds of the peripheral countries of the Eurozone, in particular, Greece. As a matter of fact, these operations help to support insolvent governments and potentially insolvent banks (see Dabrowski, 2012).

Present-day QFO in advanced economies are associated with the same negative consequences as 'classical' QFOs in developing countries or economies in transition at an early stage of transformation. Firstly, they distort fiscal statistics. Fiscal deficit and public debt are, in fact, higher than officially reported. Secondly, at the stage of getting out of non-orthodox monetary policy measures, central banks may have to admit considerable losses, which means deterioration in the GG balance. Finally, QFO may have inflation consequences (Park, 2012), which means an indirect hidden tax on owners of money balances.

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[4] See http://www.fanniemae.com/portal/about-us/company-overview/about-fm.html.
[5] See http://www.freddiemac.com/news/corp_facts.html?intcmp=AFMRCF.

1.4. From the Cash Principle to the Accrual Method

In the previous version of the of IMF GFS dated 1986 (GFSM, 1986), fiscal flows and, as a result, the balance of the government budget or GG (surplus or deficit) were recorded on the cash basis. One of the consequences included a rather widespread (especially in the CIS countries in the 1990s) practice of artificial reduction of government expenditure, deficit, and public debt through building up budget arrears.

In the new version of GFS dated 2001 (GFSM, 2013) and in the ESA95 (2013), the cash method was replaced by the accrual method. According to the latter, '...*transactions are recorded when economic ownership changes hands for goods, nonproduced nonfinancial assets and financial assets and liabilities, when services are provided, and for distributive transactions when the related claims arise*' (GFSM, 2013, para. 3.57). As a result, budgetary arrears do not artificially reduce the fiscal expenditure, deficit and public debt. They become just one of the forms of deficit and public debt financing.

1.5. Contingent Liabilities

Another problem in budgetary accounting is related to contingent liabilities arising as consequence of various types of credit guarantees, deposit insurance, other mandatory insurance programs, pension systems, etc. Figure 1.2 provides their overview.

The green vertical line delimits the contingent liabilities that shall be accounted in the current public debt statistics and the liabilities that remain outside this statistics until they will be called. In principle, all of the standard contingent liabilities, for instance, government guarantees to export credits or other standard credit programs/schemes are subject to evaluation in accordance with the respective credit risk ratios (calculated on a historical basis) and are registered in the current public debt statistics. Non-standard one-off guarantees whose evaluation on the basis of historical credit risks ratios is impossible remain outside the current public debt statistics[6]. The same pertains to implicit contingent liabilities which we will discuss in Chapter 2.

2. Public Liabilities Not Included in the Definition of Public Debt

2.1. General Comments

Despite serious efforts to clarify the definitions of public debt in GFS 2001 and ESA95, many government liabilities remain outside the public debt statistics as illustrated in the right part of Figure 1.2.

In formal terms, they belong to the category of contingent public liabilities, either *explicit contingent liabilities* that have one-off non-standard nature and are not that easy to evaluate in terms of risk of their discharge (see Section 1.5), or *implicit contingent liabilities*[7].

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[6] However, one-off budgetary guarantees, provided to admittedly insolvent borrowers, should be immediately registered as public debt.
[7] According to Polackova (1999), explicit government liabilities result from legislation or contract. Implicit liabilities are kinds of moral obligations '...*of government that reflect public and interest-group pressures*'.

Figure 1.2: Liabilities and contingent liabilities in GFS
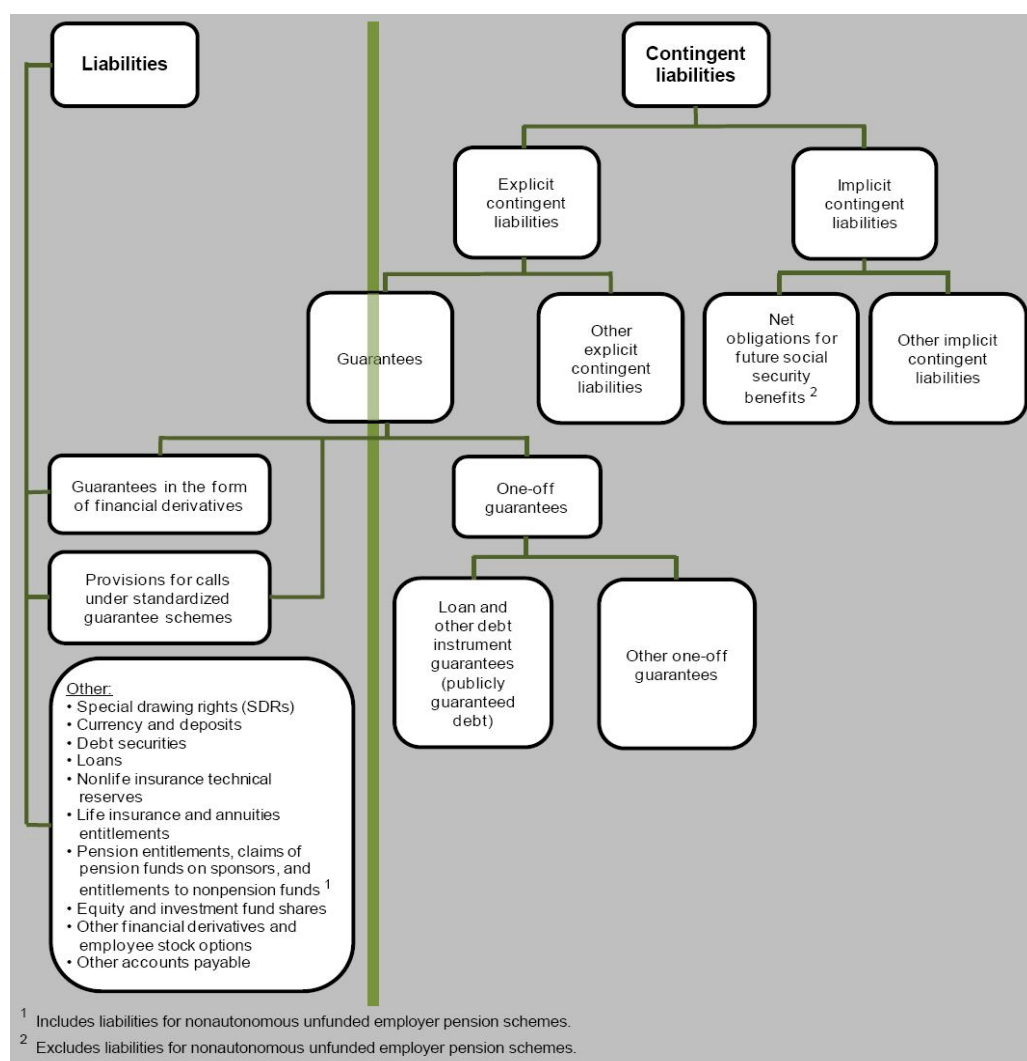
Source: GFSM, 2013, Chapter 7, p. 45

The GFS 2001 method recommends preparing separate statements on explicit contingent liabilities, not included in the current public debt statistics, and on implicit liabilities of the state pension system (GFSM, 2013, Chapter 7). ESA95 standards did not contain a similar recommendation. As a result, most of contingent liabilities remained outside the public debt statistics. International statistic databases (for instance, of the IMF, World Bank or Eurostat) have not taken them into account yet.

However, the situation is changing. Following the GFS 2001 methodology, EU adopted new standards, ESA2010 (2013), in May 2013 which also require separate statements on implicit liabilities of the state pension system (ESA2010, 2013, paragraph 17.121 and the next ones). Moreover, changes in the pension system which influence the level of future implicit public liabilities shall be reflected in the statistics of public debt (see Section 2.2).

It worth to notice that some contingent public liabilities, especially implicit ones, are very large, sometimes exceeding the official public debt. In particular, this concerns implicit liabilities in the public pension system, public healthcare system, and financial sector.

2.2. Pension Liabilities

Unfunded pension liabilities originate from the specific design o public pension systems based on implicit intergenerational contract: pensions of current pensioners are funded by pension contributions or taxes paid by currently employed people (the Pay-As-You-Go or PAYG system). Those who pay pension contributions/taxes today expect that the next generation of workers/taxpayers will fund their pensions after they retire. As a result, a substantial *implicit pension debt* of the unfunded pension scheme is created. In some OECD and EU countries it was estimated at the range between 75% and 300% of GDP (Table 2.1) in the 1990s and 2000s, when *projected benefit obligation* (PBO) and *indexed benefit obligation* (IBO) methods were used (see Eichhorst et al., 2011, p. 81–83). In many cases these figures considerably exceeded the level of official GG gross debt (see Chapter 6).

Table 2.1: Implicit pension debt in OECD and EU countries, in % of GDP

Country	Chand & Jaeger (1996)	Kune (1996)	Holzmann et al. (2004)
Belgium		101	
Canada	94		
Denmark	117		
France	265	112	
Germany (West)	221	186	
Greece		245	
Hungary			203
Ireland		78	
Italy	357	207	
Japan	166		
Lithuania			155
Luxembourg		219	
Malta			234
The Netherlands		144	
Poland			261
Portugal		128	233
Romania			256
Slovakia			210
Slovenia			298
Spain		129	
Sweden	131		
UK	117	92	
US	106		

Comment: The calculations of Chand & Jaeger (1996) and Kune (1996) were based on the PBO method, the calculations of Holzmann et al. (2004) on the IBO method (see above).

Source: Eichhorst et al. (2011), p. 82

Deutsche Bank (2013) estimates the growth in public pension liabilities by 70–100% of GDP for Brazil, Russia and China, and up to 150% for Turkey and South Korea in the period of 2011–2040 (Figure 2.1). These estimation were based on another method, *net present value (NPV) of future spending increase*.

The negative growth of population in many countries and growing life expectancy result in constant growth of future pension liabilities. These tendencies can be compensated by increasing retirement age, elimination of pension privileges for certain sectors and professional groups, raising labor market participation rate (especially for women), encouragement of legal migration, improvement of pension contributions payment discipline and decreasing average pension to average wage ratio, i.e., *replacement ratio*. Despite the

political unpopularity of all these measures, their adoption seems necessary to avoid the potential sovereign default.

Figure 2.1: Growth of implicit social liabilities in EMDE, % of GDP, 2011-2040
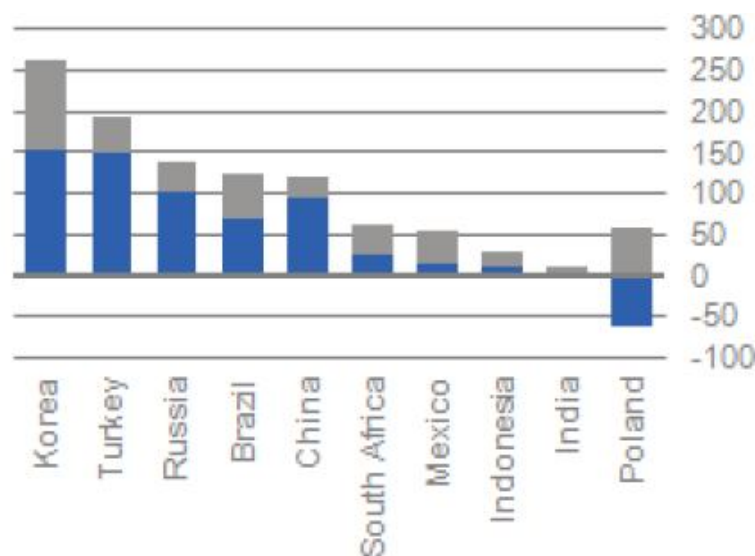
Comment: Blue columns mean the growth of public pension liabilities, grey ones the growth of liabilities in the public healthcare system — see Section 2.3.

Source: Deutsche Bank (2013)

Some pension reforms help stabilizing the level of implicit contingent liabilities in the unfunded pension scheme. We mean the transition from the *defined benefits system* to the system based on individual accounts where the amount of future pensions depends both on the total amount of pension contributions paid by a future pensioner and on the size of pension fund available at time when pensions are paid (*the defined contribution system*). Certainly, in the world of population ageing the second system leads to constant reduction in the replacement ratio. On the other hand, a strong incentive is created to increase the number of contributors to pension fund by increasing the retirement age and elimination of pension privileges.

In fact, future public pension liabilities can be hardly considered as 'contingent'. Their probability of becoming called is not lower than in case of explicit public debt instruments (for instance, treasury bonds). Their estimation is also possible as future demographic forecasts and pension legislation are known although some methodological problems should be resolved in the field of statistics of national accounts and public finance (see Lequiller, 2004).

Absence of future pension liabilities in the official statistics of public debt results in the considerable distortion of the latter. There are countries like Russia where explicit public debt remains on a very low level, but the implicit debt of the public pension system is much higher.

Worst, absence of public pension liabilities in the statistics of public debt creates negative incentives in the area of penion reforms. In the 1990s and 2000s, several transition economies (Hungary, Poland, Slovakia, Macedonia, Baltic countries, Kazakhstan and others) replaced to replace part of PAYG system with the mandatory fully funded pension system, so-called second pillar operated by private pension funds. Part of mandatory pension contributions has been redirected to individual saving accounts of future pensioners. The inevitable result of

this reform was the growing deficit of traditional, unfunded segment of the pension system, the growing official GG deficit and debt, despite the decrease in future implicit pension liabilities.

When the fiscal situation in many countries sharply deteriorated due to the global financial crisis, they decided to reverse pension reforms and transfer liabilities of the pension funds back to the PAYG system. Such measures were taken by Argentina, Hungary and Poland, and to a lesser extent by other countries of Central and Eastern Europe (CEE) (see Barbone, 2011; Jarrett, 2011). The official statistics of GG deficit and debt in accordance with GFS 2001 and ESA95 standards has improved but implicit pension liabilities have increased again. However, under the conditions of new reporting standards, ESA2010, such practices of 'creative' fiscal accounting will be at least partially reflected in the current fiscal statistics.

2.3. Liabilities of the Public Healthcare Systems

Implicit fiscal (intergenerational) liabilities also exist in the public healthcare system (*unfunded health liabilities*). The mechanism is similar to the public pension system, though the amount of contingent liabilities is more difficult to estimate for many technical reasons.

Present-day taxpayers pay mandatory contributions to public medical insurance funds or general taxes (the exact system of funding public healthcare services is less important here), but most health services will be required in the last years of their life. The negative demographic trends and population ageing contribute to increase of the hidden debt. The technological progress in medical services and the related growth in their costs is an additional factor contributing to growth of future public healthcare system liabilities.

Available estimates of implicit public healthcare liabilities look worrying: in many cases they exceed the implicit pension liabilities (see Section 2.2). For example, Medearis & Hishov (2010) estimate them for EU countries and the US within the range from 20% (Hungary) to over 500% of GDP (Luxemburg). It is interesting to notice that liabilities in the US public healthcare system (which has a limited coverage) exceed 200% of GDP. In many EU countries, the situation is even worse than in the US: in Denmark, France, the Netherlands and Spain they exceed 200% of GDP, in Poland and Sweden 300% of GDP, and in Finland, Ireland and Slovakia - 400% of GDP.

According to the IMF assessments quoted by Deutsche Bank (2013), the NPV of increase of liabilities in the public healthcare system in EMDE between 2011 and 2050 will also be considerable. It will amount to 30–50% of GDP in South Africa, Russia, Turkey, Brazil and Mexico, over 50% of GDP in Poland and over 100% of GDP in South Korea (Figure 2.1).

On the example of Poland we can see the discrepancy between the methodologies of both analyses. However, despite these differences, the size of future implicit liabilities of public healthcare systems remains serious in almost all of the countries. They need reforms aimed at limiting the growth of expenses in these systems and abuse of rights to state-funded medical aid, introduction of partial copayments for services of these systems, elimination of various group privileges in insurance contributions, etc. (see Clements et al., 2011).

2.4. Contingent Liabilities Related to Financial Stability Support

The functioning of commercial banks operating on the basis of the *fractional reserve* banking system results in banking crises from time to time. To avoid banking panic, collapse of the entire country's financial system, spreading the crisis to other countries (*contagion effect*) and adverse shock to the real economy, governments often have to support loss-making banks by replenishing their capital. Sometimes, several years later, these expenditures can be, at least partly recovered by receipts from privatization of banks nationalized during the crisis.

The adverse fiscal consequences of bank crises are usually considerable, which is confirmed by the comparative historical analysis of Reinhart & Rogoff (2009, p. 162–171). Figure 2.2 represents the IMF's estimate of the bank crises expenses in the 1980s and 1990s, i.e., before the wave of financial crises of 1997–2001 in Asia, Russia, CIS and Latin America the global financial crisis that started in 2008.

Figure 2.2 Costs of resolving banking crises, in % of GDP
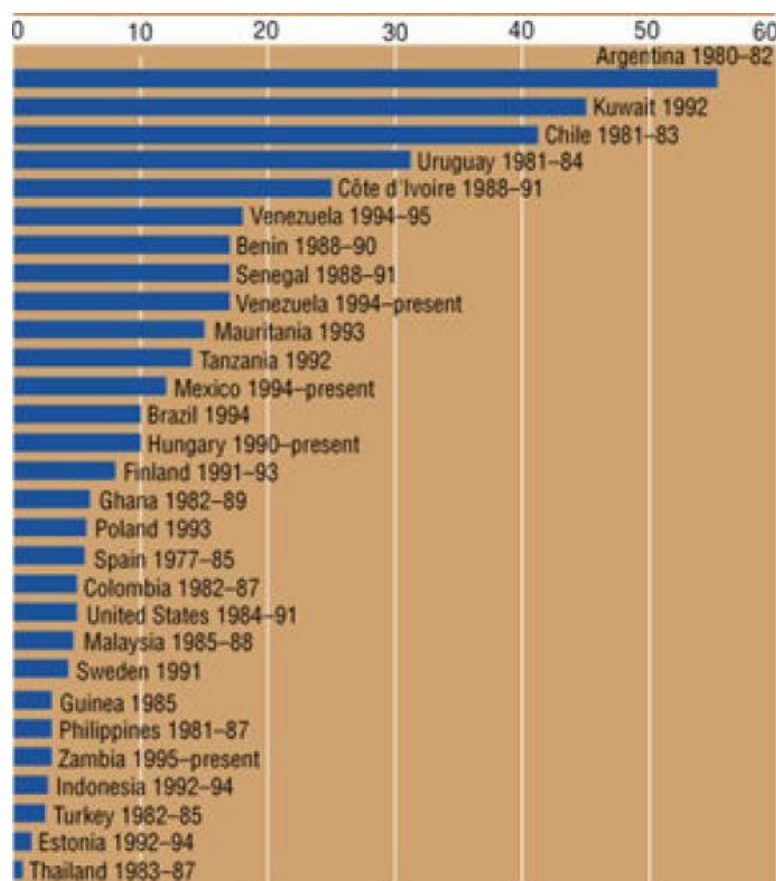
Source: Polackova (1999)

The consequences of the last global crisis were very serious for public budgets of many countries, especially the US, UK, Iceland, Ireland, Spain, Cyprus, Latvia, and Slovenia. As the banking system rehabilitation in the EU is far from completion, the list of countries that have to provide considerable budget support to the banking system may increase.

Based on this experience, we may speak about the future public liabilities related to the government's responsibility for the stability of the banking system and other financial institutions. Most of them have implicit and contingent nature. There are also examples of explicit contingent liabilities, especially those related to the deposit insurance system. In

theory, such system shall be self-funded (from banks' contributions). However, in case of a large-scale crisis, the funds accumulated in the deposits insurance system are often insufficient and the government has to provide additional support.

The example is the recent disastrous experience of Ireland: in autumn of 2008 the government, in fear of banking panic, provided 100% guarantees for all the deposits. Looking back, this decision was a great mistake (see Honohan et al., 2010), which resulted in the growth of Ireland's public debt by almost 100% of GDP (see Table 3.2).

The amount of contingent liabilities related to the functioning of the banking system depends on many factors such as bank assets to GDP ratio (the higher it is, the more potential liabilities can emerge), structure of the banking sector (the concentration of banks increases the risk of a systemic banking crisis), its owbership structure (state ownership increases the risk of crisis; the same pertains to private ownership if bank is involved in related lending), quality of banking legislation, regulation, and supervision.

2.5. Other Contingent Liabilities

Besides the liabilities related to financial system support, there are also other kinds of implicit public liabilities. They may result from an inefficient system of fiscal federalism (i.e., expectations of federal government's bailout of regions and municipalities), natural monopolies and other infrastructural enterprises (especially in public sector), the necessity to eliminate consequences of past QFO (see Section 1.3), etc. (see Polackova, 2009).

3. Absolute and Relative Public Debt Measures

Both absolute and relative public debt measures are used in macroeconomic, fiscal, and financial analyses. Cross-country public debt analyses use relative measures (see Section 3.2) as it is necessary to take account on different size of economies and different currencies in which the national public debt is recorded. In most cases, absolute public debt measures serve internal budget control and monitoring. They are also used in the system of national accounts to illustrate various financial and inter-sectoral flows and balances. Besides, they serve as a numerator to calculate relative public debt measures.

3.1. Absolute Public Debt Measures

In cross-country public debt analyses, the basic category is the *total gross debt of general government*. In accordance with GFSM (2013, para. 7.238), '*gross debt consists of all liabilities that require payment or payments of interest and/or principal by the debtor to the creditor at a date or dates in the future. This includes debt liabilities in the form of SDRs, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes, and other accounts payable. Thus, all liabilities in the GFSM 2001 system are debt, except for equity and investment fund shares and financial derivatives and employee stock options. Debt can be valued at current market, nominal, or face values.*'

The indicator of the total gross debt of GG illustrates the total public indebtedness, regardless of the particular GG segment where it occurred. This is the only possibility to carry out cross-country comparative analyses, without the necessity of considering the constitutional and institutional specifics of public finance systems in individual countries.

However, analysis of the debt of individual GG segments, for instance, federal or central government, federal entities (states, provinces, regions), municipalities, pension or other social funds may be useful for internal purposes (especially for budget monitoring and control).

Analysis of the debt of individual GG units makes particular sense under the conditions of clear delimitation of fiscal powers and responsibilities, for example, when the federal government does not bear any formal or actual responsibility for the debts of federal entities and municipalities (the case of US and Canadian federal models - see Bordo, Markiewicz & Jonung, 2011). In such circumstances the information about the federal debt is meaningful both for analytical purposes and for financial markets. If there is no such clear delimitation of responsibility, financial markets will assume the implicit federal/ national responsibility for the public debt on a sub-national level.

Table 3.1: Gross and net GG debt to GDP ratio, %

Country	Net debt	Gross debt
Brazil	35.2	68.0
Great Britain	81.6	88.8
Germany	57.4	81.9
Canada	34.7	85.3
Italy	106.1	127.0
Norway	-167.0	34.1
Saudi Arabia	-53.9	3.7
USA	84.1	102.7
France	84.0	90.2
South Africa	35.6	42.3
Japan	133.5	238.0

Source: IMF World Economic Outlook, October 2013

Beside the total gross debt, the fiscal statistics uses the indicator of GG *total net public debt*. In accordance with GFSM (2013, para. 7.245), it is calculated as '*...gross debt minus financial assets corresponding to debt instruments. These financial assets are: monetary gold and SDRs, currency and deposits, debt securities, loans, insurance, pension, and standardized guarantee schemes, and other accounts receivable.*'

The statistics of the gross and net debt differs substantially in some countries as follows from Table 3.1. It relates to large official creditors (Japan) or countries that produce oil, natural gas or other natural resources, and are able to form *sovereign wealth funds*. This second group includes Norway and Saudi Arabia.

The statistics of net debt shows a more balanced picture as it takes into account financial assets along with liabilities. However, statistics of net public debt causes a lot of statistic problems and does not always give the complete picture of current and future sovereign solvency. This relates to various quality of the public financial assets and various degree of their liquidity. In particular, the problem of insufficient quantity and liquidity of assets may related to government loans.

It is worth to consider here the experience of Russia in 1990s that inherited from the USSR not only public debt but also financial claims to many countries of the former socialist camp and developing countries, especially to Cuba, Mongolia, Vietnam, many Arab and African states. These debt claims, as of March 1, 1993, were estimated by the Ministry of Finance

of the Russian Federation at USD148.8 billion (Duma, 2003). I.e., on the paper they exceeded the amount of debt of the former USSR. However, the actual recoverability of these loans was extremely low and did not exceed 10%.

Many countries, including Russia, China and India, do not have internationally comparable statistics of the total net public debt. The IMF World Economic Outlook statistic database as of October, 2013 contained this data only for 97 countries out of the total number of 189.

Absolute measures of both gross and net debt are usually reported in the national currency. Liabilities in foreign currency are converted into national currency at an official exchange rate. These components of the total public debt may be undervalued in the countries that do not have convertible currency.

3.2. Relative Public Debt Measures

Relative public debt measures give a possibility of cross-country comparison, as well as qualitative evaluation of the amount of debt burden. The most popular measure is the ration of gross or net debt to GDP. It helps to compare the amount of public debt of the country to its economic potential.

However, this indicator is far from being perfect. First, as follows from historical analyses, the debt to GDP ratio is not the only factor that determines the level of fiscal and financial risk of the country. I.e., public debt crisis may occur at different levels of public debt to GDP ratio (see Chapter 6). Secondly, this measure is strongly pro-cyclical, i.e., it decreases in boom years and grows in time of recession or slowing growth. For instance, Table 3.2 presents the rapid increase of GG gross debt-to-GDP ratio in EU countries in the period of 2007-2010 as the consequence of global financial crisis.

The pro-cyclicality relates to the construction of the indicator. In boom phase, fiscal balance improves and this contributes to decrease or slower growth of public debt (numerator). On the other hand, the nominal GDP (denominator) grows faster. Besides, in countries which borrow in foreign currency the amount of public debt denominated in national currency (numerator) decreases as result of its appreciation. In the conditions of financial crisis and recession, all these trends work in the opposite direction. Moreover, some contingent public liabilities, not included in the statistics of public debt (see Chapter 2) may be in demand in the crisis conditions and may lead to increase in the nominal public debt. In particular, this relates to implicit guarantees of the banking and financial system stability.

As a result, the ability of public debt to GDP ratio to predict the risk of debt crisis and provide assessment of country's macroeconomic and financial stability is limited. The attempts to eliminate its drawbacks may go in different directions:

- Expanding the definition of public debt by including part of contingent liabilities (see Chapter 2).
- Comparison of the nominal public debt (numerator) to some 'potential' GDP (denominator) instead of actual one to weaken the factor of pro-cyclicality.
- Replacement of GDP by another macroeconomic aggregate, for instance, total GG revenue (actual or potential).

Table 3.2: GG gross total debt in EU, % of GDP, 2007–2012

Country	2007	2008	2009	2010	2011	2012
EU	59.4	63.9	74.4	80.2	82.8	87.0
Eurozone	66.5	70.3	80.0	85.6	88.1	92.9
Austria	60.2	63.8	69.2	72.0	72.4	73.7
Belgium	84.0	89.2	95.7	95.5	97.8	99.6
Bulgaria	18.6	15.5	15.6	14.9	15.4	18.5
Croatia	32.9	29.3	35.8	42.6	47.2	56.3
Cyprus	58.8	48.9	58.5	61.3	71.1	86.2
Czech Republic	27.9	28.7	34.2	37.8	40.8	43.1
Denmark	27.5	33.4	40.7	42.7	46.4	50.1
Estonia	3.7	4.5	7.2	6.7	6.1	8.5
Finland	35.2	33.9	43.5	48.6	49.0	53.3
France	64.2	68.2	79.2	82.3	86.0	90.3
Germany	65.4	66.8	74.5	82.5	80.5	82.0
Greece	107.3	112.5	129.3	147.9	170.6	158.5
Hungary	67.0	73.0	79.8	81.8	81.4	79.0
Ireland	25.0	44.5	64.9	92.2	106.5	117.1
Italy	103.3	106.1	116.4	119.3	120.8	127.0
Latvia	7.8	17.2	32.9	39.7	37.5	36.4
Lithuania	16.8	15.5	29.3	37.9	38.5	39.6
Luxembourg	6.7	14.4	15.3	19.2	18.3	21.1
Malta	60.7	60.9	66.4	67.4	70.3	72.5
Netherlands	45.3	58.5	60.8	63.1	65.5	71.7
Poland	45.0	47.1	50.9	54.8	56.4	55.2
Portugal	68.3	71.6	83.1	93.2	108.0	123.0
Romania	12.7	13.6	23.8	31.1	34.2	37.0
Slovakia	29.4	27.9	35.6	41.0	43.3	52.3
Slovenia	23.1	22.0	35.0	38.6	46.9	52.6
Spain	36.3	40.2	53.9	61.3	69.1	84.1
Sweden	40.1	38.8	42.5	39.4	38.3	38.0
UK	43.7	52.2	68.1	79.4	85.4	90.3

Comment: yellow color indicates IMF's preliminary estimate

Source: IMF — World Economic Outlook database, April 2013

All these proposals are not easy to implement. It would require a radical restructuring of public finance statistics not just in a single country but at the level of international standards. At the same time, even their successful implementation would not completely resolve the problems of indicators pro-cyclicality.

For example, most of existing methodologies of estimation of 'potential' GDP are based on 'filtering' past GDP trends and their extrapolation. However, the future trajectory of GDP growth may substantially differ from past trends (due to limited regularity of business cycles). In turn, the amount of GG revenue also depends greatly on business cycle , which was demonstrated in years of market boom of mid 2000s and subsequent global financial crisis (see Dabrowski, 2012). As a result, the dynamics of changes in the public debt to revenue ratio (Table 3.3) does not differ much from the dynamics of changes in public debt to GDP ratio (Table 3.2).

Nevertheless, potential revenue of GG is taken into account by financial investors in their decisions. This factor can explain the still tolerable attitude of financial markets to the large gross public debt of Japan (very low VAT rates, which may be increased at any time) and the

US (numerous tax exemptions which can be eliminated, possibility to increase personal income tax).

Table 3.3: Total gross public debt, in % of total revenue, GG, EU and G8 countries, 2007–2012

Country	2007	2008	2009	2010	2011	2012
Austria	126.5	132.1	142.7	149.6	150.6	150.5
Belgium	174.5	183.0	199.0	196.4	197.5	195.8
Bulgaria	42.7	34.2	39.4	47.3	48.6	52.7
Croatia	82.5	74.7	91.9	111.6	126.8	140.6
Cyprus	130.6	113.5	145.8	150.0	179.0	216.8
Czech Republic	69.3	73.7	88.9	98.2	103.6	115.1
Denmark	48.8	60.9	73.5	77.8	83.3	82.1
Estonia	10.1	12.4	16.6	16.5	15.7	25.1
Finland	66.7	63.4	81.5	91.8	90.9	98.5
France	128.8	136.6	160.9	166.4	169.5	174.2
Germany	149.1	151.8	165.0	188.8	180.3	181.0
Greece	263.2	277.6	338.1	365.3	401.6	351.8
Hungary	147.1	160.2	170.2	180.3	151.3	171.5
Ireland	67.4	124.8	186.8	261.4	305.8	340.5
Italy	224.3	231.0	250.6	259.0	261.9	266.1
Latvia	25.4	56.8	108.6	125.9	120.0	115.7
Lithuania	49.1	44.9	82.7	107.8	115.5	123.7
Luxembourg	16.7	34.1	34.9	45.7	43.8	49.6
Malta	153.8	157.7	171.6	175.2	178.5	177.9
Netherlands	99.7	125.2	132.5	136.9	144.1	153.6
Poland	111.6	119.1	136.9	146.2	146.5	145.0
Portugal	166.2	174.4	211.4	225.7	240.4	303.1
Romania	33.5	36.9	73.9	89.9	100.4	113.5
Slovakia	91.4	84.9	106.1	126.9	130.1	157.7
Slovenia	54.6	52.1	83.1	88.8	108.0	122.9
Spain	88.3	108.9	153.9	168.0	194.8	231.6
Sweden	73.7	72.0	78.9	75.4	75.1	74.1
UK	108.0	123.3	169.8	197.0	209.2	212.2
Canada	145.3	161.1	189.0	197.7	207.3	214.5
Japan	567.4	532.6	699.1	676.7	728.0	765.2
Russia	21.4	20.1	31.3	31.9	31.2	33.3
US	176.1	194.6	261.5	290.1	301.7	318.7

Source: Moody's Statistical Handbook, November 2013

4. Sources of Public Debt Financing

4.1. Domestic and External Sources of Public Debt Financing

The government debt can be funded using different sources: domestic and external, official and commercial. The difference between domestic and external sources is based on their residence: within the country or outside its borders. Foreign exchange laws in most countries distinguish between residents and non-residents, and this classification can be used as the base for determining sources of public debt financing.

Among domestic official sources, funding by the central bank shall be mentioned (monetizing government debt) which results in additional money creation with potential inflation consequences. The government uses it in utmost cases when others sources are unavailable.

Usually these cases are wars, revolutions, state failure, inability to collect taxes, and extreme populist experiments in economic policy. In normal conditions, there are constitutional and legislation limits, and sometimes the full ban on monetary financing of public debt [8] to protect central bank independence and stability of a national currency.

Interestingly in the conditions of global financial crisis and ultra-lax monetary policy, many countries return, in an indirect way, to this source of public debt financing. Within the policy of QE, central banks purchase government securities in large amounts in the secondary market. However, the formal purpose of QE is increasing money supply rather than monetization of public debt.

To finance its gross debt, government can also use its financial and non-financial assets, e.g. government deposits, other financial reserves (for example, originating from fiscal surpluses of previous periods), sovereign wealth funds and proceeds from selling government property (privatization).

However, in most of advanced economies and emerging markets, public debt is financed primarily in financial markets: through placement of government bonds of various maturities and, sometimes, by direct borrowing from commercial banks. Budget arrears (see Section 1.4) represent more rare and less 'civilized' form of debt financing.

External financing can be provided both by official and commercial sources. Official sources comprise loans and credits from international financial institutions (IMF, The World Bank, EU, regional development banks) and bilateral governmental loans. External commercial sources are the same as in the case of domestic funding: proceeds from the sale of government assets (privatization), government bonds placed in international financial markets and loans from commercial banks and other financial institutions.

4.2. Benefits and Risks of External and Foreign Currency Borrowing

Apart from the classification of funding sources based on residence (Section 4.1) the second important criterion relates to the currency of borrowing: either national or foreign. These two classifications are not identical. In the world of unrestricted capital movement, non-residents can purchase government securities and lend to government in national currency, and residents can finance public debt denominated in foreign currency[9]. In financial analyses, sometimes these two criteria are confused, assuming identity of currency and residence which is not necessarily in line with the reality of contemporary financial markets.

In extreme circumstances, the necessity of borrowing abroad may be caused by absence of non-inflationary domestic sources as a result of either poor development of financial market or lack of confidence of residents in the future creditworthiness of the government. In the second case, it is also difficult to borrow from commercial external sources. The international financial institutions such as the IMF and World Bank are the only available source, however, conditional on accepting fiscal consolidation program by a borrowing country.

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[8] We mean the direct credit to government or purchase of government securities in the primary market. Central banks can buy government securities in the secondary market or accept them as collateral against credit to commercial banks, i.e., use them as the tools of monetary policy.

[9] To complicate the matter, there are also government securities which are formally denominated in national currency and sold primarily to residents but indexed to changes in national currency's exchange rate. The example was well-known *tesobonos* in Mexico in the beginning of the 1990s indexed to the US dollar.

The similar limitations concern borrowing in national currency. In countries with recent history of high inflation or hyperinflation it is either impossible or comes at a very high price (high interest rate required by creditors). The situation when economic agents (both private and in government sector) cannot borrow in their national currency was called 'original sin' by Hausmann (2001). This is the main rationale of the so-called hard peg in the form of either currency board or unilateral dollarization/ euroization.

Figure 4.1: Share of domestic debt in the total public debt, EMDE, %, weighted average
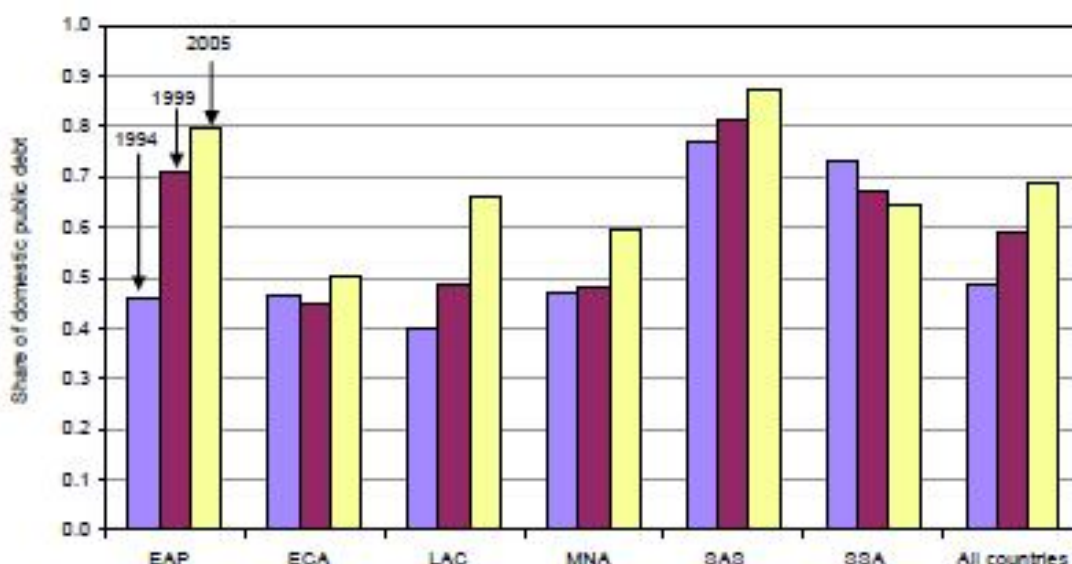
Comment: EAP - East Asia and Pacific, ECA – East Europe and Central Asia, LAC - Latin America and Carabbean, MNA — Middle East and North Africa, SAS - South Asia, SSA – Sub-SaharanAfrica

Source: Panizza (2008), p.9

The lack of confidence to national currency and high level of spontaneous dollarization/ Euroization can continue many years after the episode of high inflation, hyperinflation or currency crisis.

In less extreme cases (i.e., in the absence of strong mistrust to national currency) borrowing in foreign currency may look attractive, at least in short-term, due to the lower interest rates. The international markets of the financial instruments denominated in global currencies are also deeper and more liquid as compared with domestic market of any developing country in its own currency (even with participation of non-residents). As a result, it is possible to borrow more and cheaper internationally. On the other hand, borrowing in foreign currency means creating unhedged liabilities. When national currency depreciate total public debt denominated in national currency (and its relation to GDP) increases automatically.

Table 4.1: Share of debt denominated/indexed in foreign currency in GG total public debt, selected EMDE, %, 2003–2012

Country	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012
CEE										
Albania	25.9	25.2	25.1	24.3	23.2	27.5	33.3	37.5	38.1	38.6
Bosnia and Herzegovina	98.9	98.9	98.9	98.6	96.7	54.9	60.2	64.6	64.2	61.3
Bulgaria	90.6	87.5	84.1	80.8	76.2	75.7	76.7	74.3	73.7	77.6
Czech Republic	3.5	9.3	12.3	11.9	9.4	13.8	16.2	17.7	16.3	18.4
Hungary [a]	—	25.7	28.2	28.1	28.7	37.6	44.7	44.6	49.5	40.9
Latvia [a]	49.6	56.6	56.0	58.1	61.6	47.7	78.2	83.9	86.2	87.7
Lithuania	61.2	61.7	60.3	68.4	67.2	64.2	70.3	73.6	74.0	75.6
Poland	32.4	26.7	27.4	25.5	23.5	25.7	25.7	26.3	30.1	29.8
Romania	81.5	76.6	82.3	80.2	65.6	59.7	59.9	58.3	57.7	58.9
Serbia	61.5	58.0	58.6	59.0	61.5	64.0	57.5	59.6	60.9	59.4
Turkey [a]	46.3	41.5	37.6	37.2	31.3	33.8	29.1	26.7	29.6	27.4
CIS										
Armenia	94.4	92.9	90.8	88.4	86.9	82.7	88.2	86.9	86.4	85.6
Belarus	29.4	22.8	23.9	14.3	24.6	28.3	50.2	46.4	75.6	48.8
Georgia	—	—	79.2	78.5	78.1	85.1	85.0	85.7	85.6	84.5
Kazakhstan	64.2	48.5	32.2	27.2	22.1	18.4	18.9	23.7	23.0	19.4
Moldova	87.7	83.7	81.2	80.4	79.1	83.9	84.9	83.4	90.8	91.1
Russia	81.2	79.9	75.2	48.6	32.8	30.6	33.8	28.1	22.4	21.7
Ukraine	73.6	77.6	79.7	84.4	78.8	75.4	67.3	64.4	61.7	48.1
Middle East and North Africa										
Egypt	28.1	23.4	21.0	19.5	18.6	18.4	18.9	16.9	15.4	14.7
Israel	25.5	25.5	26.2	25.1	22.6	19.8	18.5	17.1	17.4	15.9
Jordan	76.7	72.0	69.2	65.3	58.7	38.7	35.3	36.6	31.0	28.0
Lebanon	49.1	53.4	51.9	53.3	54.6	48.5	45.2	42.5	42.4	45.7
Morocco	27.2	23.9	21.1	19.7	20.0	21.0	22.8	24.0	23.1	23.7
Tunisia [a]	64.8	63.5	64.2	60.1	58.6	61.2	58.7	60.9	58.3	60.9
Asia										
Bangladesh	66.7	66.0	65.0	64.5	62.9	56.7	53.8	51.7	49.0	47.9
China	16.2	9.7	8.5	4.7	3.2	2.6	2.2	1.9	1.6	1.5
India	7.5	7.1	6.6	6.2	5.9	6.4	5.9	5.8	5.9	5.4
Indonesia	51.4	54.0	54.3	49.6	48.1	52.1	47.4	46.2	45.0	42.8
Malaysia [a]	19.8	16.0	13.1	10.3	7.3	6.6	3.8	4.1	4.0	3.4
Pakistan	47.8	47.0	46.3	45.7	45.2	44.7	48.2	46.2	42.6	38.9
Philippines [a]	53.2	53.0	50.0	49.9	46.9	49.4	50.2	47.3	45.5	39.9
Thailand	21.6	16.7	13.1	8.0	4.6	3.4	2.2	1.8	1.5	1.3
Vietnam	76.9	75.8	70.4	68.4	67.7	62.7	60.5	59.5	61.0	56.9
Africa southwards from Sahara										
Ghana	83.3	77.8	76.8	40.8	48.4	50.5	54.0	52.7	50.6	47.3
Kenya	58.4	59.1	57.9	54.7	49.5	50.5	50.8	46.1	48.6	47.4
Nigeria	73.6	68.8	61.9	22.3	16.3	18.2	16.5	13.5	14.3	13.8
South Africa	14.5	12.4	12.6	14.0	14.3	17.8	13.5	9.7	9.9	9.2
Latin America										
Argentina	75.8	75.6	51.4	52.1	52.8	52.5	54.1	58.8	60.1	59.0
Brazil	23.7	20.3	15.7	11.3	7.6	8.3	5.6	5.4	4.8	5.0
Chile [a]	90.7	84.0	71.7	67.8	51.5	40.0	22.8	17.3	17.2	16.1
Columbia	49.5	44.6	35.8	36.5	33.6	34.2	33.6	31.2	30.8	27.8
Mexico [a]	39.3	38.1	33.6	21.4	19.5	19.0	19.1	19.7	21.2	19.7
Venezuela a	64.8	65.6	67.7	64.8	69.9	75.3	66.7	59.4	61.7	50.6

Comment: a — central/ federal/ national government

Source: Moody's Statistical Handbook, November 2013

Opening of public debt market in national currency to non-residents leads to its deepening and increasing its liquidity and competitiveness, which helps to decrease yields on government securities. However, there are often concerns about stability of this market in case of adverse external shocks. According to dominant stereotype in case of such shock, non-residents are

first to leave the market while residents will stay in. Such scenario is possible as experienced by Hungary in October-November of 2008 when mainly non-residents left the government security market denominated in forints. However, in other cases like Russia and Ukraine in 2008–2009 or Latin America in previous decades residents leave the market first.

It seems that the business model of financial investors (orientation towards long- or short-term investment) is more important factor for the stability of the government bond market rather than investors' residence. More generally, opening up of an economy to the external world (including financial market integration) offers numerous benefits but makes it more vulnerable to external shocks and dependent on global business cycle.
Despite all potential advantages of external financing of public debt, its role in EMDE decreases gradually (see Figure 4.1 and Panizza, 2008). This seems to be result of development of financial markets and progress in macroeconomic stabilization achieved by EMDE in 1990s and 2000s.

The similar picture is provided by Table 4.1 which presents the share of debt either denominated or indexed in foreign currency in the GG total debt in selected EMDE. Transition economies (in CEE and CIS) record relatively high share as compared with other regions.Russia, Kazakhstan and the Czech Republic are exceptions. On the other hand, there are substantial differences among countries in the same region, e.g. between Argentina and Brazil, between India, Pakistan and Bangladesh, Vietnam and China, Malaysia and Indonesia, Hungary and the Czech Republic.

5. Factors Determining Dynamics of Public Debt-to-GDP Ratio

Despite all its analytical shortcomings discussed in Section 3.2, the public debt-to-GDP ratio serves most often as the main measure of quality and reliability of fiscal policy in a given country. Therefore, it is useful to analyze factors, which determine its dynamics.

The relationship between the increase of GG gross debt, GG primary deficit/ surplus, dynamics of real GDP and real interest rate of government borrowing can be described by the following equation (see Escolano, 2010):

$$d_t - d_{t-1} = \frac{r_t}{1+g_t} d_{t-1} - \frac{g_t}{1+g_t} d_{t-1} - p_t$$

(5.1)

where d_t - GG gross debt-to-GDP ratio at the end of period t
d_{t-1} - GG gross debt-to-GDP ratio at the end of period t-1
r_t - real interest rate in period t
g_t - the rate of growth of real GDP between t-1 to t
p_t - the ratio of primary fiscal balance (deficit or surplus) to GDP in period t

It follows from equation 5.1 that increase of GG gross debt to GDP ratio can be explained by:
• GG primary deficit, i.e., when the non-interest GG expenditure exceeds its revenue
• real interest rate of GG borrowing which exceeds the real growth rate of GDP

The equation 5.1 illustrates the pro-cyclical character of the public debt-to-GDP ratio that was discussed in Section 3.2. During the boom phase of the cycle, the real GDP growth rate is higher, debt financing is more easily available which is reflected in lower real interest rates,

and fast growth of budget revenue helps to improve primary GG balance. During recession all these indicators deteriorate what leads to the increase in public debt-to-GDP ratio.

In addition, if there are financial markets doubts regarding government creditworthiness, the real interest rate increases rapidly which worsen additionally prospects of government solvency. This kind of vicious circle of market expectations[10] was observed before many financial crises, e.g. in Mexico in 1994, Russia in 1997–1998, Argentina in 2000–2002, Greece in 2009–2010, Ireland in 2010, Portugal in 2010–2011, and Cyprus 2012–2013.

Equation 5.1 does not determine directly the role of inflation. After beginning of the recent global financial crisis, some economists advocated moderate increase of the inflation rate as a measure to stimulate economic growth and depreciate the stock of public debt (see Blanchard, Dell'Ariccia & Mauro, 2010). However, the analysis of equation 5.1 suggests that the only way of potential influence of higher inflation on the dynamics of debt-to GDP-ratio is through real interest rates. If higher inflation was unexpected for financial markets the real interest rates would decreased. However, such scenario is rather unlikely because financial markets can forecast higher inflation and prevent decreasing real yields on government securities through demanding higher nominal interest rates in advance.

Equation 5.1 does not take into account changes in exchange rate. In fact, it holds only for the country whose government does not borrow in foreign currency. And it is rather unrealistic assumption for most of EMDE (see Section 4.2). To take this factor into account, it is necessary to augment equation 5.1 and add the debt in foreign currency (Ley, 2010):

$$D = Dh + eDf \qquad\qquad (5.2)$$

where D - total GG debt
Dh - debt in national currency
Df - debt in foreign currency
E - exchange rate (the price of unit of foreign currency in national currency)
Respectively the depreciation of national currency increases the debt burden while its appreciation reduces it.

6. The Level of Public Debt and Default Risk

Following the EU Maastricht criteria (see Chapter 7) many analysts started considering the level of gross GG debt lower than 60% of GDP as a relatively safe in terms of the default risk. But when looking at the history of debt crises (including financial crises with strong fiscal component) shown in Table 6.1, it is clear that the problems with government solvency and its access to financial markets can occur at the level lower than 60% of GDP. Moreover, sometimes they happen even when the debt-to-GDP ratio is decreasing (examples of Serbia and Ukraine in 2008).

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[10] In economic literature it is called sometimes as a mechanism of *multiple equilibria*.

Table 6.1: GG gross debt-to-GDP ratio during the public debt crises, in %

Country	The year of the beginning of the crisis (t)	t-3	t-2	t-1	t	t+1	t+2
Argentina	2001	38.2	43.5	45.6	53.6	165.0	139.4
Cyprus	2012	58.5	61.3	71.1	85.8		
Greece	2010	107.2	112.9	129.7	148.3	170.3	156.9
Hungary	2008	61.7	65.9	67.0	73.0	79.8	81.8
Iceland	2008	25.4	30.1	29.1	70.4	88.0	90.6
Ireland	2010	24.9	44.2	64.4	91.2	104.1	117.4
Italy	2011	106.1	116.4	119.3	120.8	127.0	
Latvia	2008	11.8	9.9	7.8	17.2	32.9	39.7
Portugal	2011	71.7	83.7	94.0	108.4	123.8	
Romania	2009	12.6	12.7	13.6	23.8	31.1	34.4
Russia	1998	n/a	n/a	n/a	n/a	99.0	59.9
Serbia	2008	56.3	42.2	34.6	33.4	38.1	46.5
Slovenia	2013	38.7	46.9	52.8	71.5[a]		
Spain	2011	40.2	54.0	61.7	70.4	85.9	
Turkey	2001	n/a	n/a	51.6	77.9	74.0	67.7
Ukraine	1998	n/a	n/a	29.9	48.1	61.0	45.3
Ukraine	2008	17.7	14.8	12.3	20.5	35.4	40.5

Comment: [a] — predicted value

Source: IMF World Economic Outlook database, October 2013

On the other hand, there is a number of advanced economies (see Tables 3.1 and 3.2), e.g. Japan, US, UK, France, Germany, Belgium, the Netherlands and Austria whose gross public debt exceeds, sometimes significantly, 60% of GDP and which are still considered by financial markets as financially reliable. They keep the highest credit ratings.

Table 6.1 shows that fiscal problems of the countries in crisis usually deepen after its start as a result of depreciation of national currency, growth of interest rates, costs of banks restrcuturing, and decline of GDP.

By the way, Maastricht criterion of 60% GDP and the upper limit of the deficit of GG of 3% of GDP was a result of political compromise among EU member countries and reflected macroeconomic reality of the early 1990s in the European economy. In particular, the country which had the public debt-to-GDP ratio exactly equal to 60% could afford fiscal deficit of 3% of GDP (allowed by the Maastricht Treaty) only when its real GDP grew by at least 3% per year (assuming that inflation was not higher than 2% — see Dabrowski, 2012). At that time such growth rates were not a rare case in Western Europe. Today the average growth rate is much below 3% and it means fiscal deficit must be lower than 3% of GDP to stabilize the level of public debt in relation to GDP.

Analyzing Table 6.1 and the credit rating of particular countries, it becomes obvious that the level of public debt in relation to GDP is not the single factor determining the potential risk of sovereign default. Other factors and circumstances must be also taken into consideration, e.g.:
- debt dynamics; if it grows rapidly it will create an additional risk factor;
- outstanding debt maturity; if it is short it can cause problems with debt rollover;
- availability of liquid financial assets, i.e., the difference between gross and net debt (see Section 3.1);
- the share of non-residents among creditors; their high share may increase risk of their sudden exit from government bond market exit in the case of global or regional crisis;

- the share of short-term investors among creditors (which also increase the risk of their sudden outflow the case of adverse shock);
- the share of the debt liabilities denominated in foreign currency (important in case of currency depreciation);
- the presence of the contingent liabilities, especially in the banking and financial systems (see Section 2.4 on consequences of the banking crises in Iceland, UK, US, Ireland, Spain, Latvia, Cyprus, and Slovenia which led to rapid increases in their public debts);
- government openness and transparency of the public debt management system, availability of complete information on country's public debt (IMF, 2001);
- country's financial reputation (past episodes of defaults, high inflation and hyperinflation, banking crises, stability and reliability of the national currency, etc);
- political stability and political ability of taking decisions necessary for fiscal consolidation, predictability of country's economic policy;
- tax potential of the country (see Section 3.2); availability of non-tax sources of revenue, including rent revenue related to natural resources;
- level of financial market development and its liquidity;
- external demand for country's sovereign debt and other financial instruments and the international role of national currency; this factor explains the readiness of financial markets to finance high level of public debt of such countries as the US, UK, Japan and Germany;
- situation on international financial markets; changes in global liquidity, changes in investors' mood, their response to unexpected shocks.

Summing up, there is no a single norm of 'safe' borrowing. Each country must define for itself the maximum level of public debt based upon its own macroeconomic and credit history and the experience of other countries but taking into account its own specifics. As the risk of default is determined by too many factors and sometimes unpredictable circumstances (e.g., global shocks and panic on the international markets), the maximum debt should be determined at the relatively low level with the sufficient margin of safety.

7. Normative Public Debt Ceilings

Many countries introduce the direct or indirect restrictions on growth of their public debt. Direct restrictions usually set the maximum ceiling of public debt either in nominal value or as the percent of GDP. Indirect restrictions do not set explicit limits on the level or growth of public debt. They introduce either the principle of the balanced budget or the maximum level of fiscal deficit, or restrictions on the growth of budget expenditure, assuming that such measures can help in reducing public debt or at least slow down its growth.

The above mentioned norms and restrictions are called *fiscal rules*. They are determined either in the constitution or in ordinary laws. They can concern either the entire GG or its components, e.g., central (federal) government, federation entities, regions, municipalities, etc. In some federations their member entities (for example, state, provinces) adopt the fiscal rules themselves in their constitutions or charters. This is the case of US where the states cannot rely on the support of federal government in case of default and they take care on budget discipline themselves (Bordo, Markiewicz & Jonung, 2011).

The EU and its member states are the leaders in adopting and developing fiscal rules. This process has started with signing the Maastricht Treaty in 1992 which introduced the so called Maastricht criteria: the GG deficit not higher than 3% of GDP and GG debt not higher than 60% of GDP (Chapter 6). The purpose of these norms was to ensure stability of the common European currency — Euro. Subsequently these upper limits were repeated in the Treaty on the Functioning of the European Union signed in Lisbon on December 13, 2007 and becoming effective on December 1, 2009.[11]

The additional fiscal rules were introduced in the Stability and Growth Pact (SGP) adopted by the European Council in Amsterdam on June 17, 1997 (European Council, 1997). SGP concretized Maastricht criteria, introduced sanctions (including financial ones) for their breaching and the Excessive Deficit Procedure (EDP), which is to force and help rules offender to bring deficit back below the level of 3% of GDP. Like in the case of Maastricht criteria, SGP justification was protection of Euro stability the attempt to avoid the 'free riding' problem, when the country with poor budget discipline benefits from the common currency and can borrow at the low interest rates (at the costs of others).

From the very beginning, the enforcement of Maastricht criteria and SGP faced the *collective action* problem, i.e., the lack of consensus and determination among EU member states to undertake actions require to keep fiscal discipline. The reason was too large number of rules offenders (Dabrowski, 2012). As a result, the EU member states were not ready to punish other offenders and the SGP itself was weakened in 2005 by adding different types of exceptions and circumstances which justified breaching the fiscal rules.

However after the beginning of the Greek debt crisis in 2010, SGP was tightened up again with new, this time more automatic and serious, sanctions and expanded towards strengthening various preventive measures and closer monitoring of public debt (Dabrowski, 2010). Earlier it focused solely on the deficit.

In addition, in 2011, the European Parliament and European Council adopted the directive recommending all EU countries to introduce the upper limits of public debt and fiscal deficit into their own national constitutions and legislation. Additionally, since 2012 the procedure of monitoring national draft budgets was introduced under the name of European Semester[12].

Finally, on March 2, 2012 all EU member states except the UK Kingdom and Czech Republic [13] signed the so-called Fiscal Stability Treaty[14] and it came into force on January 1, 2013. In general, it sets in the form of intergovernmental treaty the principles of the enhanced fiscal discipline inside the EU and at the national level, especially for the Eurozone countries.

As a result of the above legislative initiatives at the EU level, the process of adopting new fiscal rules in EU member states was accelerated. It has not been completed yet, therefore only preliminary analysis can be performed[15]. Due to differences in national constitutions and

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[11] See http://register.consilium.europa.eu/pdf/en/08/st06/st06655-re07.en08.pdf.

[12] See http://www.consilium.europa.eu/special-reports/european-semester for the details of this procedure.

[13] The new Government of Czech Republic formed in February of 2014 announced the intention to sign the Fiscal Stability Treaty.

[14] Its full title is the Treaty on Stability, Coordination and Governance in the Economic and Monetary Union. See http://www.eurozone.europa.eu/media/304649/st00tscg26_en12.pdf.

[15] The European Commission carries out periodical surveys and analysis of these regulations. For the results of the latest survey (from the end of 2011) see http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/documents/fiscal_rules_2011_final.xlsx.

legal systems, national fiscal rules are not homogenous and easy to compare. Nevertheless, the European Commission made an attempt to create a cumulative index of EU countries' fiscal rules which is presented in Figure 7.1. The strictest rules were adopted in Sweden, Spain, Bulgaria, Poland, UK, France, Lithuania, Denmark, Estonia, Luxembourg, Germany, and the Netherlands. Cyprus, Greece, and Malta are on the other end of this spectrum.

Figure 7.1: Index of fiscal rules in EU member states, 2010–2011
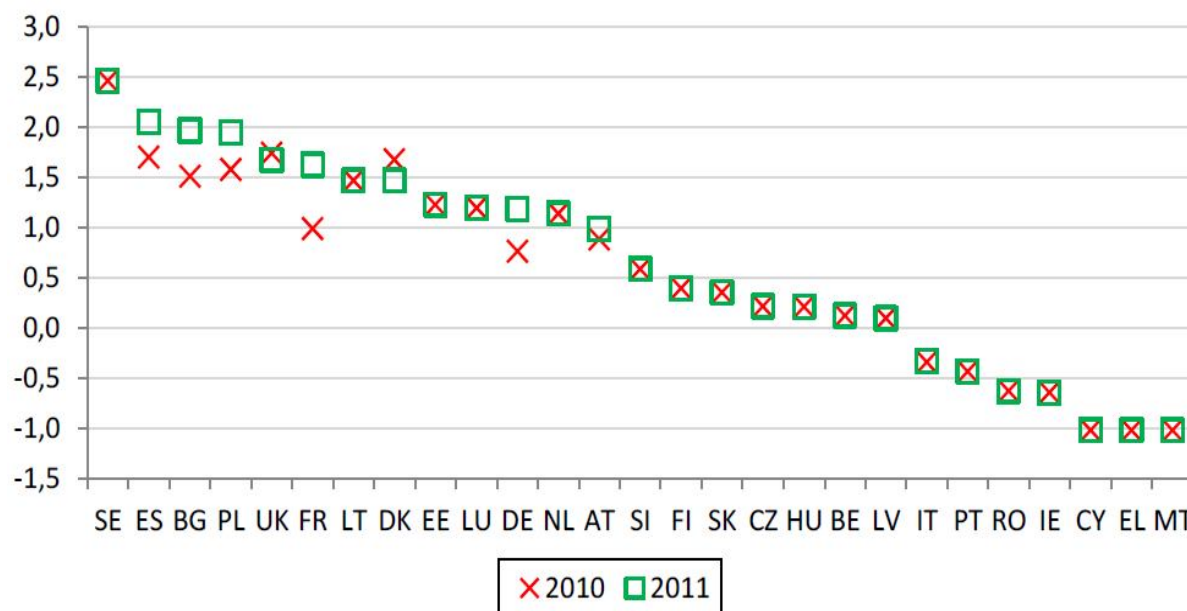
Source: http://ec.europa.eu/economy_finance/db_indicators/fiscal_governance/documents/nfr_2011_graph_4.pdf

One of the first explicit constitutional provisions on the upper limit of public debt (60% of GDP) was adopted in Poland in 1997. It was accompanied by setting two additional maximum levels of public debt by ordinary legislation (50 and 55% of GDP). Breaching these limits triggers corrective fiscal measure.

The similar constitutional regulation (the total GG debt not higher than 60% of GDP) was adopted in Spain in 2011 but as opposed to Poland it allows some exemptions in the case of recession, natural disasters and other emergencies. In Bulgaria since 2003, the forecasted public debt-to- GDP at the end of budget year cannot exceed that of the previous year. However, this regulation cecomes active only if the public debt-to-GDP ratio exceeds 60%.

Germany chose another way and in 2009 it adopted the constitutional amendment which is known as the 'debt break' (*Schuldenbremse*) although it is not directly related to the level of public debt (Economist, 2011). Instead starting from 2016 it sets the maximum ceiling of the 'structural'deficit (i.e. cyclically adjusted deficit) of the federal budget and budgets of federal lands (*Länder*) at the level not higher than 0.35% of GDP. Starting from 2016 federal lands will not be allowed to have any structural deficit. However, the constitution of Germany provides the exceptions in the case of natural disasters and deep recession.

Germany's experience was followed by other EU countries: Austria (2001), Italy (2012), and Slovenia (2013). Earlier the similar constitutional regulation was adopted by a non-EU country — Switzerland (2001) and a EU member Sweden (the regulation came into effect in 2007). Interestingly, the Swedish constitutional amendment requires the 'structural' fiscal surplus of 1% of GDP.

Contrary to Europe and despite numerous legislation initiatives, the US Congress never adopted the 'balanced budget amendment' to the federal Constitution although such rules are adopted in the constitutions of most of states. For example, in 1995 it was only one vote lacking to adopt the constitutional amendment which set the maximum nominal ceiling of federal debt in the Senate (after its adoption by the House of Representatives).

Although in the US since the First World War there has been a practice of federal laws which set the upper borrowing limits of the federal government they cannot be perceived as the systemic restriction on the growth of public debt. In practice, they have been often revised upward [16] (Austin & Levit, 2013). Rather , they serve as the authorization tool to allow federal government to place US Treasury bonds on the market. At the same time, the upper debt limits often remain uncoordinated with budget appropriation laws which define the expenditure commitments of the federal government.

The existence of the effective constitutional and legal regulations which discipline the government finances favorably influences the confidence of financial markets to a given government (as they mitigate the risk of country's default) and helps the latter to borrow at lower interest rates (Hatchondo, Martinez & Roch, 2012).

8. Conclusions for the Macroeconomic Policy

Since 2008 the world economy has been facing the consequences of the global financial crisis, the end of which is still not visible. As a result, many paradigms of the economic policy have been revised and this process is far from being completed. One of the topics which needs fundamental rethinking (especially in advanced economies) relates to the role of public finance and fiscal policy in ensuring economic growth and financial stability. The task is to elaborate the new analytical approach and detail indicators which are necessary to make a correct diagnosis and effective recommendations.

The reason to revise the conceptual basics of fiscal policy is the rapid growth of public debt in many advanced economies which reached the record-high level in the peace time and which raised a number of doubts in respect to future creditworthiness of those countries. The rapid growth of public debt has been determined by numerous factors: too optimistic assessment of the state of the public finances before the crisis, costs of the crisis itself (decrease of government revenue, automatic growth of social expenditures, costs of banking system restructuring) and the countercyclical fiscal policy aimed to overcome recession (Dabrowski, 2012).

Leaving aside the question of economic rationale and efficiency of countercyclical fiscal policy, it is worth to note that carrying out such policy in time of deep financial crisis requires prior building up a sufficient fiscal reserves in 'good' times.

The same is true for the financial support of banks and other enterprises affected by the consequences of the crisis. Again, this is not the purpose of this paper to discuss the economic rationale of such support. However, if one considers such support as feasible and necessary, the adequate budget space shall be created for it in advance.

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[16] Despite partisan conflicts related to revision of these limits. The last one took place in October 2013.

All this leads us to the problem of the 'safe' level of budget deficit and public debt at the 'normal' or 'good' time[17]. Most likely they should be set at the much lower level than it could be done ten years ago. At the same time, one should not forget that there is no single norm of fiscal security. As the historic experience shows, the risk of default may arise at the different levels of public debt, sometimes at a very low level by international comparison. In fact, the 'safe' borrowing level is very individual for different countries depending on many factors and circumstances, sometimes unpredictable (Chapter 6).

The additional argument in favor of cautious analytical and policy approach is associated with the highly pro-cyclical nature of relative measures of deficit and debt (see Section 3.2) which are applied in the cross-country analyses. By the way, these measures serve very often as the basis of the formal fiscal rules described in Chapter 7. There is no good substitute for the debt-to-GDP ratio yet (the debt-to-revenue ratio is also pro-cyclical), However, one should not forget about its analytical limitations.

The experience of the last crisis also points to the necessity to improve estimates of the contingent liabilities, especially the ones related to the financial sector stability (Section 2.4).

When looking at the future, the issue of the correct estimation and accounting of the government debt and other contingent liabilities (especially implicit liabilities of the public pension and healthcare systems) has the fundamental importance in the context of population decline and aging. In some countries, such liabilities exceed the official statistics of the public debt several times. As a result, the official statistics does not provide the correct picture of the government debt and the actual size of the fiscal burden which will be inherited by the next generations of taxpayers.

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[17] Due to globalization and irregularity of business cycle it is difficult to determine at which phase of the cycle a given economy is and whether it is necessary to see its current performance as the evidence of 'good' time.

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