Why 60 and 3 percent?

European debt and deficit rules – critique and alternatives

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"The Euro at 20 – macroeconomic challenges"

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Abstract

The 60 percent debt limit and the 3 percent deficit cap, invented in Maastricht, are enshrined in the Treaty on the Functioning of the European Union (TFEU) and the "Fiscal Compact". These two numbers have become cornerstones of the complex fiscal policy framework of the European Monetary Union (EMU) in the secondary law of the EU. The European authorities never provided sound economic justifications for the 3 and 60 percent rule, especially not for the debt cap. There is no other advanced country outside the EU that has a legal or even a constitutional debt cap. The caps are not stock-flow consistent. Both numbers came into the Maastricht Treaty by incidence.

The paper investigates the reasoning for the rules by the European Commission, the IMF and in academia. Indirect support comes from debates about debt sustainability identified with sovereign debt "solvency", from the IMF-concept of "fiscal space" and theories about intertemporal budget constraints. The implicit balanced budget rule in the EMU rulebook has also roots in Buchanan's Political Economy of public debt, a pre-Keynesian philosophy. Yet, all these theories and concepts do not deliver sound explanations for both caps, applied even-handedly to all member states of the EMU despite enormous structural differences.

The paper argues that the EMU fiscal rules entail a bias for contractionary policy, thus dampening growth and employment, especially in high-debt member states. This feature becomes best visible if the debt and deficit dynamics in the EMU are compared with the U.S. The main difference is the historical prevalence of higher growth rates than implicit interest rates on sovereign debt in the U.S. whereas in most EMU members interest rates exceeded growth rates. The interest-growth differential is a key factor for the level of debt which can be influenced by prudent policies. With low interest rates in the medium-term or even longer, the EMU faces a new monetary environment which could open the door for a reform of its fiscal policy.

The paper pleads for a reconsideration of the fiscal policy rulebook of the EMU. Most importantly, there should be a deficit rule that allows (1) effective counter-cyclicality and also (2) a "golden rule" for more debt-financed public investment. Furthermore (3), high-debt countries in EMU should have the option to carry a higher debt level, as a legacy from past times, or to reduce their debt level gradually. The paper proposes a fiscal Taylor rule, similar to the well-known monetary policy rule. These proposals are made given that at the time being there is no political consensus to establish a full-fledged EMU treasury. If this changes, more leeway for the EU treasury would justify stricter rules for member states.

Contents

List of acronyms

AMECO Annual macroeconomic data base of the European Commission
bp basis points
CDS Credit default swap
DSA Debt Sustainability Analysis
DSGE Dynamic stochastic equilibrium model
EA Euro area
EC European Commission

ECB European Central Bank
ECOFIN Economic and Financial Affairs Council
EFSF European Financial Stability Facility
EMU European Monetary Union
ESM European Stability Mechanism
EU European Union
FC Fiscal Compact
FS Fiscal sustainability
FSR Financial Sustainability Report
GDP Gross Domestic Product
GNI Gross National Income
IMF International Monetary Fund
LoLR Lender of Last Resort
MTO Medium-term budgetary objective
NPV net present value
OG Output gap
p.a. per annum
p.c per capita
pp percentage points
SFA Stock Flow Adjustement
SGP Stability and Growth Pact
SPB structural primary balance
TFEU Treaty on the Functioning of the European Union
TSCG Treaty on Stability, Coordination and Governance
WEO World Economic Outlook

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1. Introduction

As is well known, initially there were only two fiscal rules in the Maastricht Treaty for the European Economic and Monetary Union (EMU): the 3 percent deficit limit and the 60 percent of GDP debt ceiling. If the debt level was higher, it would be enough if the country slowly approached the limit. So, the 60 percent limit was *de facto* a rule with less priority although included in primary EU law – the EU Treaties – which is almost impossible to change. Initially, both rules applied only to accession to the EMU. In 1997, the Stability and Growth Pact (SGP) was added, calling for permanent compliance with the 3 percent rule. Most of the SGP is secondary EU-law.

Journalists found that the 3 percent limit was "invented" by two low-rank young officials in the French Ministry of Finance in 1981 (FAZ 2013). They were asked by Philipp Bilger, deputy of the budgetary departmnt in the Ministry of Finance under Laurent Fabius, the then finance minister under the presidency of Francois Mitterand, to make a proposal for budget negotiations in order to limit the wishes of cabinet members. There was no economic rationale behind the number 3, as the inventors told the journalists. The French negotiators of the Maastricht Treaty used this number, specifically Jean-Claude Trichet, at the time Finance Minister; the Germans agreed (Tietmeyer 2005, p. 163). Later, the justification for the 3 percent rule was seen as a safeguard for price stability against fears of inflationary borrowing in individual countries, and a deterrent tor Keynesian deficit spending rejected by the then prevalent supply-side economics (Schönfelder/Thiel 1996, p. 150).

Regarding debt, there was no economic justification, apart from the suggestion that the debt level was approximately equal to the average of the 12 EU countries. Tietmeyer, a key German negotiator from the German Ministry of Finance, recollected that in the debates a "rough connection" was seen between the 3 and the 60 percent criteria. With expected average 5 percent nominal growth and an average deficit of 3 percent the 60 percent debt level could be maintained (Tietmeyer 2005, p. 164); yet Tietmeyer admitted that this was no precise scientific reasoning. If the "rough connection" was really intended, 3 percent for deficits should be an average, not a cap. Whatever the origin of these numbers, they are arbitrary and not consistent with each other – but fundamental pillars of the EMU (for an early critique see Pasinetti 1998). The riddle is why the numbers had not been changed since the advent of the Euro in 1999. One explanation

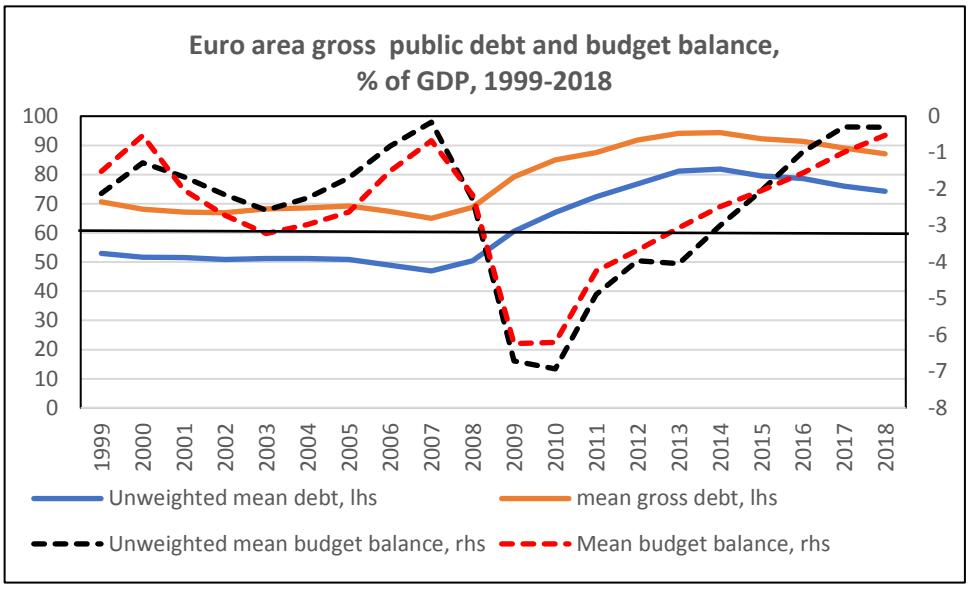
could be that the negotiators did not care much for economic consistency, but more for key political tenets: keeping not only inflation as low as in Germany, allow only a small dose of Keynesian policy, limit the size of member state revenues and expenditures, relative to GDP, and avoid any kind of centralised European economic governance (Schönfelder/Thiel 1996, pp. 149ff., 163ff.). No unification of fiscal policy, hence no EU Treasury, but few rules for national fiscal policy with two caps (cp. also Brunnermeier/James/Landau 2016, pp. 56ff.).

In the preparation of the Stability and Growth Pact, it became clear that the German negotiators opted for a balanced budget rule, with some counter-cyclical leeway. The rule should be a balanced budget over the cycle or a surplus. 3 percent should be the cap, not the average (Tietmeier 2005, p. 232ff.) .The French side agreed. The implicit long-term target became now a very low debt level, perhaps even zero, as in James Buchanan's public debt philosophy (see chapter 4.6). However, the 3 percent-rule of the SGP was violated by Germany and France in the early 2000s, when Germany faced stagnation of the real GDP over 13 quarters (Q1-2001 to Q1-2005). The SGP was flexibilised slightly to allow for deviation from the rule in the case long slumps. Furthermore, country-specific Medium-Term Budgetary Objectives (MTO) were instituted, and cylically adjusted budget balances were allowed with country-specific caps.

After the the global financial crisis when deficits and debt levels had hiked, Germany and France pushed for hardening the SGP, in particular the German government which had adopted a so-called debt brake with a balanced structural budget rule in its constituion in 2009.[1] The 6-Pack of 6 regulations of the EC brought a major hardening of the SGP in 2011, supplemented by the "Two Pack" with two new regulations in 2013. The basic rules (3 and 60 percent) in the primary European Law remained, the change came with secondary law, until the Fiscal Compact (FP, officially TSCG) in 2013 which required contacting member states in an intergournmental treaty to adopt balanced-budget rules in the constitutions or similar high-ranking law in the member states. This legal form was chosen because UK and the Czech Republic disagreed so that a change of the EU Treaties requiring unanimity was not possible.

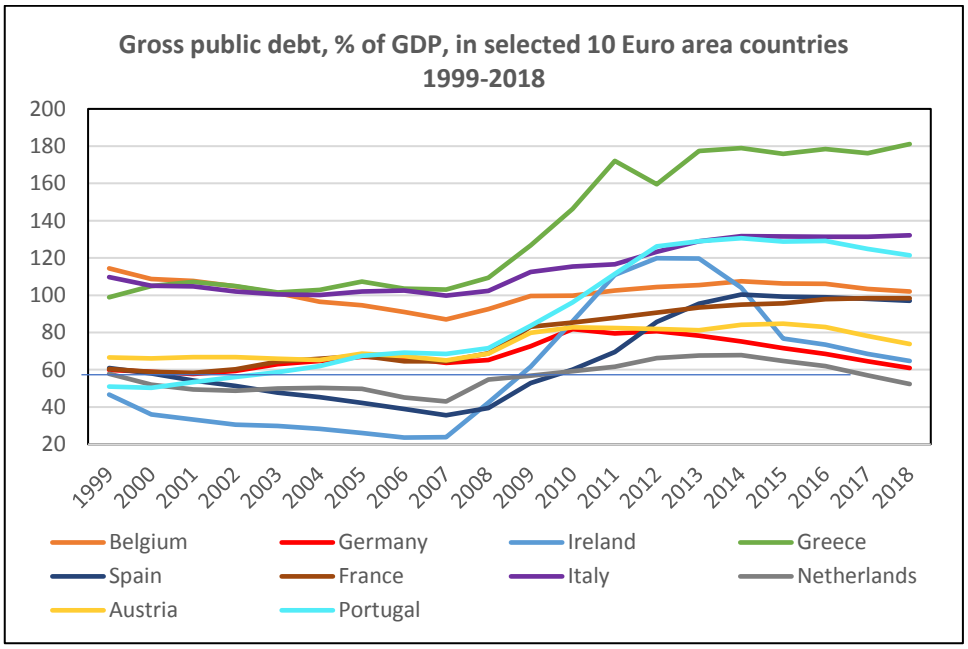
[1] Chancellor Merkel called for a „Fiscal Union" in this sense. See Financial Times 16 May 2010.

Figure 1.1



Source: AMECO 2019

Figure 1.2



Source: AMECO 2019

After the financial crisis of 2008-9 and the subsequent Euro recession in 2012-13, the debt level of the Euro area rose by 29 pp to 94 percent within six years (see figures 1.1 and 1.2) and the spreads of interest rates on sovereign debt temporarily exploded for several countries. The mushrooming sovereign debt, alongside the Greek crisis in 2010, was mis-interpreted as a "European debt crisis" resulting from profligacy and fiscal indiscipline. "Sustainability" of public debt became the keyword, without clear definition. An economic justification of the 60 percent debt cap was not provided. There seems to

be no deficit-debt or flow-stock consistency. Although fiscal policy rules in EMU have been somewhat flexibilised under the Juncker Commission (2014-2019), there is – in our opinion - a deeply rooted austerity bias in the European fiscal policy, best visible in comparison fiscal policy in the U.S. Increased problems arise, if monetary policy of the ECB loses steam when interest rates stand at the zero bound, European centralised fiscal policy is rejected and national fiscal policy is either trapped in straitjackets or does not use the fiscal space that exists. We argue that the fiscal rules in EMU should give countries more policy space if there is no consensus for a full European Treasury with a Fiscal Union..

In this essay, both the 3 percent and the 60 percent limit are questioned, both the size of the limits and the prescription of uniform deficit and debt limits for all member states alike. In chapter 2 we describe the present rather complex set of rules in EMU, and in chapter 3 we investigate the sparse economic justifications presented in the background papers and manuals of the European Commission (EC). Other concepts which hold that there are debt thresholds beyond which public debt default risks emerge are partly used by the EC as theoretical backing, based on the notion of intertemporal budget constraints. Other concepts stem from academia. We review these concepts in chapter 4 and then the criticisms in the literature in chapter 5. This part of the academic literature raises doubts on the notion of debt sustainability and debt thresholds for risks of "debt default or "government insolvency".

Chapter 6 elaborates on the growth-debt nexus by analysing empirically the differential of interest rates on public debt and GDP growth rates. Since Evsay Domar (1944) this differential is considered the key determinant of the debt ratio, besides the primary budget balance. Orthodox theory holds that interest rates have to exceed growth rates, which is backed by some empirical studies. We show evidence that debt dynamics reflect quite mixed results regarding the differential. We focus on the comparison of the deficit-debt performace of the U.S. and the Euro area for the period 1999-2018. Following a recent paper by Blanchard (2019) we show how the U.S. benefitted strongly from higher growth relative to interest rates, in contrast to the EMU.

In chapter 7 we analyse eight areas for reforming the European deficit-debt rulebook. Chapter 8 summarises and presents policy conclusions.

2. The fiscal policy rules of the EU

The current basic rules for EU fiscal policy can be summerised as follows.

The budget deficit must not exceed 3 percent of GDP; it should be balanced or in surplus (Article 3a of the "Fiscal Compact", TSCG). This condition is considered as fulfilled if the structural deficit is not lower than 0.5 percent if the debt level is above 60 percent (Article 3b). With debt "considerably below" 60 percent, the structural deficit has a limit at 1 percent (Article 3d). The debt rule implies a debt convergence value of 33 percent of GDP under realistic assumptions (structural deficit 1 percent, nominal GDP growth 3 percent); with a strictly cyclically balanced budget (in absolute terms) the debt would converge even to zero. If the debt is above 60 percent, the difference between the actual and the target value should be reduced by 1/20 every year "as a benchmark" (Article 4 of TSCG) so that the target could be reached by 2032. These new rules are semi-primary law, anchored in an inter-governmental treaty rather than in European Law. They involve a major change compared to the Maastricht Treaty, i.e. tightening of fiscal policy.

If the economy is booming, that is if the output gap (OG) is positive, a structural budget surplus should be achieved in order to be able to take counter-cyclical measures in bad times, i.e. in times of a negative OG. The target structural budget balance is set by the medium-term budgetary objective (MTO) of the EC. The rules for the MTO are prescribed in detail in the secondary law of the EU, especially the regulations that came with the 6-pack and the 2-pack for the preventive and the corrective arm, based on Art. 121, 126 and 136 of the TFEU. The complex rulebook is summarised and updated in the annual "Vade Mecum of Stability and Growth Pact" of the EC (EC 2019), with a volume of more than 200 pages.

The cornerstone of the MTO-philosophy is calcualting structural balances, based on estimating OG which relies on estimating potential output. The latter is defined according to the Fiscal Stability Board: "The level of real GDP in a given year that is consistent with a stable rate of inflation." (FSB 2018, p. 91) The Commission calculates MTO for member states for 3 years, differentiated for those with debt above and at or below 60 percent of GDP. For instance, in 2019 MTOs range from -0.5 for Germany and maximum 0.25 percent for Portugal and Slovenia, while Italy's MTO stands at 0.0 percent (recently lowered by 0.5 pp after the conflict with the Italian government)(EC 2019, April, p. 92). Since the key effects results from the structural primary balance (PSB), the interest burden on public debt has to be added to the structural balance. This means, for

instance, that Germany has a PSB of around 0.5, Italy and Portugal of 3.7 percent. Greece is not listed in this context but has a primary surplus of 4.4 percent in 2018 (AMECO). The MTO include also components resulting from estimated implicit liabilities and debt and costs of ageing under the "no policy assumption" that no corrective measures were taken over a very long time horizon.

Countries that have not yet reached their MTO, have to follow a pathway of adjustment. Country-speficic floors (for normal cyclical positions) are the minimum benchmarks (MB) which presently range from -2.0 percent (Greece) to -0.8 percent (Netherlands). MB are supposed to guarantee a safety margin against breaching the 3-percent rule. For the adjustment to the MTO, it is agreed that the normal pace of improvement is 0.5 pp for countries above 60 percent debt level. This adjustment rule was flexibilised according the OG over the cycle (see figure 2.1, the "Matrix of requirements", included in the "Code of Conduct of the SGP", EC 2019, p. 16). The more negative the OG becomes, the smaller the structural adjustment requirement, differentiated for countries above and below the 60 percent debt level. The category "exceptionally bad times" existed in many countries in the past only in 2009, but even on the EMU average the gap was never lower than -3.5 percent. In "bad and very bad times" structural deficits have to be lowered at least by 0.25 percent, a prescription for procylicality even though hidden behind the idea that cyclical deficits are justified. In "good times", with an OG above 1.5 percent, 0.75 pp increase in the structural balance is demanded. Note that the implicit assumtion is that this is an inflationary situation given the definition the OG, hence such inflationary situations should better not exist.

Countries which have reached their MTO have to increase their expenditure (net of interest and some other items) at the rate of growth of potential output, countries that do not fulfill the MTO yet are required to follow a lower expenditure path ("expenditure benchmark")(EC 2019, p. 7). The level of this path can, in principle, be increased by tax increases. The 3-percent cap for the budget deficit can only be broken under extraordinary conditions.[2]

[2] "States are deemed to have complied with their deficit commitment if at least one of the two following conditions is met:the deficit has declined substantially and continuously and has reached a level close to 3% of GDP; the excess is only exceptional and temporary, and the deficit value is still close to 3% of GDP.A deficit above 3% of GDP is considered exceptional when it results either (i) from an unusual event outside of the Member State's control and with a major impact on its public finances, or (ii) from a severe economic downturn. " EC 2019, p. 51

Figure 2.1: Matrix of requirements

	Condition	Required annual fiscal adjustment*	
		Debt below 60 and no sustainability risk	Debt above 60 or sustainability risk
Exceptionally bad times	Real growth < 0 or output gap < -4	No adjustment needed	
Very bad times	-4 ≤ output gap < -3	0	0.25
Bad times	-3 ≤ output gap < -1.5	0 if growth below potential, 0.25 if growth above potential	0.25 if growth below potential, 0.5 if growth above potential
Normal times	-1.5 ≤ output gap < 1.5	0.5	> 0.5
Good times	output gap ≥ 1.5	> 0.5 if growth below potential, ≥ 0.75 if growth above potential	≥ 0.75 if growth below potential, ≥ 1 if growth above potential

* all figures are in percentage points of GDP

Source: EC 2019, p. 17

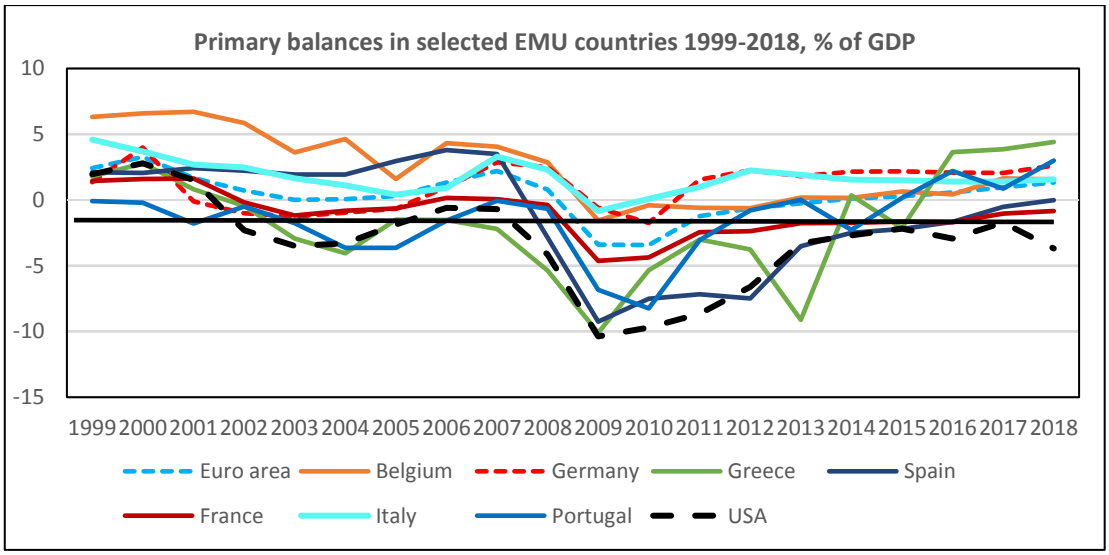
The fiscal framework relies almost exclusively on automatic stabilisers, while discretionary expansionary fiscal policy is considered inappropriate for countries with debt above the cap and for the others limited to the 0.5 or 1.0 percent caps. Despite flexibilisation, the calculation of structural balances excludes one-off measures for revenues and spending, since "there is therefore a strong presumption that deliberate policy actions that increase the deficit are of a structural nature." (EC 2019, p. 9) This precludes country-specific counter-cyclical spending of the type "timely, targeted, temporary". Only in the case of "unusual events" that are out of control for member states and impact the financial position of a country, such as a severe economic downturn, deviation from the pathway to achieve the MTO or from the MTO itself if the country is compliant with the MTO (see Art. 3 (3) of the TSCG and EC 2019, pp. 25 ff.). The Commission decides case-by case on applications for the unusual-event-clause. A binding rule-set for such situations when coordinated expansionary fiscal policy deems necessary – symmetrical to contractionary measures – does not exist.

Othe "flexibility options" from the MTO-pathway refer to three other cases: if costly structural reforms are implemented ("Structural Reforms Clause"); if the government co-finances EU investment ("Investment Clause"); when pension reforms

are implemented ("Pension Reforms Clause"). The leeway that can be granted by the Commission is limited, but the Commission has some discretion to judge differently about member states applications (see Claeys et al 2016, 3). Since 2018, the Commission added the "Constrained Judgement Approach" which allows under specific circumstances to depart from the conventional measurement of OG (EC 2019, p. 18) and use of the so-called "Plausibility Tool". Despite more temporary flexibility, the key thrust of the SGP is pushing countries with debt above 60 percent towards primary structural surplus, with centralised fiscal policy fine-tuning.

Using the MTOs for EMU members set for 2019, there is an average of -0.5 which implies an average structural primary surplus of 1.5 percent (the primary balance comprises the interest burden on public debt plus the structural balance). The highest primary balances have to be carried by Greece (a programme country as a special case), Italy and Portugal (both 3.7 percent), Spain (2.5 percent), Belgium and Slovenia (each 2.25 percent). Despite considerable primary surpluses, gross debt ratios did not drop much in these high-debt-countries in the last few years. According to the Fiscal Compact, gross debt in countries with, say, 100-130 percent debt level should reduce their level by 2-3.5 percent annually (5 percent of the distance to 60 percent). Since 2013 when the Fiscal Compact was in force until 2018 the debt level of the 6 high-debt-countries around or above 100 percent (excluding Greece) remained on average almost constant, with 3 large countries even increasing their debt levels (France, Italy, Spain). Figure 2.2 shows as an illustration the primary balances for the six high-debt EMU members (plus Germany and the U.S.). We see that members were differently affected by the financial crisis and that most countries tightened their fiscal policy alread in 2010 with a considerable reduction of primary deficits, contrary to the U.S. Italy kept always in this period a primary surplus.

Figure 2.2



Source: AMECO,

If one or both of the first mentioned targets (deficit and debt ceilings) are missed, the country is confronted with the rules of the "corrective arm" of the SGP so that an excessive deficit procedure can be opened. Within our research questions, we focus only on the preventive arm.

It is noteworthy mentioning what is not addressed in the EU fiscal policy rulebook. We see four critical points:

- The rules do not differentiate between countries according to the long-term relationship of GDP growth and interest rates on public debt.
- The inherent problems of structural fiscal balances with the output gap methodology are not addressed in the EU-regulations (see critiques from Horn/Logeay/Tober 2007, Truger 2014, Claeys 2017, Tooze 2019, Darvas 2019, Heimberger 2019, Efstathiou 2019 and many others). The measurement depends on two assumptions: (a) A positive OG, called in the “matrix” above “good times” is defined as inflationary, but the measurement does not consider inflation; often positive output gaps occur with inflation below targets. (b) If deficits of bad times should be offset by surpluses in good times, countries would have to target at inflationary output surpluses in good times. (c) Good and bad times should cancel out within 4 years (i.e. from peak to trough) since a business cycle is assumed to last 8 years (Fiscal Board 2018, p. 91), but in “normal times” a structural surplus of 0.5 (> 0.5) percent is requested for countries below (above) 60 percent debt level. This implies roughly a primary surplus of 2.5 percent in normal times – with interest payments on debt around 2 percent of GDP – which tends to reduce the debt level continuously

below 60 percent (cp. the arithmetics in chapter 4.1). In brief, there seems to be a procyclicality bias built in the measurement of structural balances (Truger 2014).

- The public sector deficits are not seen in a macreconomic perspective. This would require looking at the external balance and the private sector balance.
- Regarding the 60 percent cap, the term “sustainability” is used in the Fiscal Compüact (Article 3), but there is no reasoning for choosing this threshold. However, in some reports of the EC there are hints to this issue which we will review in the next chapter.

3. Justifications for the 60 percent rule by the EU Commission

Among the many official publications of the Commission hardly any explain the concept of fiscal policy, especially the 60 percent cap. It is taken as epitome of fiscal discipline. The "Fiscal Sustainability Report 2015" (FSR) of the Commission (EC 2016) explains it on less than one page (p. 22f., and technically in Annex A6), and the Commission's "Vade Mecum on the Stability and Growth Pact" addresses it on one of 215 pages (EC 2018a, p. 65). It was initially claimed that high debt levels are the result of high deficits that could be inflationary. But then it would be enough to prevent inflationary deficits. Deficit rules would suffice.

The key attempt to justify the EU's debt rule is provided by the objective of “Fiscal Sustainability” (FS) in the 2015 FSR: "Fiscal sustainability is generally meant as the 'solvency' of the public sector: A public entity is considered as solvent if the present discounted value of its current and future primary expenditure is smaller than (or equal to) the present discounted value of its current and future path of income, net of ana initial debt level.” (EC 2016, p. 22) Ponzi-games – debt and interest are paid by issuing new debt – is thereby excluded. Here, sustainability of debt has its theoretical underpinning in the net present value concept of intertemporal distribution. The concept menioned here excludes systematically regimes with $g > r$ or $r = g$. This means that structural primary surpluses are needed continuously. This concept will be analysed in detail in the chapter 4.2.

Insolvency is distinguished from illiquidity that arises when the state temporarily has insufficient liquidity or cannot mobilize it on financial markets to meet its obligations. This includes the case of high or rising interest rates for the refinancing of maturing bonds (rollover). Illiquidity could lead to insolvency, but insolvency does not necessarily include illiquidity. The application of the term “bankruptcy” of firms to states is

problematic insofar as states have sovereign rights. They can change their income and expenses, get rid of the final repayment with revolving credit if lenders agree, and obtain sufficient liquidity through their own central bank as a "lender of last resort" (LoLR); and states do not pass away when insolvent (see Schmidt 2014, Lindner 2019).

In the next step, the Commission defines FS, in the sense of solvency, as follows. It is a fiscal policy with a structural primary balance, which can be enforced unchanged in the long term, without a trend of rising debt, let alone cyclical deviations. It is not mentioned that this definition of sustainability can refer to *any* level of debt (cp. Pasinetti 1998) so that any rule would be arbitrary. Why should the 60 percent limit in particular be critical for insolvency?

The Commission circumvents an explanation of the 60 percent margin by calculating three indicators of FS, which are now the yardstick for determining the structural primary deficit and thus the MTO: the short-term indicator S0, S1 until 2030 and S2 with an infinite time horizon.

Indicator S0 is a compound index composed of 25 sub-indicators – one is the "fiscal index" with 12 indicators and the other the "financial-competitiveness index" with 13 indicators. S0 combines them and serves as an early warning signal for "fiscal stress" (figure 3.1). It presents current fiscal challenges with a one-year time horizon that could cause major problems; however, the index loses signalling power due to the weighted aggregation of so many diverse indicators and has unclear significance for action. Arbitrary thresholds for the index values are used for low, medium- and high-risk classification. The indicator has little to do with sustainability which is normally understood as a long-term feature. The gross debt ratio is here only one out of 25 indicators. The broad focus on more than just the debt ratio and budget balances is sensible, but the term "sustainability" seems to be a misnomer.

Figure 3.1: Short-term sustainability indicator (S0)

	Fiscal index		**Financial-competitiveness index**
1	Budget balance	13	Net international investment position
2	Primary balance	14	Net saving of households
3	Cyclically adjusted balance	15	Private sector debt
4	Stabilising primary balance	16	Private sector credit flow
5	Gross debt, general government	17	Short-term debt, non-financ. corporations
6	Change in gross debt	18	Short-term debt, households
7	Short-term debt	19	Construction, value added
8	Net debt	20	Current account balance
9	Gross financing need	21	Change of real effective exchange rate
10	Interest-rate growth differential	22	Change in nomin. unit labour costs

11	Change in expenditure	23	Yield curve
12	Change in final consumption expenditure	24	Real GDP growth
Overall index			

Source: EC 2017. Note: shortened for illustration by the author.

Indicator S1 is linked to the attainment of the contractual 60 percent limit that was taken as legal norm. It shows which structural primary balance (SPB, i.e. cyclically adjusted budget balance, excluding interest expenditure) will be needed in each country over the next five years to meet the 60 percent target by 2030. In doing so, a number of assumptions are made, which are supplemented by sensitivity analyses. The assumption "unchanged fiscal policy in the forecast period", i.e. constant SPB, is maintained. The costs of the future old-age provision are included (pensions, health and care costs). It is also accepted that S1 could be calculated differently, if a different target value were chosen instead of 60 percent or a different temporal adjustment path (EC 2016, p. 22, footnote 13). Essentially, S1 is one of many possible scenarios.

Since 2015, the S1 indicator is complemented by a Debt Sustainability Analysis (DSA) with a ten-years horizon. Here the costs of retirement provision are excluded; the focus is on debt rather than the SPB (see EC 2018, 85 f.). The DSA methodology is similar to that of the IMF, which has long been conducting DSA analyses for all its members, used as an appendix to the Article IV consultations for country diagnoses (Alcidi/Gros 2018). However, the DSAs of the IMF are designed for only five years, so by definition they are not really sustainability analyses in the long-term connotation, but rather scenarios for the medium term. Similar applies to the Commission's DSA methodology. Unlike the IMF, however, the Commission makes no assumptions about the sustainability of primary budget surpluses.

The long-term indicator S2, which is rather the true indicator of sustainability because of its unlimited time horizon, is exempted from the 60 percent norm and is based solely on the assumption that current debt will not rise faster than GDP growth, i.e. given debt ratios remain stable (see EC 2016, pp. 70ff.). The adoption of an unchanged fiscal policy, i.e. a constant SPB, stays the same as in S1. As a result, the requirements for a high primary balance are lower than for S1, but this must be maintained infinitely. The fiscal costs for pensions are included as in S1.

According to the Sustainability Monitor 2017 analysis, S2 requires a structural primary surplus, which must be achieved on a permanent basis (2.0 percent for the Euro area with large deviations for individual countries, see EC 2018b, figure 3.8 on p. 59). For all countries, the fiscal risk, i.e. the risk to "long-term sustainability", is considered

low (except for Slovenia). For most high-debt countries, the scenario shows favourable results (EC 2016, 73), even for Italy and France, in particular because of lower future pension costs than in Germany, for example. At the end of the adjustment period, this scenario leaves very high divergences in the debt levels between Member States. Because of the legal requirements, namely the 60 percent rule in the Treaties, the Commission adheres to S1 instead of S2 when determining the MTO, and only uses S0 and S2 in addition. Other scenarios between the extremes are not investigated.

It seems that fiscal sustainability analyses of the EC take r and g as exogenous. For r it is assumed that over the long run interest rates would return to the old "normal" before the financial crisis, around 3 percent in real terms (EC 2018b, 40). This would always lead to unfavourable r-g differentials. That both r and g could be influenced by monetary and fiscal policy is not even taken into consideration (see 7.2 below).

4. The conceptual background of the European fiscal rules

4.1 Basics of public debt analysis

In several of its policy-oriented papers, the EC makes references to debt sustainability analyses of the IMF, OECD and affiliated authors (cp. EC 2015, 23). The basic rationale of these concepts differs somewhat, but can be represented by papers from Blanchard et al. (1991), Ostry et al. (2010 and 2015) as well as by a publication from the rating agency Moody`s (2017), based directly on Ostry et al.'s work and guiding the rating activities of this agency. These authors build on a broader group of literature, mainly from within or around the IMF and OECD. An updated view on debt sustainability was published officially be the IMF (2011). A common feature of these approaches is the attempt to assess the degree of fiscal pressure that could ultimately lead to loss of control over sovereign debt which could trigger a default on debt service, rollover problems or debt-reducing inflation. Therefore, this methodology focuses on identifying thresholds for reduced "fiscal space" due to high sovereign debt, rather than on strict quantitative debt rules. In this section, we review them one by one taking them as representative for a broader range of literature. Comments, criticisms and alternative concepts by other authors follow in section 5.

All the analyses reviewed here build on the basic accounting identities, initially elaborated by Evsay Domar (1944), in more detail see the manual from the IMF (Escolano 2010). The main equations are summarised as follows with this notation: B is public debt,

r is the nominal interest rate on public debt, g is the growth rate of the nominal GDP (or GNI), P is the primary balance and D is the overall budget balance. Lower case letters take these variables as ratio to nominal GDP or GNI.

Equation (1) shows the determinants of public debt in period t, namely debt in the previous period t-1, interest payments in t on debt that prevailed at the end of the previous period and the primary balance which is defined in equation (2). The debt can increase or decreases by stock-flow (i.e. debt-deficit) adjustment SFA which summarises debt issued for purchasing financial assets (or revenues from sale of financial assets), apart from statistical errors. This kind of debt is part of gross debt, but excludes financial assets held by the government. A primary surplus will reduce the budget deficit or lead to budget surplus in t and to a lower B if everything else is constant. It should be mentioned that all variables used in this section are cyclically adjusted since the focus is on the long run abstracting from cyclicality of growth.

(1) $B_t = B_{t-1} + rB_{t-1} - P_t + SFA_t$

The primary balance of period t is the overall budget balance, total tax revenues (T) less total expenditures (G), which are reduced by interest payments on debt of the previous period. This implies that the overall budget balance plus the interest payments equal the primary balance. P shows the degree at which government revenues are used for the prime expenditures for purchasing goods and services, public investment and transfers.

(2) $P_t = [T_t - (G_t - rB_{t-1})] = D_t + rB_{t-1}$

The budget balance D is T-G, relative to GDP denoted as d, and the interest payments on public debt, as a share of GDP is denoted as z. Hence, we obtain for the budget balance (2a), all variables as share of GDP:

(2a) $d_t = p_t - z$

The change of the debt-to-GDP ratio against the previous period is shown in equation (3) which results directly from (1).

(3) $\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}} = \frac{B_{t-1} + rB_{t-1} - P_t + SFA_t}{Y_t}$

If all components of (3) are taken as shares of GDP, denoted in lower case letters, we obtain with a few re-arrangements of equation (4):

(4) $b_t - b_{t-1} = \frac{r-g}{1+g} b_{t-1} - p_t + sfa_t$

Assuming that SFA is zero and that 1+g differs not much from 1, the change in the debt ratio is approximated by

(5) $\Delta b_t \approx (r - g)\, b_{t-1} - p_t$

This leads us to the key conclusion that the change of the debt ratio depends on the growth-adjusted interest payments on debt and the primary balance (6). If the debt level shall be held constant, a positive growth-adjusted interest payment obligation must be offset by a primary surplus of the same size, vice versa in the case of g > r. The sustainable primary balance, i.e. the one that keeps the prevailing debt ratio stable, is p', and the corresponding budget balance is d':

(6) $p'_t = (r - g) b_{t-1}$ if $\Delta b_t = 0,\ d'_t = p'_t - z$, if $b_t = b' = constant$

For the Euro area, the simple equation portrays the sustainable budget deficit d' that maintains the debt ratio b' at the official ceiling of 60 percent. This equation is often used to derive the 3 percent deficit rule from a given 60 percent debt level and 5 percent nominal growth, as shown in (6a).[3]

(6a) $-d'_t = g' b'_t$

If d' is split into the primary balance and z (equation 2a), the interest payments on debt as share of the GDP, and the equation solved for p', we obtain

(6b) $p' = (r - g) b'$

If we go back to equation (4) and use λ as in (7), and disregard sfa, we obtain equation (8) for the debt ratio in t.

(7) $\lambda = \frac{r-g}{1+g}$

(8) $b_t = (1 + \lambda)\, b_{t-1} - p_t$

If t_0 is the initial period and t_N the Nth period, equation (9) shows the value of growth adjusted

interest payments until N and minus the sum of future primary balances.

(9) $b_N = b_0\, (1 + \lambda)^N - \sum_{t=1}^{N} (1 - \lambda)^{N-t}\, p_t$

Solving (9) for the present value of debt in t_0, leads us finally to (10).

(10) $b_0 = b_N\, (1 + \lambda)^{-N} + \sum_{t=1}^{N} (1 - \lambda)^{-t}\, p_t$

Hence, the present value of debt, as a share of GDP, equals the interest payments in the future, growth adjusted, and the present value of primary balances. This arithmetic is the basis for further analyses to which we turn now.

[3] Equation (6a) differs slightly from (6) and the following equations in the implicit assumption that interest is paid for the debt of the current period rather than on debt at the end of the previous period.

4.2 The intertemporal budget constraint of public debt

Formulating the determinants of the debt ratio in net present value terms is used as the standard way to analyse intertemporal budget constraints and debt sustainability. This standard analysis is summarised in a paper from the IMF by Julio Escolano (2010), based on Blanchard/Fischer (1989) and Bartolini/Cottarelli (1994) and a number of other authors. The core ideas are directly or indirectly incorporated in the EU fiscal policy framework. The basic proposition is the "no-Ponzi condition", i.e. the exclusion of Ponzi-financing. Ponzi games are the persistent postponement of debt redemption and interest payments by incurring new debt for redemption and interest. For excluding Ponzi-financing, a positive growth-adjusted r-g differential is assumed for theoretical and empirical reasons. A persistent negative r-g differential is not compatible with the no-Ponzi-rule.

The starting point for the net present value analysis is equation (10). The first term on the right-hand side, related to the r-g differential, denoted as λ, tends to become irrelevant, no matter whether r > g or r < g, because the value of (1+ λ) approaches zero with an infinite time horizon as shown in equation (11):

(11) $\lim_{N\to\infty}(1+\lambda)^{-N}b_N = 0$

If this tends to be the case asymptoticly, the net present value of debt must equal the right hand term (on the right side of the equation), namely the present value of all future primary deficits and surpluses. Hence repayment of redemption and interest by primary surpluses is compelling, rollover infeasible. This is also called the *transversality condition*. Respecting the transversility or no-Ponzi-restriction is key for debt sustainability in this framework: "Sustainability thus requires that today's government debt is matched by an excess of future primary surpluses over primary deficits." (Chalk/Hemming 2000, p. 4)

Chalk/Hamming from the IMF (2000) corroborate the no-rollover restriction as follows. They analyse the intertemporal budget constraint in the framework of a representative agent model in a closed economy, abstracting from monetary conditions; it is an abstract debtor-creditor relationship and not a specific model for the public debtor. Furthermore, it is a microeconomic model. In this framework, the debtor faces constraints imposed by the lender. If none of the lenders ever receives redemption and/or interest payments and is urged to lend more and more for rollover, the lenders have ultimately no

advantage compared to no lending. Blanchard and others argue that this would be in contrast to a positive time preference for consumption.

Yet, if r < g, would this allow sustainable Ponzi-financing, with permanent primary deficits and a constant debt ratio, as shown in equation (10)? Escolano (2010) argues that this would lead to a consumption boom with high growth and large credit expansions which are eventually not sustainable (p. 12). Such booms have occurred in certain historical periods, often with inflation and negative interest rates and/or repressed interest rates, sometimes even with declining debt ratios. In the long run however, r tends to exceed g, as Blanchard et al. (1991) argued hinting to otherwise emerging dynamic inefficiencies. This is called the "modified golden rule", compared to the neoclassical optimal growth and accumulation path; the latter stipulates that dynamic consumption maximising growth trajectories require r = g (cp. Weizsäcker/Krämer 2019). By contrast, the German Council of Economic Experts (GCEA 2007, p. 41 ff.) argues that in the case of r < g Ponzi-financing would be feasible and would not necessarily lead to dynamic inefficiency. In their view – with which we agree – not only debt could be rolled over but also interest payments on debt. They emphasize that public debt is in general risk-free in contrast to the private sector so that risk-adjusted interest rates would be similar. Ponzi-financing allows to avoid tax increases (p. 43) without a higher debt ratio. However, in countries like Germany with a long-standing positive r-g differential, a positive permanent primary surplus would be necessary, hence tax-financing of interest payments, at least to some extent.

If it were accepted that r tends to be higher than g for reasons of dynamic effciency, the no-Ponzi-financing rule would require that at least interest service is not financed by new debt. This is implicitly tantamount to stipulating a balanced budget rule with a primary surplus such that p = z and d = 0 (cyclical variations are of course possible but not addressed here). However, if this interpretation of the conclusions from the present value analyses is correct, the debt ratio would converge to zero, positive growth rates given. This implication is not mentioned in Chalk/Hemming's paper.

Chalk/Hemming hold that respecting the transversality restriction and avoiding Ponzi games played by governments is the core of debt sustainability: "Sustainability thus requires that today's government debt is matched by an excess of future primary surpluses over primary deficits." (Chalk/Hemming 2000, p. 4) There may be long phases of primary deficits, but they must be followed by surpluses. The ultimate sustainability condition is

– following the authors – that debt does not grow faster than the interest rate (p. 5). It is not understandable why the authors do not argue with the *growth-adjusted interest rate*, hence with r-g rather than r. If growth of debt is $\dot{B}$, the authors' rule $r \geq \dot{B}$ implies however that the debt ratio may rise permanently if $r < g$ such that $\dot{B} < r > g$. Contrarily, if $\dot{B} < r > g$, the debt ratio would converge to zero. This would mean that the demand for boundedness of public debt refers only to r and disregards g. The meaning of debt sustainability in the context of the present value approach seems, to say the least, debatable.

What is the outcome for the debt and deficit rules recommended by these authors? The answer is not clear-cut. The principal reasoning of Escolano is that (i) the debt ratio cannot rise infinitely, because it would signal pending insolvency and debt default; (ii) governments face an intertemporal budget constraint as today`s debt is tomorrows primary surplus since $r < g$ is no viable option; (iii) primary balances are bounded since they cannot rise infinitely and are normally limited to a few percentage points (p. 8ff.). The bottom line is that there is some debt limit, but it cannot be determined. Even the notion of a stable debt ratio is not necessarily a guideline for sustainability. More important than the debt ratio is the size of the primary surplus.

The theory of intertemporal budget constraints holds that large debt ratios require higher primary balances. If the r-g is given and positive, the term b(r-g) rises with a higher b and requires a higher primary surplus. On the other hand, if r-g were negative, a higher absolute value of b(r-g) occurs because of a large b would lead to strong reduction of the debt ratio and a lowerprimary balance.

The standard interpretation of the intertemporal budget constraints concept can be found in EU fiscal policy rules and also in publications of the ECB (Checherita-Westphal. 2019, ECB 2019 and ECB 2016, Turner/Spinelli 2012, see also Escolano 2010, p. 9*)*. A rough empirical analysis presented in these publications is supposed to provide sufficient evidence that in most advanced OECD countries the long-term r-g-differential tends to be around 1 pp.[4] This is seen as a kind of proof for the no-Ponzi-rule, even though this primary surplus would be too small to pay for interest, let alone for partial redemption (other than permanent rollover). The notion of sustainability remains vague, especially if

[4] The finding of Blanchard 2019 (and mentioned already in Blanchard/Weil 2001 that the U.S. ran persistently a negative r-g differential) is ignored. Positive r-g differentials are considered possible only in emerging economies that catch-up with advanced countries and under conditions of financial repression. However, the present value approach as a theory-based rule applies to any country.

it is based on long-term expectations of g, r and p. More rigorous debt analyses in the framework of intertemporal constraints calls for massive primary surpluses and ring alarm bells due to the fear of huge over-indebtedness against the backdrop of preventing permanent rollover of terminal redemption, especially in the U.S. (cp. D'Erasmo et al. 2016)..

As we will see in section 7, a more thorough empirical analysis of the r-g differential shows that the data used by ECB and others are deeply flawed. Evidence is mixed, especially if the period after the grand financial crisis is included. Rollover of debt predominates in all countries, also partial debt-financing of interest payments, hence Ponzi-financing is common in many countries, not only in historical phases of negative real interest rates, in times of inflation or financial repression.

Our principal critique of the concept of intertemporal budget constraints is summarised as follows:

- The concept cannot deliver a quantified debt cap such as the 60 percent cap or similar margins.
- There are various definitions of debt sustainability in the framework of this concept. Making them operational requires arbitrary assumptions.
- If there is no debt ceiling derivable, stock-flow consistent deficit rules can hardly be deduced. One rule might be that interest payments on debt have to be tax financed, so that primary surpluses of this size are necessary. However, this would lead to balanced budgets and eventually to a debt ratio of zero. Others hold that only a fraction of this amount suffices.
- Holding that Ponzi-financing in the sense of debt-financing of interest service, at least partially, is not compatible with debt sustainability, is not convincing. There is plenty evidence that long-standing negative r-g differentials can occur without compelling dynamic inefficiency. The concept of dynamic inefficiency is controversial in the context of different growth theories. In such a scenario, fiscal costs of debt are zero; raising taxes for debt service is unnecessary and more costly.
- The key variables like r, g, p and b are seen as exogenous and not interdependent – but they *are* interdependent in reality, and to some extent they can be influenced by policies.
- Focusing on net present values of debt with infinite time horizons requires the assumption of complete financial markets with rational expectations (Blanchard/Weil

2001), perhaps approximated by stochastic or deterministic expectations. Either way, uncertainty is ruled out.

Some of these caveats are addressed in the following approaches.

4.3 Blanchard et al. – strong intertemporal budget constraints

Blanchard et al. (1991) were worried about the strong rise of debt-GDP-ratios in the 1980s. In a sample of 18 OECD countries sovereign debt rose from 20 percent in 1979 to 31 percent in 1989 (op. cit., p. 9) – while four countries in this group managed to lower their elevated debt level in the second half of this period (UK, Australia, Denmark and Sweden). The authors start their analysis of debt sustainability by identifying intertemporal budget constraints. They extend the above analysis to net present value analysis over infinite periods. Debt sustainability in the approach of Blanchard et al. means, in a strict sense, that the debt-to-GDP ratio does not change or returns after a bulge to its initial level. If r-g is positive continuously, p must offset the growth-adjusted interest burden by a primary surplus, to be achieved permanently. In other words, the present value of growth-adjusted interest service on debt in all future periods must equal the negative present value of the primary surplus in all future periods so that assets and liabilities net out (Blanchard et al. 1991, p. 12). Since the net present value approach is forward looking, r, g, t* and p has to be taken as *expected* values over an infinite period.

A rise in p can be implemented by cutting government spending on goods and services or transfers, or by raising the average tax rate. Hence, a one-time rise of the debt ratio requires a one-time rise in the primary surplus which must then be kept constant, given (r-g) > 0 and remaining unchanged. The intertemporal budget constraint means that an increase of fiscal space incurring a lower p in the present, no matter whether used for spending for goods and services, transfers or tax cuts, requires permanent future sacrifices if the debt ratio is to remain stable, i.e. sustainable. The elevated tax rate t* denotes the tax-to-GDP ratio necessary to realise the necessary primary surplus so that t*- t is coined *tax gap*. This gap can symmetrically be used for tax increase or spending cuts. Tax gaps can be derived for the short-, medium- and long-term (quantified as 1, 5 and 40 years), depending on expectations for r, g, spending on goods and transfers and total taxes tx. They are simple indicators, suited to be communicated to policy makers. The long-run gap should include future costs of aging, as in the S2 indicator of the European Commission.

The authors do not determine a specific sustainable *debt level,* such as 60 percent or similar. They mention that there is no need to return precisely to the initial debt level. Yet, a permanent increase of b is ruled out as being unsustainable since it would require a permanent rise of the primary surplus alias the sustainable tax rate t* - which has its limit when 100 percent of GDP is taxed (t*=1). Since this may be an irrelevant limit in reality, they hold that that with a higher t further increases of t will be more worrisome. Therefore, they propose to measure the distance to sustainable public debt as $\frac{t-1}{1-t}$ which rises the higher the initial t. This indicator is considered a good proxy for the room to manoeuvre for fiscal policy or for "fiscal space". In other words, fiscal stress increases the higher the level of taxation. If this is foreseen by financial investors, risk premia on interest rates might rise, thus worsening the r-g differential. Any delay in increasing the primary balance after a debt hike would aggravate the burden of future liabilities. Hence the reaction of fiscal policy to debt hikes is an indicator for the capacity to act sustainably. This leads to estimating *fiscal policy reaction functions* as early warning indicators.

The key tenet of Blanchard et al.'s paper is assuming a permanently positive r-g differential; their calculations use simply by assumption 2 pp for the long-term rates, meaning a 40 years time horizon (p. 17), even though the numbers are not important for the basic reasoning. They insist that the positive sign of the differential and the assumption that it is constant are essential for their reasoning. Amazingly, the authors even hint to highly negative differentials in OECD countries in the 1970s which melted to one percent in the 1980s, but claim insistently that there is "general agreement" that in the medium and long run the real interest rate exceeds the growth rates (Blanchard et al. 1991, p. 15). Lower real interest rates would give strong incentives to general credit demand which would jack up interest rates. A negative r-g differential would be a theoretical "curiosum" reflecting dynamic inefficiency. Even though not mentioned explicitly, in (neoclassical) optimal growth theory real interest and growth rates converge. Stipulating a permanent positive differential would require more reasoning in this theoretical framework. Yet, Blanchard et al. concede that in a scenario of a long-run *negative* differential everything is different and debt sustainability rules would change fundamentally (p. 35). Interestingly, in two later papers Blanchard argues that there can be long spells of negative differentials which allow for higher fiscal deficits (Blanchard and Weil 2001, Blanchard 2019). The "general agreement" from 1991 seems gone, rejected by a former strong believer. While in 1991, "Sustainability is basically about

good housekeeping." (p. 8), things are much more complex and less stringent in 2019. See about Blanchard's (2019) full somersault in chapter 5.1.

In a way, Blanchard and Weil (2001) prepare the turnaround in 2019. They start with the surprising question: "The average realised real rate of return on government debt for major OECD countries over the last 30 years has been smaller than the growth rate. Does this imply that governments can play a Ponzi game, rolling over their debt without ever increasing taxes?" (p. 1) In the 1991 paper there was no mention about this empirical fact which was seen as a curiosum, as mentioned. The authors admit that they had written the 2001 paper already in 1990, kept it unpublished, and had learned from other literature published in the meantime.

If g exceeds r over long periods, new debt has no fiscal costs. With persistent primary deficits additional debt can be issued usable for interest payment so that debt is rolled over continuously, principal and interest is paid in full or partially with new debt. If Ponzi-financing is ruled out, r must be larger than g. If Blanchard's and Weil's empirical observations are correct, major OECD countries have practiced (or still practice) Ponzi financing – see in section 7 our empirical analysis – which is considered in traditional growth theory a kind of dynamic inefficiency leading to overaccumulation of capital. The authors argue in length that indeed Ponzi financing may be possible and not necessarily in contradiction to dynamic efficiency under certain conditions. Regarding public debt, the relevant interest rate is the risk-free interest rate. Ponzi-games with higher growth than the risk-free rate are seen as infeasible, but they can also occur in certain r>g scenarios. Pareto-suboptimality may be involved, owed to externalities of taxes, uncertainty in overlapping generations markets, transaction costs and information asymmetries. In short, market incompleteness can lead to other than the conventional results. The authors conclude: "Thus, Ponzi games may be feasible. And if they are, they may – but need not – be Pareto-improving." (p. 21) This would mean the curiosum is no longer a curiosum.

4.4 Ostry et al. 2010 – diminishing fiscal space with high debt

Against the backdrop of a rise of the debt-GDP-ratio from 71 to 106 percent within only five years (2007-2012) in advanced countries, a group of authors from the research department of the IMF, headed by Jonathan Ostry, presented a new concept of "fiscal space" (Ostry et al. 2010 and Ostry et al. 2015). The basic idea is that so-called fiscal

space tends to shrink with higher debt relative to GDP and that decisive steps toward primary surpluses, i.e. austerity, are urgently needed to lower sovereign debt. The reasoning is similar to Blanchard et al. (1991) but differs on important analytical and policy-related points.

The main propositions are as follows. Debt sustainability is no longer defined as running a constant debt-GDP-ratio whatever the level may be, but a methodology of country-specific estimations of fiscal space with country-specific debt-levels for debt sustainability in the sense of having fiscal space and a higher "fiscal cliff" beyond which fiscal space is lost. Fiscal space is defined as the distance between the fiscal limit, the cliff, and the actual debt ratio. Beyond the cliff, there is no finite new and reliable debt level, uncertainty is high, debt is ever increasing, thus triggering insolvency risks.

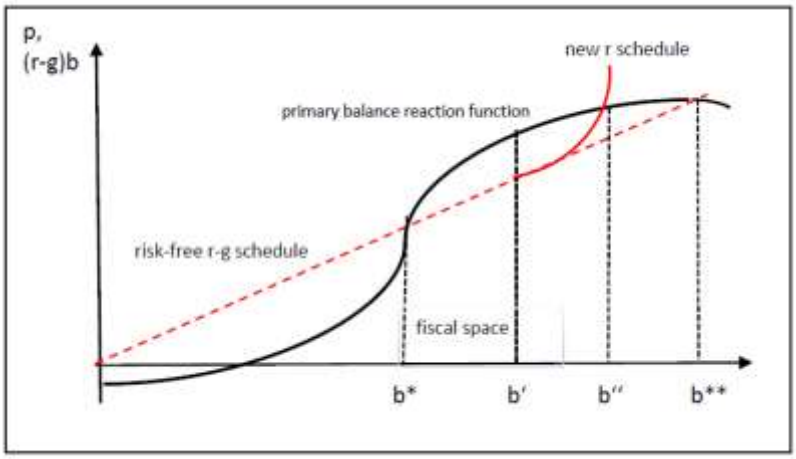
High public debt, inherited from earlier periods, often evolved for good reasons, is seen as deadweight for growth unless ample fiscal space exists. If this is the case the debt ratio should not be lowered since the welfare costs would exceed the additional insurance against debt risks (thus invoking over-insurance). Public investment is considered highly necessary as an important part of the aggregate capital stock and should be smoothed over time due to lumpiness and other reasons. Therefore, the traditional golden rule is advised for countries with fiscal space (allowing fiscal deficits for public investment). To determine the margin of fiscal space, stress tests on sovereign debt need to be conducted using historical data with many indicators. The track-record of countries' dealing with surges of debt should reveal information for the country-specific debt-reaction function. Decisive and upfront measures to curb debt above a certain threshold are needed to impress financial investors. Countries with no or little fiscal space should either live with an increased debt level and wait for higher growth or raise non-distortionary taxes.

Ostry et al. hold that inherited high debt makes a country poorer. They assume – with Blanchard et al. 1991 – permanent $r > g$ regimes and rule-out Ponzi-financing following the net present value arguments.Their reasoning is summarised as follows. Under these conditions, debt service has to be paid perpetually, the higher the debt ratio. This is a drag on growth for several reasons. First, rising tax rates are considered distortionary with negative effects on growth. Second, public investment tends to be crowded out due to higher debt service which impacts growth adversely since less public capital accumulation likely has a negative impact on private capital accumulation. This argument holds even if only a small part of public investment is crowded out by the debt

service. Overall, crowding out of aggregate (public and private) investment occurs. Third, if open economies were analysed with hiking external indebtedness, additional problems would occur. For this reason, a closed economy is analysed with public debt owed ourselves. Ostry et al. are aware that the causality of high sovereign indebtedness and growth may be reversed; they counter that causality could be both ways and then be mutually reinforcing.

Hence, steady-state growth is on a lower trend than with less debt (at this point they argue causally – more debt, less growth), leading to perpetual welfare losses compared to temporary and painful welfare losses during an austerity cure (the authors do not use the term "austerity"). If highly-indebted countries are compelled to a lower growth trend there is no hope to improve the r-g differential, even if the real interest rate remained constant. It is explicitly emphasized that Keynesian aggregate demand effects are excluded in this analysis – not because they are irrelevant – but in order to better focus on the pure supply side features; also, debt-rollover risks are excluded and come additionally into the picture.

Figure 4.1: Debt limits by Ostry et al.



Source: Adapted from Ostry et al. 2010, p. 8.

Fiscal space is measured as the distance between the debt limit beyond which the debt becomes unsustainable under the assumption of the historic policy responses to deal with sovereign debt, and the actual level of debt. Ostry et al. portray this with a heuristic graph depicted in Figure 4.1. The solid curved line is the reaction function of the primary balance to a change in the debt ratio. The dashed line represents the growth-adjusted interest burden with risk-free interest rates according to the historical growth trend ((r-

g)b). Its slope depends on the differential r-g which is assumed to be positive, as mentioned above. If the curves intersect at the debt level b*, debt is sustainable in the sense that the growth-adjusted debt service is offset by a primary surplus so that the public debt ratio remains stable. At a higher level of debt, for instance due to a shock which requires higher primary spending, the debt level b' might be reached beyond which creditors demand risk premiums – endogenous to the debt level – so that the dashed curve shoots upward (see the red solid curve which is portrays market reactions). The primary balance reaction function is no longer capable or willing to adjust toward higher primary surplus (the slope is decreasing). If this adjustment fatigue continues, b" is reached and eventually b** where no further primary balance response to higher debt occurs (or it is even diminished), so that interest rates become infinite due to extreme uncertainty. Then debt sustainability is lost. Prudent fiscal policy would keep debt below b' and preferably at b* to be shielded with ample fiscal space against adverse shocks. Debt levels beyond b' require fiscal policy responses that go beyond what is known from the track record.

Since the fiscal response function, the core of the concept, is not measurable as there is practically no empirical experience with unsustainable sovereign debt in advanced countries after World War II until 2010, the function is estimated by the authors. They use a big bundle of determinants, such as the output-gap, government expenditure gap (cp. Blanchard et al. 1991), inflation, demographic dependency rate, oil prices, trade openness etc. (p. 21).

The final outcome of the exercise is an estimation of b* and b** for the period 1998-2007 with implied interest rates on public debt (using actually paid interest on gross debt) for 21 OECD countries. The median b* is around 50 percent, ranging from 0 (Australia and others) to 111 percent (Canada), the median fiscal cliff b** is 192 percent, ranging from 152 percent (Canada) to 263 Percent (Norway). With model-estimated interest rates the mean ranges from 54 percent for b* and 171 percent for b**. Japan and Italy are excluded since they are considered not to be on a sustainable trajectory toward a convergence level of debt. Other critical candidates are in this analysis Greece, Portugal and Ireland. It is interesting to see that results are extremely country-specific and differ also strongly when model-implied interest rates are used. b** is estimated at fairly high levels. Some countries with a high b* have ample fiscal space if their track record is based on a their historical reaction function, which demonstrates stronge response to debt hikes.

The authors calculate the fiscal space as the difference between IMF debt forecasts for 2015 and the b**. Due to the uncertainties in estimations of the fiscal reaction function it is assumed that countries differ in their probabilities of really having the fiscal space that was calculated. So, countries are classified in those with full fiscal space available as is calculated, those with 50-85 percent and less than 50 percent probability of having de facto the estimated fiscal space. Country-specific probabilities are not explained although they influence the result heavily. Moreover, using probabilities as proxies for uncertainties in the estimation shed doubt on the reliability of the estimation method. The final result is that Japan, Italy, Greece, Iceland and Portugal have least fiscal space ("red") while Ireland, Spain, UK and US have limited space ("yellow").

A year after the publication of Ostry et al. (2010), the rating agency Moody incorporated the concept almost 1:1 in its methodology for sovereign debt ratings of countries (Moody's Analytics 2011). The authors added the term "survival interest rate" to the sustainability analysis. Survival rates indicate the maximum interest rate on sovereign debt that a country can carry without running into ever increasing interest payments on debt as share of GDP which would render debt unsustainable. Countries with ample fiscal space can cope with fairly high survival rates, in contrast to low space countries (Australia's rate is estimated at 10 percent, Italy's at 4 percent). In a scenario with the survival rate, lying above the historical trend, the growth-adjusted interest curve would slope steeper and touch the fiscal response curve as a tangent. This shifts the debt limit from b** to the left.

Furthermore, a special additional risk is mentioned. In case of "fiscal fatigue" (Gosh et al. 2013), if people resist against further austerity, the entire fiscal response function could shift downwards losing any intersection with the growth-adjusted interest curve, thus triggering immediate unsustainability. Still, it is emphasized that at points beyond sustainability there need not be immediate insolvency, but insolvency risks with interest rate hikes are looming.

According to the authors, the methodology chosen differs from traditional approaches regarding the rating of sovereign debt based on credit default swaps (CDS-implied default frequency, CDS-I-EDF). Despite correlations, the new approach is supposed to capture the fundamentals underlying the fiscal reaction function. The latter is estimated slightly different from Ostry et al. with a country-specific fixed term, measuring fiscal prudence, and a bundle of fundamental determinants of the primary

balance; an error term is added to the estimation method. CDS and also spreads on sovereign bonds rates, in contrast, measure market sentiments of bondholders. An estimation methodology for sovereign debt risks emanating from non-evidence-based thought experiments in the ivory towers of think tanks has eventually gained eminent political impact.

4.5 IMF – debt rules as "steady state" and as mere "reference points"

Hints to a 60 percent rule can be found in an IMF-Working Paper from 2010 (Kumhof et al. 2010). The Fund uses the "Global Integrated Monetary and Fiscal Model" (GIMF) for simulations and projections for different regions on the globe. It is a dynamic stochastic equilibrium model (DSGE) based on dozens of assumptions. It includes fiscal debt rules for the Euro area average, for the US, Japan, Emerging Asia and the rest of the world. The model is also used by some central banks. A steady state (i.e. equilibrium) real interest rate of 3.0 percent is used across countries, the world technology frontier (i.e. technical progress) grows by 1.5 percent, global population 1 percent, global inflation is 2 percent. This would imply that steady state output growth falls short of the real interest rate (2.5 > 3.0%) (cp. Kumhof et al. 2010, p. 50 and p. 68). The model concludes: "Calibrated government-debt-to-GDP ratios are roughly in line with the data, but will require some refinement in future work." (p. 52) The calibrated steady debt-GDP ratio is 60 percent for Euro area, 50 for the US, 75 for Japan (table 7, p. 70). It is not clear what the assumed deficit rule in the model is. Presumable it is based, at least in part, for the Euro area on the rules of the Stability and Growth Pact.

The model shows clearly that changes in a few assumptions likely have massive consequences on outcomes. The model itself is quite opaque due to the number of assumptions. It is certainly not a sound justification of the Euro area 60 percent rule (and not intended to be so). Moreover, a steady state debt-GDP-ratio is in this context not the alarm line beyond which insolvency gains increasing probability. Besides, the steady state applies in the GIMF model to the Euro area average, not necessarily to all members. What deviation from the steady state means is not analysed.

For a long time, the IMF provides debt sustainability analyses (DSA) for its regular Article IV country reports, as an appendix. Furthermore, in critical situations "hard" DSA can help the IMF to decide when debt restructuring is necessary. In general, the IMF methodology for DSA looks at scenarios regarding the intertemporal budget constraints

for public debt. While in the past IMF's focus was on low-income and emerging market economies, but with the Iceland and Greece crisis the advanced economies required a modernisation of DSA (IMF 2011). The key propositions are as follows.[5]

- For the IMF, the time horizon for DSA is normally five years in order to assess whether sovereign debt of a country can be serviced. Debt and fiscal policy become unsustainable if in the absence of fiscal policy change government can sooner or later not pay the debt service (IMF 2011, p. 5). This requires an analysis and forecast of fiscal policy responses.
- In the past, the differential of the real interest rate and real GDP growth was on average positive with +1 percent in G20. In contrast, low-income countries experienced benevolent conditions with -8 and emerging economies -4 ppts differential (IMF 2011, p. 10). Hence appropriate primary surplus is permanently necessary to keep the debt ratio stable.
- Like in the paper of Ostry et al. (2010) which paved the road for the renewed IMF concept, higher debt ratios are considered to involve higher risks: sustaining a primary surplus is difficult; higher debt tends to slow down growth and can increase interest rates (risk premia) which can trigger rollover risk. The methodology distinguishes long-run debt convergence levels under current conditions and maximum sustainable debt levels beyond which risks rise strongly – fully in line with Ostry et al.'s fiscal space proposition. The former is estimated at 50-75 percent, the latter at 80-192 percent (median for advanced countries) (IMF 2011, p. 12).
- The main conclusion is that there is no generic threshold for debt sustainability across all countries: "The paper does not find a sound basis for integrating specific sustainability thresholds into the DSA framework." (IMF 2011, p. 3) "In this approach, the reference to 60 percent of GDP should not be construed as a level beyond which debt distress is likely or inevitable, nor should it be used to judge whether debt is sustainable or not. Rather the reference point should be used as an indication that more analysis is needed." (IMF 2011, p. 12) In other words, the IMF

[5] See also Alcidi/Gros 2018 who compare the debt sustainability assessments of the IMF and the European Commission. The authors demonstrate mainly the commonalities of both approaches apart from interesting contrasting details, but they miss a fundamental difference, namely that the 60 percent rule of EMU is outright rejected by the IMF as a general rule.

rejects the EMU 60 percent margin, at least as general threshold for advanced countries.

- The approach pleads for country-specific analyses with a special focus on the composition of public debt: foreign currency debt, debt in local currency held by foreigners, maturities, refinancing rates, CDS spreads, liquidity indicators. Also, private and semi-public debt with contingent liabilities should be included since private debt could be transformed in public debt (e.g. in the case bank bail-outs).
- If primary surpluses are needed, their size has to be in line of the country's economic and political capability which is considered limited. Cuts in urgent infrastructure investment might be counter-productive and harm growth. Empirical analyses show that in the past only few countries could sustain high primary surpluses (5 percent and above) over a longer spell (IMF 2011, p. 8).
- Regarding the methodology of DSA, scenarios (baseline and alternatives), stress tests with shocks and stochastic simulations (to account for uncertainty) should be conducted.

Several authors have estimated the effects of debt levels and their increase on interest rate spreads. Most analyses find only small effects. Laubach (2009), found for the US that a 1 pp rise in the projected debt-GDP-ratio raises the 4 years-ahead 10 years forward rate by only 3-4 basis points (bp), while a 1 pp rise in budget deficits raises interest rates by 20-29 bp when controlling for all other influences). Depending on the monetary policy stance and automatic fiscal stabilisers a negative correlation of deficits and interest rates can occur (op. cit., p. 859). Ardagna et al. (2004) analysed a sample of 16 OECD countries for the period 1960-2002 regarding the response of contemporaneous long-term interest rates on government bonds to a spike in the primary deficit; they found a rise of 10 bp after a 1 pp rise which cumulates over 10 years to 150 bp. For the interest rate effects differentiated between low- and high-debt countries (above 62.5 percent), results seem not very conclusive. For countries below this margin there were no positive interest rate increases. The authors assume that effects are non-linear. Faini (2006) confirms the small effects of rises in the debt level on interest rate spreads in the European Monetary Union (3 bp on 1 pp rise in debt, p. 469). He finds no clear evidence that high-debt countries have a stronger interest rate pressure than countries with a lower level of debt. Engen and Hubbard (2004) found similar results for the U.S.: an increase of the debt-GDP-ratio by 1 pp increases long-term real interest rates on government bonds by 3

bp. However, one must be cautious to generalise these results. There has not been an outright sovereign debt default of central government debt (in own currency) in advanced countries since World War II until the Greece crisis 2009-2010. Greece was a special case in the EMU due to the lack of a LoLR and special currency redenomination risks, i.e. fears of Euro-exit and contagion risks, including the risks of a break-up of the Euro system and eventually depreciation or appreciation risks of new national currencies. There is little experience with pending debt crises at critical debt levels.

In 2013 the IMF published another "Staff Guidance Note" for dealing with Debt Sustainability Analyses (IMF 2013). In principle, the main tenets of the approach from 2011 was reconfirmed, but with focus on risk analysis rather than a single indicator like gross debt to GDP ratios. Benchmarks for high risks are seen – regarding advanced countries – in five dimensions: bond spreads against benchmarks (Germany, U.S.), 600 bp; external financing needs, as share in GDP, 25 percent; annual increase in short-term debt, as percentage of total debt; public debt held by non-residents, benchmark 45 percent. The benchmark for gross debt is seen at 85 percent of GDP. Benchmarks signal a "high risk" evaluation which require fiscal stress tests. The conceptual framework for policy measures should include preserving growth, including output gaps, and political feasibility, but has a focus on the primary balance. The main focus is on mitigating rollover risks.

In practice, the IMF position regarding fiscal policy has changed several times. During the financial crisis the IMF was strongly pushing coordinated Keynesian-style expansionary fiscal policy, later and especially regarding the Greek crisis the IMF authorities did not give a clear orientation (cp. Fiebiger/Lavoi 2017).

It is noteworthy mentioning in this context that no other advanced OECD country has debt rules with debt caps or similar even though many have deficit rules, a few also constitutional deficit rules like Switzerland. More precisely, following the IMF Fiscal Rules Database (IMF 2017), many developing and emerging countries have established some sort of debt rules, some – especially within regional currency unions – with caps on debt, such as 20 (Botswana), 40 (Panama), 50 (East African Monetary Union), or 70 (West African Economic and Monetary Union) percent of GDP. Since most of these countries have a large part of debt in foreign currency, in contrast to advanced, their situation is fundamentally different.

4.6 Buchanan and the balanced-budget concept

James Buchanan, the Nobel Prize Laureate of 1986, pioneer of New Political Economy and Public Choice Theory, was a fervent proponent of constitutional balanced-budget rules. He is also Honorary President of the German Walter Eucken Institute which celebrates the German "Ordo-Liberalism". As one of the most influential economists of the 20th century, his thoughts about public debt diffused also to Germany and other European states and may have influenced the fiscal rules of the Maastricht Treaty and the subsequent secondary laws of the EU. The Maastricht Treaty came in the aftermath of Ronald Reagan's and Margaret Thatcher's "supply-side economics" and the demise of Keynesianism. Different schools of thought in the then key countries, Germany and France, both with little Keynesian tradition but diverging attitudes to state interventions in markets, had to find a compromise. Buchanan's ideas regarding public debt were far more radical than German Ordo-Liberalism, but they were part of the then prevalent mindset and even more so with the rising importance of public choice theory and New Political Economy.

Buchanan's writings about public debt and fiscal deficits were spread over several decades, laid down in two books and many articles. They can be summarised briefly in seven propositions, following Tempelman (2007, all quotes in italics from p. 446). Tempelman is a staunch supporter of Buchanan.

1. *"The burden of public debt falls on future generations."* This means implicitly that future generations have no benefit, since governments tend to finance present consumption (or transfers) by incurring debt.
2. *"Public debt constitutes negative capital formation."* Since deficit financing tends to increase consumption and crowds out fixed investment, capital accumulation and growth are hampered. The often-held argument that Keynesian fiscal policy tends to be inflationary is not in the centre of Buchanan's theory.
3. *"Ricardian equivalence does not hold because of fiscal illusion."* Citizen and bondholders do not have infinite time horizons but have a strong time-preference, i.e. prefer short-term interests. Deficits raise incomes and consumption with no short-term burden.
4. *"Keynesian macroeconomics is the principal cause of the disappearance of the unwritten balanced budget norm that existed prior to the 1930s."* The old norm is seen and appreciated as the norm of the classics. In Buchanan's wording: "The legacy or heritage

of Lord Keynes is the putative intellectual legitimacy provided to the natural and predictable biases toward deficit spending, inflation, and the growth of government." (cited in Tempelman 2007, p. 442)

5. *"Barring institutional constraints, public deficits will be a permanent phenomenon."* This means that cyclical deficits do not tend to be offset by surpluses, e.g. in the U.S. since the end of the Eisenhower administration.

6. *"Public debt is immoral because future generations bear a financial burden as a result of spending and borrowing decisions in which they did not participate."* It is therefore "taxation without representation." (cited by Tempelman 2007, p. 445) This proposition has two implications. First, even if future generations would benefit from present public investments, they cannot participate in decision-making. Second, bondholders are beneficiaries of deficit spending, in contrast to the net-present-value reasoning with infinite time horizons.

7. *"A constitutional balanced-budget amendment is required to remedy the tendency in elective democracies for government to borrow and spend rather than to tax and spend, and to spend much rather than little."* The main promotors of deficit-spending are politicians seeking their short-term political success, exploiting fiscal illusion of taxpayers. As a consequence, without a constitutional amendment the state tends to become bigger and bigger. Buchanan supported politicians striving for balanced-budget amendment in the US-Constitution. In 1995, Congress came within a single vote to passing such an amendment.

We comment Buchanan's ideas with a few remarks:

- Buchanan proposed a zero public debt economy, although he held that credit *per se* is neither good nor bad. At few occasions he had some sympathy for debt financed public investment, distanced himself from such a golden rule by arguing, without sound evidence, that *de facto* deficits serve predominantly consumption because this is the wish of citizens, and politicians tend to follow them. This way, he mixes empirical observations with axiomatic propositions.
- If there are cyclical lapses from full employment requiring more aggregate demand, this should be facilitated with money creation by the central bank, following Milton Friedman.
- Buchanan not only misses the clear distinction between debt-financing for consumption and investment and confuses golden-rule-deficits with cyclical deficits; furthermore, he

does not even address the issue of varying differentials of interest rates and growth rates as analysed by Domar.

- A pervasive feature is the distrust in the capacity of parliaments to combine short-term and long-term interests of society. Again, it is a proposition, or an axiom, without examination of evidence.

The main tenets from Buchanan's theory are built on axioms, moral value judgements and simple generalisation of some empirical observations understood as something akin to laws in natural sciences. What remains, is demonization of debt and deficits, in a softer version reluctance with and fear of deficit spending, no matter for which purpose. The belief that there is a general deeply rooted "deficit bias" in modern parliamentary democracies prevails until today among prominent economists (cp. Feld 2019); this would then be countered with a balanced budget bias, at least for structural balances with only few exceptions. This philosophy is probably one ingredient of the fiscal rules in the EMU since Maastricht.

It is noteworthy to remind that the German architects of the Stability and Growth Pact, decided in 1997, opted in the negotiations clearly for (cyclically balanced) budgets or surplus. The normal or "neutral" budget balance should be close to zero as one of the main German negotiators remembered, with 3 percent as a cap for a cyclical component, in contrast to the earlier ideas of *average* 3 percent deficits when preparing the Maastricht Treaty (Tietmeyer 2005, p. 232 and p. 163f.). Although not explicitly spoken out, the implicit ideal must have been a zero sovereign debt economy. The description of the economic philosophy of the German negotiators of the Maastricht Treaty and later European regulations in the secondary law shows a clear continuity of thought over the decades, quite akin to Buchanan (Brunnermeier/James/Landau 2016, pgp. 66f.).

5. Criticisms of the debt sustainability concepts

Now we turn to three representative criticisms of the above-mentioned debt sustainability concepts and especially on discussions about the growth-debt nexus. The first is a recent paper from Blanchard (2019) which can be considered a denial of Blanchard et al. (1991). The second is Wyplosz' fundamental critique of the idea of debt sustainability in general. The third are papers from Panizza and other authors which question the proposition that higher debt causes lower growth.

5.1 Blanchard (2019) – no intertemporal budget constraints

Olivier Blanchard delivered in January 2019 the presidential address to the American Economic Association on "Public Debt and Low Interest Rates" with startling propositions which challenge the so-far mainstream view on high public debt in the U.S., and implicitly also the debt rules in the EMU. Besides this, Blanchard 2019 twists Blanchard et al. 1991 by almost 180 degrees. The main propositions are as follows.

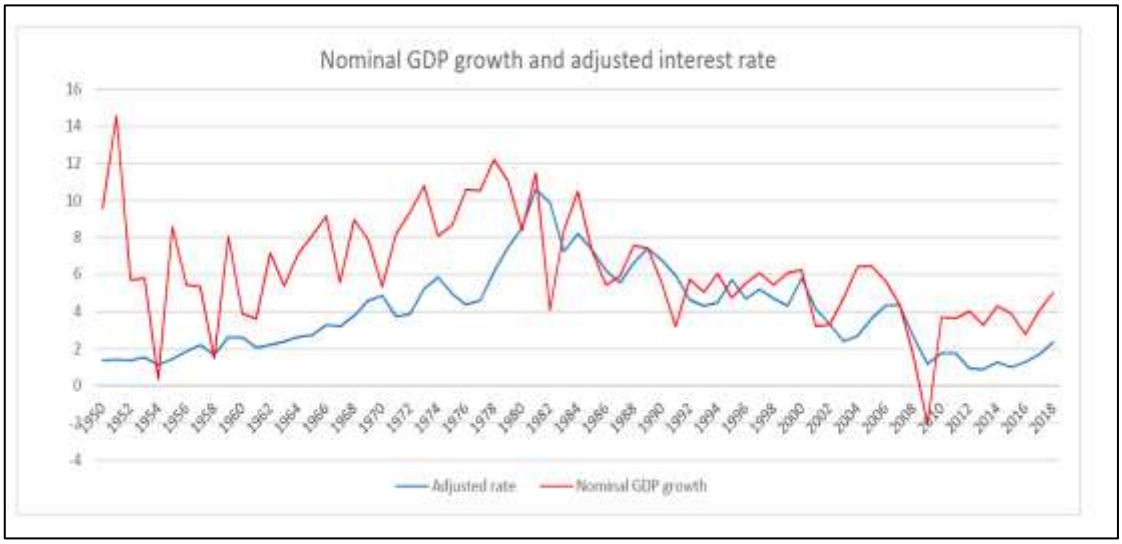
The paper starts with the main message: "Put bluntly, public debt may have no fiscal cost." (1). This is because the GDP growth rate was historically – analysed only for the U.S. for the period 1950-2018 – higher than the interest rate and is so presently at a considerable degree which is likely to sustain for the medium or even long term. The historical picture is somewhat blurred by occasional adverse constellations, especially in the 1980s. The U.S. experienced three mountains of the debt-GDP ratio – right after World War II, in the early 1980s under the Reagan administration and in the course of the great financial crisis since 2008-10. After the peaks, debt came always down, though gradually, to much lower levels despite a lower growth trend. Even if the primary balance had been zero over the whole period the debt level would have a downward built-in trend with excess growth over the interest rate.

Blanchard does not mention "dynamic inefficiency" which he mentioned 1991, and no mention of his (et al.) 1991 paper in which a r-g differential of 2 pp was seen as a general trend which necessitates a permanent primary surplus for keeping debt at some level "sustainable". The intertemporal budget constraint is under these conditions no longer binding. This constellation is not only forecast for the case of "secular stagnation" but was prevalent in most decades after the War. Blanchard cites Shiller who had calculated the same result for the period 1871-2018 for the U.S. (pp. 6f.). Under such conditions the rollover of maturing debt should be unproblematic. This finding is not less than a blunt denial of the relevance of intertemporal budget constraints under the condition that $g > r$. Furthermore, it is held that fiscal policy could exploit low interest rates on sovereign debt relative to growth rates as long as inflation is under control. No mention of the present (2019) U.S. budget deficits of 6 percent, primary deficit of 2 percent, with historically low unemployment, at a debt of 107 percent of GDP in 2019, even increasing against the previous year (data from AMECO). The contrast to Europe could not be sharper although the growth-interest differential is in 2018-2019 more negative in the euro area than in the U.S.

Blanchard construes a risk-free interest rate as a benchmark to compare output growth with. The interest rates on debt are adjusted for maturity by using a weighted average of short- and long-term rates. Furthermore, the interest on sovereign debt is adjusted for taxes payed by bondholders (excluding domestic bondholders who are exempted and foreign investors). The adjusted interest rate lay almost always below the short-term rate (1-year T-bills), and the average r-g differential 1950-2018 was -2.5 pp (see figure 5.1).

The new insight in this work stems partly from calculating an adjusted interest rate. The average maturity is here presently around 5 years, and since there has never been any default or rollover risks, the adjusted rate can be considered risk-free. This rate might be a politically repressed rate to some extent, for instance by QE and also by conventional monetary policy, and also elevated by costs of banking regulations regarding certain capital ratios and liquidity buffers.

Figure 5.1: Nominal GDP growth and adjusted interest rate in the U.S. 1950-2018



Source: Blanchard 2019, 9

Blanchard does not address the issue directly whether the level of sovereign debt elicits interest rate increases. Since the debt is considered safe and the rate calculated as risk-free, there shouldn't be any risk-premium. Since this depends on the risk perception of creditors, the entire performance of interest rates and the interest-growth differential hinges on expectations of bondholders. The issue of multiple equilibria is discussed and the risk of self-fulfilling "bad" expectations is seen and not completely ruled out. If this

would occur, hard austerity measures with primary surpluses would be necessary. Apparently, Blanchard assumes that investors trust in the U.S. track record on successful coping with public debt and keeping sovereign bonds as safe assets, despite having no deficit and debt rules. That adverse expectations of financial agents could perhaps be fended off by the central bank's open market policy with predominantly outright operations – the Fed is holding a large share of sovereign bonds – or on other avenues is not addressed.

Blanchard discusses whether negative welfare effects – such as distortions of relative prices – can emanate from continued high debt, even if there are no sustainability concerns. The conclusions are that such effects exist, mainly reduced capital accumulation, but the magnitude of the effects is considered small.

Unaddressed is the diminishing growth rate in the U.S. and elsewhere. It must not be ignored that growth in the U.S. in the long period since 1950 was propped up by population growth of 1.1 percent annually (US Census Office and AMECO). In the last decade population growth came down to 0.6 percent. By contrast, in the countries of the Euro area population grew since 1960 by 0.44 percent p.a., which came down to 0.2 since 2000; in Japan, population growth declined to almost zero since 1990 (AMECO). Population growth feeds to some extent into GDP growth, and it must be checked whether interest rates diminish alongside growth rates. Also, the prospective costs or hidden burden of aging had been disregarded by Blanchard (2019) while he postulated in 1991 to include them in a concept of long-term sustainability.

A big theoretical, conceptual and fiscal policy gap remains between Blanchard et al. 1991 and Blanchard 2019. At the same time, his analysis is in strong contrast to the IMF concepts (based on Ostry et al. 2010) on which he had worked for many years as the chief economist.

5.2 Wyplosz – debt sustainability is "mission impossible"

Charles Wyplosz (2011) discusses IMF concepts of public debt sustainability, mainly applied to developing countries. He considers the concept of debt sustainability as "mission impossible". Its justification is based on the Domar-equation (Domar 1944), used by all discussants reviewed so far. This is an *ex post* identity derived from National Accounting (Wyplosz 2011, 11, here in my notation). Since fiscal sustainability is

forward looking with a long-time horizon, the *ex ante* version of equation (5) above has to use expected values of r, g and p, denoted here by E:

(5a) $Eb_t - b_{t-1} = E\,(r-g)\,b_{t-1} - Ep_t$

(7) $Eb_t = b_{t-1} + E\,(r-g)\,b_{t-1} - Ep_t$

Foreseeing long-run growth and interest rates is an "impossibility principle" as the future is unknowable. In practice of sustainability analyses, only educated guesses are made, often camouflaged with sophisticated statistics and calculations: "Not only is it possible to achieve any degree of precision in such projections, but also it is generally the case that growth, budget outcomes and interest rates are endogenous to debt sustainability." (p. 1) Hence running primary surplus may influence growth and interest rates, primary deficits conversely.

Wyplosz argues that long-term growth and the interest rate (for long maturities) are not predictable with sufficient certainty for periods of several decades. Instead, using arbitrary assumptions or historical trends contradicts the insight that the future is uncertain and open to change. Even minor changes can reverse the difference between r and g, with major long-term debt implications.[6] Technical progress would have to be forecasted, natural population growth, migration, the central bank's exchange rate and monetary policy, apart from the policies of governments. The assumption "no fiscal policy change" or the clause "without major adjustments" over long periods is more than unrealistic, especially when one thinks of pensions policy. According to Wyplosz, public debt should not be used as a measure or target of fiscal policy - which does not mean unlimited deficits and ever-increasing debt levels. Fiscal policy would better focus on the deficit, not the debt. As far as the avoidance of state insolvency is concerned, other criteria and policies are much more important: the productive use of debt, the composition of debt, inflation and "financial repression", credibility of authorities, hence institutions.

Six definitions of sustainability are distinguished:

- serviceability of debt, thus guaranteeing solvency, based on liquidity
- a debt level below an estimated threshold target
- prospective solvency under the assumption of major corrections in fiscal policy
- the net worth of future primary balances less present debt is positive

[6] Alcidi/Gros (2018) have calculated that in the most extreme case a 1 bp difference in r can decide about sustainability or unsustainability, i.e. a cumulative decrease or increase of debt in the long-term future.

- net worth of future primary balances less present debt, be it positive or negative, must not decrease (based on Arrow's notion of environmental sustainability)
- stationarity: debt does not grow without bounds or, alternatively, debt declines weakly

All definitions come to different policy conclusions. At the end of the day, the reaction function of authorities is decisive, the ability to cope with fiscal stress, especially in case of rollovers. Ultimately it is the credibility of the debtor that counts.

Regarding the role of inflation, Wyplosz hints to the British reduction of high debt in the period 1946-1970 which was implemented with an inflation tax. Taxing investment incomes can help adjusting the growth-interest differential, also regulations that put a cap on demand deposits such as regulation Q in the U.S. (1933-1986). The regulation kept deposit interest rates low which enabled low borrowing rates for the sovereign and private debtors. Banking regulation may also impact interest rates.

Finally, Wyplosz calls for fiscal rules, as an analogue to the Taylor rule in monetary policy (p. 22). Which rules is left open, apart from a few principles.

5.3 Research on the debt and growth nexus

The relationship between growth and public debt touches on three questions: first, is there a correlation between public levels and GDP growth; second, if there is such a relationship, what is the causal nexus; third, are there thresholds of debt beyond which long-run growth tends to decline. In the first part, the theoretical background of the prevalent belief that there is a negative relationship between growth and debt is discussed. In the second part empirical evidence from past research is presented.

Growth is understood in this context as medium- or long-run growth rate. The debate should focus on debt in own currency, hence on advanced countries. Emerging and other developing countries are in this respect very different due to "original sin", i.e. the necessity to issue debt mostly in foreign currency with foreign creditors.

Reasoning for a negative relationship between growth and debt

A negative relationship between growth and debt ratios is seen primarily by those who see the causation as follows. *Crowding-out* of private investment is often considered the main driver (Elmendorf/Mankiw 1999). The funds of saving would be reduced by higher budget deficits leading to reduced aggregate saving with increased interest rates. The underlying concept is the loanable funds theory (Faini 2006). Lower aggregate saving

reduces investment, less capital accumulation and reduced growth. Inflows of foreign savings would alleviate the pressure. The loanable funds theory disregards that aggregate saving and finance differ. Saving is the part of an *ex post* observed national income not consumed, while finance is money and credit mobilized by the financial sector for use for investment and other expenditures, thus creating national income and eventually saving. Hence, saving is endogenous, as is money. If the loanable funds theory is flawed, the crowding-out theory of public debt holds only in the case of output at potential output and/or full employment. Besides, any public debt would diminish private saving, if the theory were correct, not only at high debt levels. This way thresholds cannot be explained.

A different crowding-out reasoning is used by Ostry et al. (2010). *Public investment* would regularly be crowded out by increasing debt service, even at constant interest rates, which has negative impact on the total capital stock. If the public capital stock is complementary to the private capital stock, the latter's growth is impeded. The observation may be true for many cases of rising debt ratios, but it depends on the structure of public spending. In case of negative output gaps this crowding out effect would not work, also not in the first case mentioned above. In addition, Ostry et al. mention distortions due to higher taxes. This could be true, but is also valid for raising primary balances to reduce debt. Besides, one might consider non-distortionary tax increases. Also, the magnitude of potential distortions resulting from tax increases needs to be estimated. One could also consider that tax or spending increases could target on reducing other distortions.

Ostry et al. (2011) had claimed that countries with a high debt burden lose the capacity to conduct counter-cyclical fiscal policy since they have lost fiscal space. Yet a strictly counter-cyclical policy need not necessarily raise the debt-GDP-ratio (cp. Cottarelli/Jaramillo 2012, and Furman 2016). In a slump, multipliers are higher than in booms, fiscal costs are less, probably even less than when turning to procyclical policy. The claim that these countries have lost the option for fiscal policy may be wrong. Since Ostry et al. explicitly exclude demand effects, they cannot capture the problem of self-defeating austerity.

Blanchard et al. (1991) had argued that high debt would require *higher tax rates* which might cause welfare losses and are more difficult to raise once taxation is already high, due to political resistance. However, the political pressure might be more dependent on the level of tax revenues to GDP. If 1 percent of GDP is necessary for additional debt

service due to increased debt, it may be 5 percent of revenues if the revenues/GDP ratio is 20 percent, and only 2 percent if the revenue/GDP ratio is 50 percent. Moreover, tax increases or expenditure cuts might be at the same magnitude if the primary balance needs to rise due to fiscal austerity. Nevertheless, ever-increasing tax rates (or expenditure cuts) due to increasing debt levels are incompatible with any sustainability consideration.

Rising spreads on interest rates might be another cause for fiscal crowding out at certain margins of debt. The fear of financial investors would be that future rollover of maturing debt is endangered. This would imply that the country cannot raise taxes or cut other expenditure due to political resistance, presently or in the future. Or investors build up expectations which can become self-fulfilling if spreads spiral up. Often such situations occur if sudden unexpected leaps in debt occur. This can however be only a temporary liquidity problem which should be fixable by the treasury or the central bank. Everything is of course different if foreign currency debt is involved and exchange rate depreciation is feared. Then indeed a country's fiscal space is limited.

In most debates about rising spreads the policy response of monetary policy is ignored. In many countries, especially the U.S. and also Japan, the central bank or semi-state institutions own large parts of government debt and are capable to smooth bond prices on the secondary and sometimes even primary bond markets. This implies an extended Lender of Last-Resort-function (LoLR) of central banks. By European law, the ECB has only a very reduced LoLR-capability since LoLR-functions are to some extent considered "monetary financing of states" via a strict interpretation of this prohibition this exists nowhere else. It is amazing that all the literature on public debt and sustainability has never researched why there has been no debt insolvency of central governments in advanced countries after World War II in countries with stand-alone currency.

What does empirical evidence tell us?

Panizza/Presbitero (2013) provide a survey on the empirical literature nexus of debt and growth. Their bottom line is that the correlation between high debt and lower growth cannot be taken as general and robust relationship. Countries are very heterogeneous in this respect. For countries in which growth dropped and debt grew, there is evidence that the causality runs from low growth to increased debt (see also Panizza/Presbitero 2012). Economic growth normally depends on a number of key determinants, and the level of

debt could be one among many, though with a low weight. Some authors found a small negative growth/debt elasticity (higher debt with respect to a decrease in growth), but this could, as Panizza and Presbitero comment, easily be overwhelmed by growth enhancing policy. The search for significant thresholds of debt levels was unsuccessful. Expansionary fiscal policy contributing to high debt may even have positive long-run growth effects via hysteresis – short-run positive output effects can have lasting impacts (Gechert/Horn/Paetz 2019).

Is the causality relevant? If there is no robust evidence for a causal link from debt to lower growth, but evidence only for causality from lower growth for diverse reasons to higher debt, then there may be no identifiable threshold. Many if not most advanced countries experienced decelerated growth over the past decades and higher debt with various ratios, but not necessarily facing loss of solvency. Ostry et al.'s hint that causality might run in both directions is no argument against Panizza's and Presbitero's critique. A threshold for public debt is not helpful if the lower growth is the cause of a higher debt ratio.

How about the reasoning that uncertainty rises and credibility of debt sustainability drops at certain thresholds? Indeed, trust in debtors is important, but there is no evidence for trust-thresholds; moreover, the assertation of quantifiable thresholds rests on forecasts of fiscal stress at certain debt levels, see above. Or it is hinted to potential emergence of spreads. Then spreads are the cause of uncertainty and subsequent rollover-stress, not the result of potentially lost insolvency. Circular reasoning emerges, as the authors hold. To avoid misunderstandings, it is not rejected that problems of a high burden of debt service can arise at certain levels of debt in certain countries. But the allegation is rejected that such general thresholds across advanced countries exist.

Often the analyses of Reinhart and Rogoff (2012) are seen as chief witness for debt thresholds at the margin of 90 percent debt to GDP. It was however proven that Reinhart's and Rogoff's empirical methodology of data analysis was flawed (cp. Herndon et al. 2014). The claim that beyond 90 percent in a large sample of advanced countries growth rates fall can not be upheld. Sometimes short-term reduced growth was observed, but not a general long-run growth slowdown. The performance of countries is very diverse. This finding is fully in line with the IMF 2011 authors reviewed above. Some authors respond that maybe the 90 percent margin is not the correct measure, but then it is another higher margin. Indeed, this could be true, but again there is no evidence which supports the

generic threshold proposition. The weakest among all threshold claims is the forecast-condition "new policies excluded" so that only the past fiscal response function suffices to forecast institutional incapacity (cp. Wyplosz 2011). Learning effects are then systematically precluded, backward-looking expectations are considered to be the only type of expectation in this regard. History would show for many countries they authorities were capable to cope with critical situations regarding high debt so that insolvency of advanced countries did not materialize. A supportive argument for those who claim existence of thresholds could be, in our view, that these authors exclude the options of inflating debt away or using "financial repression", not uncommon in the past.

A few researchers arguing in line with Reinhart/Reinhart/Rogoff (2012) found debt thresholds for advanced countries. Among others Kumar and Woo (2010), Checchetti et al. (2011) at a debt threshold of 96 percent and Baum et al. (2013) for Euro area countries beyond a threshold of 95 percent. Panizza/Prebitero (2013, 182 ff.) find the econometric analyses insufficient to prove robust empirical evidence. Their main arguments are that correlations are interpretated as causation, that there is an omitted variable bias and that robust proofs of general thesholds is not provided. They do not dispute that correlation between debt and growth may exist.

Panizza/Presbitero (2013) raise the question whether gross or net debt is relevant when the growth-debt nexus is analysed. They hold that net debt is difficult to measure in a uniform way across countries so that gross debt is used. However, this implies, we would conclude, that then the informative value of gross debt is blurred. Moreover, the same gross debt of countries may have different impact if net debt differs which is often the case. Furthermore, valuation of debt matters, be it face value or market value.

Lastly, the authors hint to papers in their survey which see feasible counter-cyclical fiscal policy space despite high debt levels in a low-interest-rate environment in which public investment could even be self-financing under favourable conditions (e.g. DeLong/Summers 2012). The same authors observed self-defeating austerity which curtail output and raise debt to GDP ratios in certain situations, though not in general (Fatàs/Summers 2015). The defenders of increased primary balances against too high debt are mostly blind in this regard (not so Ostry et al. 2010/2015 who call for primary surpluses only in good times of the economic cycle).

Pescatori et al. (2014), a team from the IMF, analysed a panel of advanced countries and episodes throughout the 20th century with a focus on the debt-growth relationship.

For medium-term growth, they couldn't detect a relationship but a weak one for short-term growth after leaping debt beyond certain thresholds. The debt level alone is a poor predictor for future growth, but may contribute to predicting growth in the medium and long term. They found however a relationship between high debt levels and output volatility via fiscal and monetary policy changes.

Last but not least, De Grauwe/Ji (2013) investigated the relationship between interest rate spreads and debt for four countries in the Euro area 2010-11, namely Portugal, Italy, Ireland and Greece (EMU-4). They compared the relationship of interest rate spreads against German bonds, relative to the debt level, with a sample of 14 advanced countries with own currency and own central bank ("stand-alone countries" vs. EMU-4 countries) in the pre- and post-crisis period. They found for the EMU-4 only a very small increase in spreads alongside debt to GDP, however the spreads were suddenly blown up in the period 2010-11. In stand-alone-countries the link of debt to spreads was insignificant before and after the financial crisis, across different debt levels. In EMU-4, the spreads occurred in the time-context when debt of some countries was re-interpreted by financial investors. Hence there was no change in fundamentals, such as the debt level or other fundamentals like change in growth prospect etc. The specific feature of the EMU-4 is the lack of a LoLR-function as it exists in all stand-alone countries. This leads to a systemic fragility of EMU-4 bonds markets so that changed risk perception of bondholders can be self-fulfilling. This, liquidity problems impede rollover of maturing debt – impossible in stand-alone countries – and subsequently lead to default.

Interestingly, all other analyses of debt sustainability reviewed here miss this institutional specificity of a currency union and treat all advanced countries similarly. This renders the mainstream debt-sustainability analyses as promoted by the European Commission, the ESM and many IMF analyses useless. Although the role of credibility and trust of financial investors is correctly detected by Blanchard et al. 1991, Ostry et al. 2010 and many others, the specific institutional risks of fragile EMU bond-markets are not well understood. None of the empirical analyses which pretend to have found debt thresholds has controlled for the support of central banks in case of debt rollover problems. These insights cast strong doubts on the conceptual validity of general debt rules like the 60 percent margin or similar rules based on fiscal space estimations.

After having reviewed many different concepts of debt sustainability and concomitant criteria, both theoretical approaches and empirical research, the core of all

debt sustainability analyses, namely the notion of the intertemporal budget constraint, the conclusions for the EMU fiscal rules need a deeper comprehensive treatment. Before we come to that part in chapter 7, we analyse empirically a key issue of the above reviewed analyses regarding the relationship of interest rates on public debt and economic growth. Obviously, the sign and the magnitude of the r-g differential impacts strongly the design of fiscal policy.

6. Determinants of public debt dynamics: comparing the U.S. and EMU 1999-2018

In this chapter we amaöyse the prime determinants of the debt ratio, the r-g differential in the U.S. the EMU for the period 1999-2018. Then we show differences among EMU member states. Before we start with this agenda, we take a look at the long haul for the U.S. (1950-2018) and for a key EMU country, Germany, in order to better understand their long-run debt trajectories. There are no data for this period for the group of the Euro area countries, but some countries time series are available.

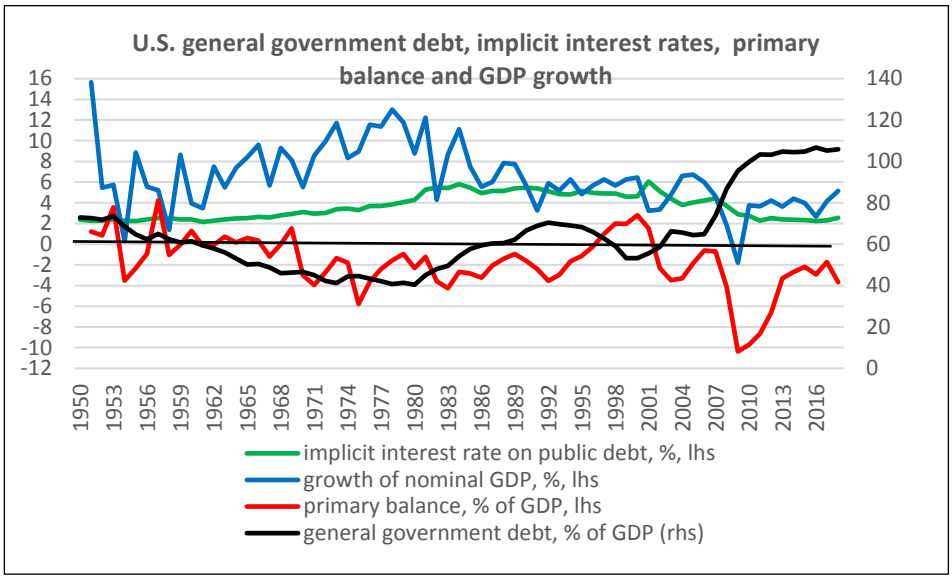
The bottom line of this chapter is that there is no general empirical normality across advanced countries that r tends to be higher than g in the long run, as contended by conventional theories, especially in the concept of intertemporal budget constraints. The evidence shown here is in stark contrast to assertions by the IMF, OECD and ECB which hold that advanced countries tend to have positive r-g differentials on average (ECB 2016, Checherita-Westphal, 2019, Escolano/Shabunina/Woo 2011 and others). For instance, the ECB (2019) wrote in its Montly Bulletin: "Empirically, the relevant interest rate-growth differential for public debt dynamics, as defined above, has been positive for advanced mature economies over longer periods. The value for mature economies over extended periods of time has hovered around one percentage point." (p. 62)[7] Even though, it is mentioned that all Euro area countries but Italy have negative r-g differentials in 2019 which will continue in 2020 (p. 62).

In the U.S., over the whole period 1951-2018 g performed clearly above r, with an average differential of -2.8 pp. For the period 1990-2018 the differential melted to -0.6 (see figure 6.1). Apart from nine out of 67 years (1951-2018), g exceeded r. Real growth

[7] It is added: „… in overlapping-generation models with non-diversifiable uncertainty or models with rational bubbles, a negative $i - g$ on government debt could co-exist with a dynamically efficient economy." (p. 62) No mention of the US-performance or of other advanced countries. Only emerging economies could have negative r-g differentials, due to financial repression and catching-up.

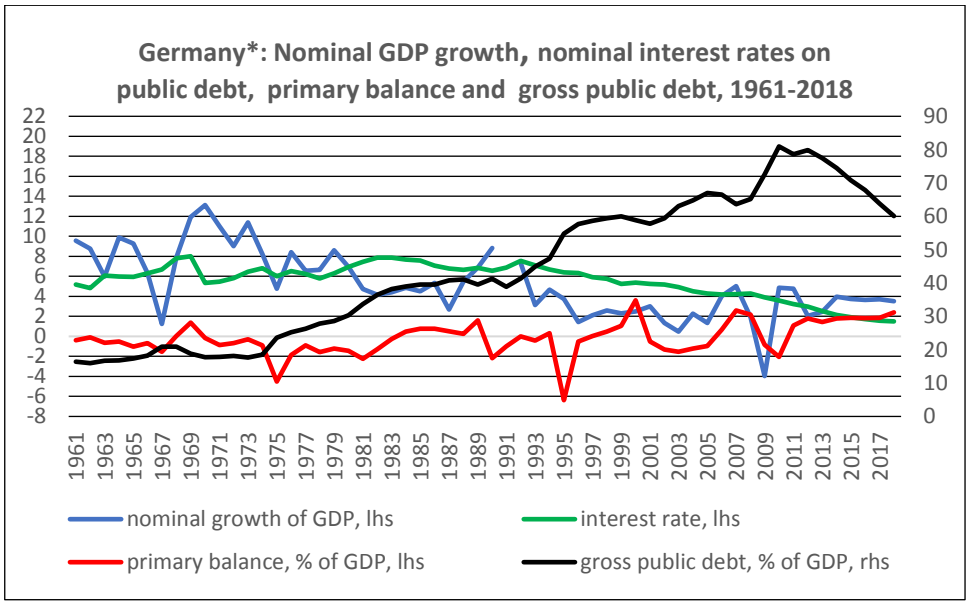
was supported by population growth with around 1 percent p.a. 1960-2018, much more than 0.4 percent p.a. in EU12. Interestingly, the slowdown of nominal growth since the early 1980s, caused by disinflation and lower real output growth, is accompanied by lower interest rates on sovereign bonds. The primary balance was only in 16 out of 67 years positive; it averaged over the whole period at -1.75.

Figure 6.1: The U.S. debt and deficits dynamics 1950-2018



Source: Abbas et al. 2010, U.S. Treasury 2019, IMF 2019, AMECO, own calculation. Note: all rates/data are nominal.

Figure 6.2



Source: AMECO. *Until 1990 West Germany. No data for growth in 1991.

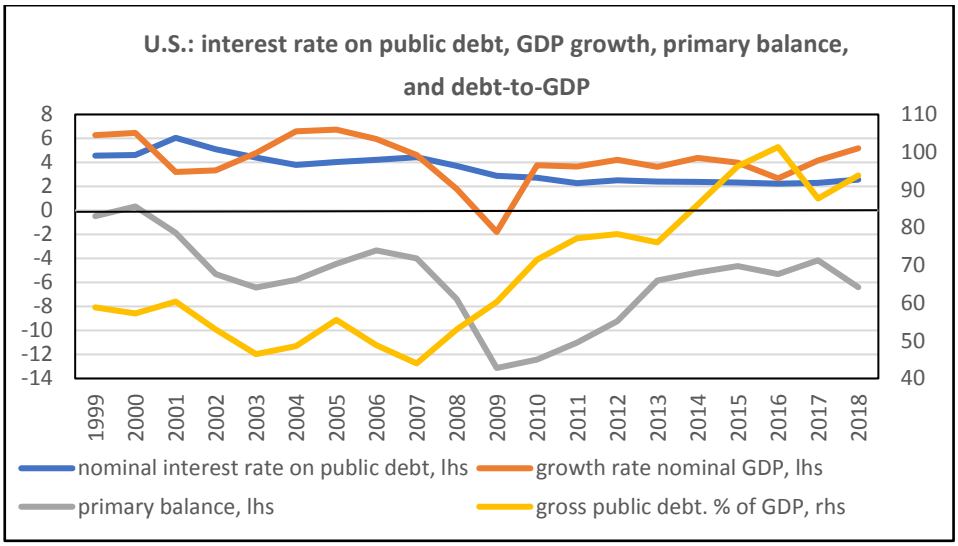
In Germany, debt grew almost continuously since 1961 (16 percent) to 81 peceent of GDP in 2010. The r-g differential over the entire period was on average 0.1 percent, comprising a negative differential until 1980 (with two short interruptions), and a strong positive differential until 2009. The average primary balance was zero. The seemingly ever rising debt level aroused concerns about debt sustainability which contributed to establishing the constitutional debt brake in 2009.

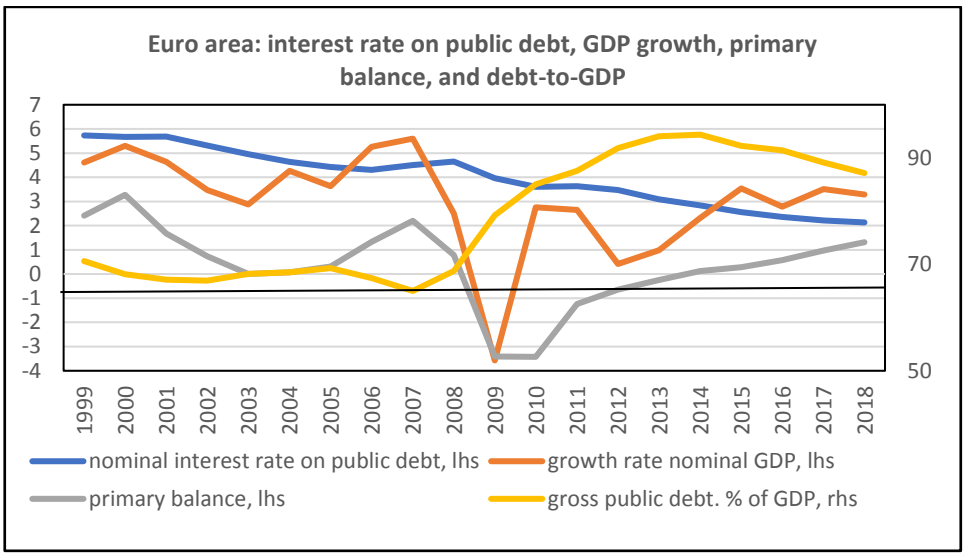
After this short overview we turn to the comparison the U.S. and the Euro area since 1999.

Comparing the U.S and Euro area fiscal performance 1999-2018

Figures 6.3 and 6.4 (and table 6.1) summarise the deficit-debt dynamics of the U.S. and the Euro area. Again, the r-g differential was a bit more favourable in the U.S. (-0.6 percent versus 1.2 percent in EMU), mainly because of better growth performance while the interest on public debt came down in both blocs from around 6 to 2 percent from 1999 to 2018. However, in the U.S. the growth rate lay above the interest rate before and after the crisis while the interruption during the crisis was shorter and less deep. The main reason was a more aggressive primary deficit spending in 2008 and 2009, down to -13 percent, compared to -3.5 percent in the Euro area followed by primary surpluses after 2014 (cp. figure 6.5). In the U.S., a double hike of the debt level was tolerated, in the Euro area a double dip backlash in growth, first much deeper than in the States in 2009 and then in 2010-2012. The inflation in the U.S. returned to target (and slightly above) since 2017 (2.1 and 2.4 percent in 2018), and remained in the Euro area at 1.5 and 1.7, respectively. On average in the 19-years period, the primary balance in the Euro area was positive with 0.4 percent and negative in the U.S. with -1.7 percent.

Figures 6.3 and 6.4: U.S. and Euro area key fiscal indicators 1999-2018





Source: AMECO, U.S. Treasury 2019

Interest payments on public debt increased in 2018 to 2.7 percent of GDP and shrank in the Euro area to 1.8 percent. Yet, interest payments and the primary deficit could be rolled-over in the U.S. with an overall deficit of 5.8 percent (2018), while the Euro area deficit was on average only 2.5 percent. The U.S. applied Ponzi-games, meaning rolling over debt and interest payments. It seems very clear that growth and as a result employment but also tax reduction counted much more in the U.S. than the debt level, and the mirror image holds true for the Euro area.

Table 6.1: Fiscal indicators for the U.S. and the Euro area 1999-2018

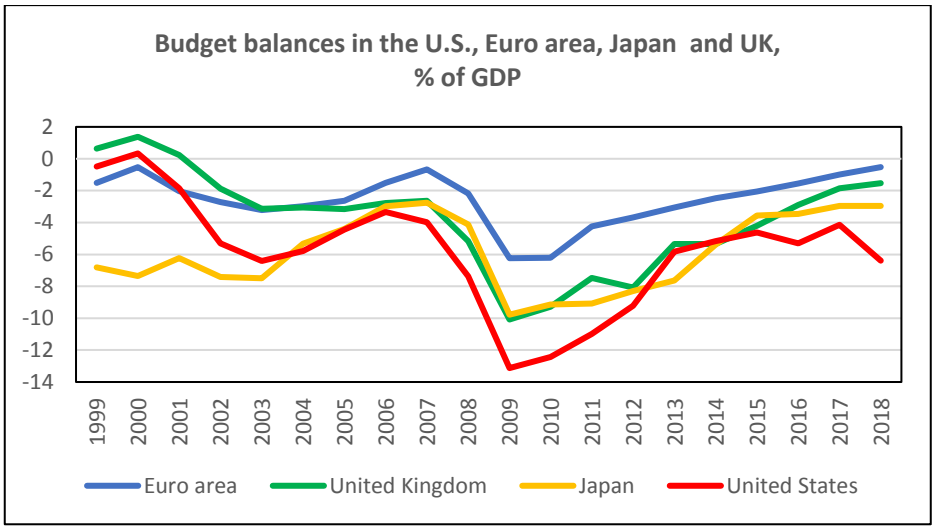
mean	Euro area	United States
nominal. interest rate on public debt, %	4.0	3,5

nominal GDP growth, % p.a. (g)	2,7	4,1
nominal GDP growth p.a., % p.a. (g p.c.).	2,6	3,2
r-g, pp	1.3	-0.6
r-g p.c., pp	1,4	0,3
short-term interest rate, %	1,9	2,2
real short-term interest rate, %	0.3	0.3
long-term interest rate, %	3.4	3.6
real long-term interest rate, %	1.9	1.6
primary balance, % of GDP (p)	0.4	-1.7
change of debt ratio b, pp, 1999-2018	16.5	48.3
interest burden/GDP, mean 1999-2018 (z), %	2.9	3.5
change of z, 1999-2018, pp	-2.1	-1.1
interest payments, % of total expenditure	6.1	10.7
SFC adjustment, mean, % of GDP 1999-2018	0.45	-0.2
budget balance, % of GDP (d)	-2.5	-5.8
growth of real primary spending (GDP-deflator), %	1.5	2.7
growth of real revenues (GDP-deflator), % , p.a.	1.4	1.5
real GDP growth, p.a.	1.4	2.0
real GDP growth p.c., p.a.	1.0	1.2
gross consolidated debt, % of GDP 2018	87.1	90.0 (est.)*
CPI, mean 1999-2018, %	1,7	2,2
public investment, % of GDP	3,1	3,6
unemployment. % of total labour force	9,5	5,9
population growth, %	0.9	0.4

Source; see figures 6.3 and 6.4. *Estimated with data from U.S. Treasury 2019, consolidated with social security institutions.

How different fiscal policy in the Euro area responds to crises can be seen in figure 6.5. The U.S. fiscal response to the financial crisis 2009 was more than twice as much as in the Euro area, while Japan and the United Kingdom were closer to the U.S. than to the Euro area. The Euro area reduced deficits much quicker than it was done in the other countries. 2009 was the only year in 1999-2019 where a coordinated discretionray counter-cyclical policy was practiced in EMU, otherwise EMU relies on automatic stabilisers. The comparatvely weak and too short response in 2009 is certainly owed to lack of a European Treasury, barriers to inter-governmental policy coordination and the restrictions in the rule-set, especially the high valuation of controlling the debt level relative to the 60 percent margin.

Figure 6.5: Budget balance in selected advanced countries 1999-2018



Source: AMECO

The r-g differentials within EMU

Among EMU-members the r-g differential differs strongly (cp. table 6.2). Over the entire period 1999-2018, 7 out of 19 countries had a negative differential, namely four Eastern European countries in a catching-up mode (partly with extreme values), and Malta, Ireland and Luxembourg. The latter two enjoy higher growth due to exploiting tax privileges. In the second sub-period 2009-2018 Germany joined this group with a differential of -0.7 percent, and Austria reached zero percent. For a number of countries the r-g differential became in the second sub-period markedly unfavourable, especially in Greece, Italy, Spain, Cyprus and Portugal, although the implicit interest rates on public debt dropped in these countries in the range of 1.8 to 2.9 pp (2018 compared to 2008). In 2008, the deviations from Germany's implicit rate were relatively small, apart from the Baltic states. The worsened r-g differential in the crisis countries came mainly from growth, i.e. from the double-dip recession after the financial crisis, strongly influenced by the turn to contractionary fiscal policy after one "Keynesian year" (2009). The nominal long-term interest rate fell in 2008 to the lowest level in Germany (0.4 percent), but remained comparatively high in Greece (4.2 percent), Italy (2.6 percent) and Portugal (1.8 percent). The country-specific spreads were wider in 2018 compared to 2008. This reflects not only different debt levels inherited from former times as legacy debt, but also the attempt to approach the 60 percent cap with growth-dampening austerity. Interestingly, Belgium carries its high debt level of 102 percent 2018 (despite no reduction after the financial crisis) but enjoys quite low long-term interest rates below the implicit rate on its debt.

Table 6.2: r and g for EMU member states 1999-2018

	r-g	r-g	r-g	r	r	r	r	r long
	1999-2008	2009-2018	1999-2018	1999	2008	2010	2018	2018
Euro area	0.8	0.9	1.0	5.7	4.6	3.6	2.1	1.1
Belgium	1.1	0.3	0.9	6	4.6	3.7	2.2	0.8
Germany	*2.3*	*-0.7*	*1.0*	*5.2*	*4.2*	*3.5*	*1.4*	*0.4*
Estonia	*-8.2*	*-3.4*	*-5.2*	6.6	5.7	1.9	0.4	n.a.
Ireland	*-3.7*	*-2.6*	*-2.7*	*5.2*	*5.0*	*4.5*	*2.5*	1.0
Greece	-1.1	5.8	2.5	8.3	4.8	4.3	1.9	4.2
Spain	-2.4	2.6	0.4	5.8	4.4	3.5	2.5	1.4
France	0.8	0.7	0.9	5.1	4.5	3.1	1.7	0.8
Italy	1.5	2.7	2.2	5.9	5.0	3.8	2.8	2.6
Cyprus	-2.2	2.5	0.4	5.6	5.2	3.7	2.7	2.2
Latvia	*-10.9*	*1.8*	*-3.4*	*7.3*	*7.3*	*4.6*	*1.9*	*0.9*
Lithuania	-5.2	1.1	-1.6	8.6	4.6	6.7	2.4	0.3
Luxembourg	*-2.5*	*-2.6*	*-2.2*	*5.5*	*5.0*	*2.8*	*1.5*	*0.6*
Malta	*0.7*	*-3.4*	*-1.0*	*7.9*	*5.7*	*4.9*	*3.3*	*1.4*
Netherlands	0.3	0.4	0.5	6.6	4.9	3.2	1.6	0.6
Austria	1.0	0.0	0.7	5.5	4.6	3.7	2.2	0.7
Portugal	0.6	2.4	1.6	6.1	4.6	3.5	2.8	1.8
Slovenia	-1.4	2.2	0.8	11.3	5.1	4.7	2.8	0.9
Slovakia	*-3.5*	*0.4*	*-1.1*	*10.5*	*4.6*	*3.7*	*2.7*	*0.9*
Finland	0.1	0.4	0.5	6.5	4.2	3.3	1.4	0.7
USA	*-2.1*	*-1.3*	*-0.6*	*4.5*	*3.7*	*2.7*	*2.5*	*2.9*

Source: AMECO

Among the four large of all members, Spain was the closest to r = g, with strong population growth, a favourable negative r-g differential before the financial crisis but excessive austerity thereafter, quite the opposite of Germany. One can conclude that the four large EMU countries comprising 75 percent of the GDP of the union, are the main culprits for not achieving US-like dynamics.

Our conclusion is that there is no economic "law", in accordance with evidence, that interest rates in advanced countries tend in general to exceed growth rates so that sizable primary surpluses are necessary to keep debt from rising indefinitely. Evidence across countries is mixed and changes over time within countries. The r-g differential depends, inter alia, on the depth and length of cyclical setbacks which let g plummet more than r, and of cyclical upswings in which g tends to surpass r. Another factor is the interest rate on sovereign debt in EMU. One aggravating factor is the country risk, in EMU especially the redenomination risk, apart from risks emanating from legacy debt several decades ago. Moreover, it seems quite clear that market rates on sovereign debt play a

bigger role in EMU than in a fully integrated political union like the U.S., apart from the US-dollar as the prime global reserve currency. For the future, a key issue for all debt issues is whether or not the Euro area will return in the medium-term to old "normal" of much higher interest rates or remain close to the zero-lower bound.

Regarding other OECD countries, data are scarce. Norway follows a clearly negative r-g differential trend in the period 1999-2018, Sweden, UK, Japan, Korea, Australia, Switzerland and Canada are in negative territory after the financial crisis (AMECO, OECD.Stat), with no data before the crisis.

Overall, especially after the financial crisis many advanced countries are in a $r < g$ trajectory, before the crisis only a few countries besides the U.S., but data are incomplete for earlier periods.

7. Neither 3 nor 60 – searching for prudent debt and deficit rules

So far, our search for sound theoretical justifications of a general public debt cap in general and for a specific value of 60 percent of GDP or similar was not successful. Seemingly, there are no robust economic explanations. We found only some hints in the fiscal space concept of Ostry et al. (2010) but the quantitative debt limit proposed is more an alarm bell than a clear limit and differs strongly between countries. We found conclusions from the concepts of intertemporal budget constraints using net present values for debt limits by applying infinite time horizons and implying complete and perfect financial markets, but these concepts do not derive a certain debt limit. More practical approaches of the IMF look at specific risks for the medium term, rather than at a generic rule applying to all countries. There is widespread agreement that a certain debt ratio, whatever its level, should not be exceeded in the long run. Yet, this is in contradiction to the notion that there is no consensus about the critical level of the debt limit. So, the first consensus has little value. No wonder that not a single advanced country outside the EU has fiscal debt rules with caps, but many have deficit rules. The latter are easier to define and seem more important.

Furthermore, fiscal deficits have to be consistent with desired debt levels. Stock-flow consistency is needed, regarding caps on deficits as well as long-term explicit or implicit target-balances like balanced budget or others. The Euro area fiscal framework has opted for 60 and 3 percent margins, while the floor for structural balances is set at -0.5, and at -1.0 percent – if debt has fallen clearly below the 60 percent cap. These targets trend to

very low – or even zero – debt ratios, coupled with relatively high primary surpluses in the transition to the targets.

In this chapter we focus on seven neglected but important issues. We

- clarify the fiscal rules for the three regimes of r > g, r = g and r < g
- look at the interdependencies among the main variables r, g, p and d
- analyse the public debt dynamics in the context of the stance of the private sector
- discuss the usage of deficits for implementing the "golden rule" for public investment
- include inflation in the debt and deficit analysis
- broaden the analysis of the fiscal policy regime by including the repercussions on the current account
- question equating debt sustainability with "solvency" of sovereign debt.

All seven sub-topics have political consequences. They will be summarised at the end of this chapter.

7.1 Three regimes and the r-g differential

Most analyses have barred the cases r < g and r = g from the analysis of fiscal rules for either theoretical reasons (no-Ponzi-game restriction, dynamic inefficiency) or for empirical reasons which however are selective and not universally valid. Amazingly, the latter have more or less ignored the U.S. and a few other advanced countries (ECB 2016, ECB 2019, Checherita-Westphal 2019, Escolano/Shabunina/Woo 2011) (see chapter 6), not differentiated historical phases of countries and thus obtain questionable results. In other words, there is important evidence that all three regimes regarding the r-g differential do exist long since in reality. This is even more important since for the medium-term – perhaps even longer – low interest rates seem to be likely among most advanced countries, even lower than prospects for nominal growth. The starting point are equations (8) and (2a) which are repeated here:

(8) $b_t = (1 + \lambda)\, b_{t-1} - p_t$

(2a) $d_t = p_t - z$

We disregard the net present value version of equation (8) with an infinite time horizon and focus instead on finite time horizons, either the medium-term, say less than ten years, or the long-term with a couple of decades.

It is noteworthy mentioning that g in the equations is average growth, which is not necessarily identical with potential output growth. However, potential output growth with conventional measurement techniques is similar to average growth rates, but the measurement is questionable. So, we treat d and p as long-term, i.e. average balances.

a) Growth exceeds interest rates

If the $r < g$ option is not considered a curiosum put possible and if the no-Ponzi-restriction is lifted (as in GCEA 2007, mentioned above), permanent primary deficits are possible without raising the debt ratio. Then debt can be rolled over persistently and interest is paid by incurring new debt. There is apriori no identifiable limit for the debt ratio. The term Ponzi-game should not be negatively connotated under such conditions: creditors get their money back and receive interest, but are ready to lend again to the same debtor, being aware that sovereign bonds are risk-free. What is not feasible in the private sector, may be feasible in the public sector. Such a fiscal policy regime needs to be accompanied by the central bank, the guardian for price stability and financial system stability. The most important precondition is the willingness of creditors to purchase – voluntarily – low-interest sovereign bonds and roll them over in the medium and long term. Key limitations are inflation and grave current account imbalances.

Yet, it may not be prudent to increase the debt level infinitely by hook or by crook, but there is a wide and comfortable range of discretion. The sentiments of financial investors might become uncertain, and expectations on inflation/deflation and exchange rate risks might change. If the present debt ratio is aimed to be maintained, the primary balance would be in deficit, big enough to offset the negative value of the growth-adjusted interest payments, the left-hand term on the right side of equation (8). The latter is (in absolute value) higher the higher the debt level b. If $p < 0$, then $(d+z) < 0$, since $p = d + z$. If $(d+z)$ is negative, i.e. the absolute value of the budget balance exceeds interest payments. This implies that there is ample space for the "golden rule" for public investment.

If authorities aim at reducing b, primary deficits can be reduced below the growth-adjusted interest burden or even increased to a primary balance of zero. Then still interest payments remain debt-financed: if $p = 0$, $d = z$.

It is difficult to prescribe specific fiscal rules for the $r < g$ regime, since many sustainable options exist. Even if the debt ratio is wanted to be bounded at a specific cap, several options for deficit spending remain, depending on the size of the r-g differential.

Fixing a specific rule is not necessary for achieving debt sustainability, except when inflation and current account imbalances occur; fixed rules would sacrifice the broad room for discretion that authorities have. In brief, r < g is like a royal road for fiscal policy.

In Table 7.1 below, scenario A with r < g is sketched, assuming a stable debt level is intended to be maintained. If r were 3 and g 4 percent, and b' 60 percent, a permanent primary balance of -0.6 percent is sustainable, coupled with persistent budget deficits of -2.4 percent. If r were persistently smaller than 3 percent, as assumed in this scenario, the differential r-g gives space for more financing public investment (or other expenditures).

b) r = g scenario

The middle-of-the-road regime r = g is seldom discussed as it is at the borderline of the two other regimes and likely an average of both. Assuming that by and large with symmetric deviations the regime can indeed occur and be managed, the primary balance would average at zero if the present debt level is targeted to be maintained. This implies that d = -z. Interest payment could be rolled over, but deficits are normally not earmarked for certain spending categories; we could also use the overall budget deficit for public investment. The golden rule could be (partially) satisfied. If the debt level is wanted to be reduced, a small primary surplus would allow a permanent budget deficit to the extent that p exceeds z, i.e. (p–z) > 0. Especially in the case of a high debt level, the r=g regime with a zero primary balance or a small surplus is very helpful in preventing self-defeating primary surpluses.

Assuming a stable debt level of b'=0.6, the primary balance would be zero and – with r being 3.5 percent – the overall sustainable budget balance would be -2.1 percent (scenario B), equating the interest payment burden. This means that the interest burden is paid permanently with debt. Of course, this is the most economical way of financing public investment, superior to tax-financing.[8]

c) Scenarios r > g

[8] A comparison of tax-financed and credit-financed public investment shows that the latter is much less expensive over long periods under the r > g regime when only interest is paid by taxes. Continuous investments, credit-financed, a break-even point comes after several decades when tax-financing requires a lower share in GDP, using realistic assumptions. In r < g or r = g regimes, credit financing is always superior to tax-financing.

The r > g regime, which has so far prevailed in most EU member countries (and the majority of advanced OECD countries)[9] requires for the sake of keeping the present debt level stable, persistent primary surpluses, hence p' > 0. In the case of a debt target b' of 60 percent and 3.0 nominal growth and 4.0 percent interest on debt, we would obtain d' = -1.8 which requires a primary surplus of 0.6 percent (scenario C).

For reducing debt ratios above 60 percent towards the EU cap of 60 percent, higher primary surpluses than p' are needed, say p'' during the transition to b' (scenario H). This presumes that the r-g differential is not negatively affected by the higher primary surplus. If p'' > p' > 0, then (d+z) > 0 or d > -z, thus leaving little or no space for debt-financed public investment. Countries seeking for precautionary reasons a lower debt level than the cap, face the same transition pain as countries with b" above b'.

Countries within a r > g scenario and a high debt level b" > b' have two options. Option F maintains the high b" and option G reduces it toward a level seen as "safe" or somehow believed to be "sustainable", i.e. b' (this corresponds to the sustainability indicators S2 and S1 of EU Commission). In F, the budget balance necessary to maintain the debt level is d' = (p'- z) < 0. Assuming b' is 100 percent and g and r again 3.0 and 4.0 percent, respectively, the primary balance p' would have to be a 1.0 pp surplus, and for the average budget balance we obtain -3.0 percent. In option G, during the painful transition to b'=0.6 we would have to run a higher primary surplus p'' of, say, 2.0 instead of 1.0 percent. This leads to a transitory budget balance of -2.0 percent despite a primary surplus of 2.0 percent; at the end of the transition, the sustainable budget balance would be slightly smaller at -1.8 percent, but the primary balance would be stabilised at 0.6 percent, as shown in the above paragraph. The costs of a persistent higher b" compared to b' (i.e. 100 rather than 60 percent) would be 1.4 percent of GDP for ever, due to the higher primary surplus, but the costs of the transition are 1 pp of GDP due to the higher primary surplus compared to maintaining 100 percent debt. The key requirement for the transition is, again, that the higher p does not affect r and g negatively.

How about a *balanced budget rule* in the framework of a r > g scenario? If the long-term budget balance d' is zero, allowing for precisely symmetric cyclical deviations (here in absolute values), the primary balance would match the interest payments: if d = 0, then p = z. If g > 0 and r > g, the debt level would trend to zero. For a zero-nominal-growth-

[9] The OECD has 36 members of which 33 are advanced countries (2019). Only 5 of these are not EU members.

economy the balanced-budget rule is however sensible and sustainable in the sense of a constant debt ratio. Hence a cyclically balanced budget rule, excluding structural deficits, is under the condition of positive nominal growth "sustainable" but lacks any economic justification. It is blunt prohibition of credit for public finance à la Buchanan.

Apart from the scenarios discussed so far, we have added a r > g regime (scenario E) targeting at b' with 80 percent of GDP. 80 percent is in 2018 close to the debt level of France and the average of the Euro area. Furthermore, we added a scenario D with a debt target of 40 percent which might be implicit in Germany's fiscal policy strategy, looking for a large "safety space" far below the 60 percent cap, supposedly preparing for the demographic transition to rapid aging in the next decades.[10]

Table 7.1: Alternative fiscal policy trajectories

Scenario	r- g regime	b'	g	r	r-g	z	p'	average d'
		exog.	exog.	exog.	exog.	rb'	(r-g)b'	d'= p'-z
A	r < g	0.6	0.4	3.0	-1.0	1.8	-0.6	-2.4
B	r < g	0.6	2.5	1.5	-1.0	0.9	-0.6	-1.5
C	r = g	0.6	3.5	3.5	0	2.1	0	-2.1
D	r > g at b'	0.6	3.0	4.0	1.0	2.4	0.6	-1.8
E	r > g at b'	0.4	3.0	4.0	1.0	1.6	0.4	-1.2
F	r > g	0.8	3.0	4.0	1.0	3.2	0.8	-2.4
G	r > g at b'' > b'	1.0	3.0	4.0	1.0	4.0	1.0	-3.0
H	transition b_0 to b'	b'' = 1.0 to b' = 0.6	3.0	4.0	1.0	4.0	2.0	-2.0
		endog.	exog.	exog.	exog.	endog.	endog.	exog.
I	r > g, balanced budget norm 10 years, converging to	$b_0 = 0.6$ $b_{10} = 0.441$ $b_\infty = 0$	3.0	4.0	1.0	2.4 -> 1.8	-2.4 -> 1.8	0.0
J	r > g , d = -0.5% in 10 years, converging to	$b_0 = 0{,}6$ $b_{10} = 48.5$ $b_\infty = 0.167$	3.0	4.0	1.0	2.4 -> 2.0	1.9 -> 1.4	-0.5
K	r > g d = -1.0% over 10 years, converging to	$b_0 = 0.6$ $b_{10} = 0.528$ $b_\infty = 0.333$	3.0	4.0	1.0	2.4 -> 1.33	1.4 -> 0.33	-1.0
L	r > g	$b_0 = b_\infty =$ 0.67	3.0	4.0	1.0	2.7	0.67	-2.0

Source: own calculations. Note: z is the interest payments on debt at the prevailing interest rate which may differ from the implicit rate on debt.

[10] In the German Federal Ministry of Finance such considerations have been discussed below the level of offcial announcements. The German GCEA (2007) also seemed to prefer a debt target of 40 percent, but not expressed explicitly (p. 73).

In the first part of table 7.1, scenarios A-H use b' as an exogenous norm. In part I-L we have used average budget balances as a norm with floors at -0.5 and -1.0 percent of GDP following the present framework of the Fiscal Compact and the present rulebook of the European Commission. Scenario L reduces the overall budget balance to -2.0 percent, allowing a considerable golden rule for public investment, and leads eventually to a stable debt ratio of 67 percent. In scenario I, we simulate a balanced budget norm with the same assumptions as in the other r < g scenarios. Starting at the 60 percent debt ratio, debt would drop to 44 percent after 10 years, heading for zero asymptoticly (à la Buchanan). With a budget balance of d' = -0.5 (-1.0) percent after 10 years the budget level would stand at 48.5 or 52.8 percent, respectively, moving to fall further though not to zero. We see that the 60 percent margin is not stable in scenarios I, J and K but converge to very low levels without economic justification.

This implies that the debt and deficit rules in the EU rulebook are not consistent. Countries are free to favour a debt level far below b' (remember that Ostry et al. 2015 had argued it would be a senseless and costly over-insurance), and countries that go for b' = 0.6 should be allowed to run sustainable d' and p', i.e. d' = - 1.8 and p' = 0.6 as shown in scenario C. Of all scenarios discussed, it is clear that A and B (with a lower interest rate) are more favourable than C and C is more advantageous than D. Within the scenarios in the r > g regime, it remains open whether maintaining high legacy debt (G) is superior to transiting to the b' = 0.6 scenario (H).

So far, our analysis of the r-g differential evolved simply from national accounting identities. Causalities and interdependencies have not been analysed, as if g and r were both exogenous and disconnected. This caveat will be addressed in the next section.

7.2 Interest and growth rates – interdependent and endogenous

The key variables relevant for primary balances are the legacy debt from former times, i.e. b_0 in our equations, and the r-g differential, thus the determinants of r and of g. The traditional notion is that low real interest rates have a positive impact on fixed investment, hence on embodied technical progress and thus real growth, and with constant inflation they impact also nominal interest rates and nominal growth. This relationship works both through the demand and the supply side of fixed investment. We focus now first on r, then on determinants of g.

The nominal interest rate on public debt is normally a mix of short-term and long-term interest rates, often more tilted to the long-term. If government securities are considered risk-free, interest rates on sovereign bonds are lower than on corporate bonds. Nominal interest rates on sovereign bonds depend on five groups of determinants if we constrain the analysis to debt in own currency, typical for advanced countries:[11]

a) inflation and inflation expectations

b) the supply side of sovereign bonds markets:

- central banks' monetary policy, including policy for financial system stability; the type of open market policy (outright purchases, repurchase agreements, outright purchases or medium-term maturity bonds (QE), depreciation risks and exchange rate policy, holding of non-traded bonds;
- the size of the bonds market which determines its liquidity (integration of national bonds markets)
- in the case of a monetary union, the redenomination risk and related exit risk of members, including contagion risks[12];
- central banks' capacity to avert speculative attacks or mitigate rollover risks;

c) the demand side of sovereign bonds market:

- domestic and international demand for sovereign bonds, normally considered a safe asset; this includes the role of a currency as a global or only regional/national currency, but also the degree of risk-averseness of financial investors
- administrative demand for government bonds (social security institutions, state-owned banks, non-banks, type of open-market policy of central banks)

d) country specific risks

- such as spreads against other bonds, perception of rollover and default risks, country ratings and their perception by central banks
- the role of legacy debt from former times and country-specific policies to cope with them
- growth trend of countries

[11] At this juncture, we do not resume the debates on natural interest rates in a Neo-Wicksellian context or optimal growth rates tending to r = g in the framework of marginal productivity theory (Brand et al. 2018 and von Weizsäcker/Krämer 2019). See also the Keynesian critique of these approaches by Palley 2018.

[12] Since exit from the Euro system could lead to the break-down of the currency union, this risk includes depreciation and appreciation expectations in the case of return to national currencies. Such expectations feed into long-term bonds rates.

e) tax policy: taxation of income from bonds (income tax, capital gains tax, tax-exemption rules) which impacts net costs of public debt; debt management

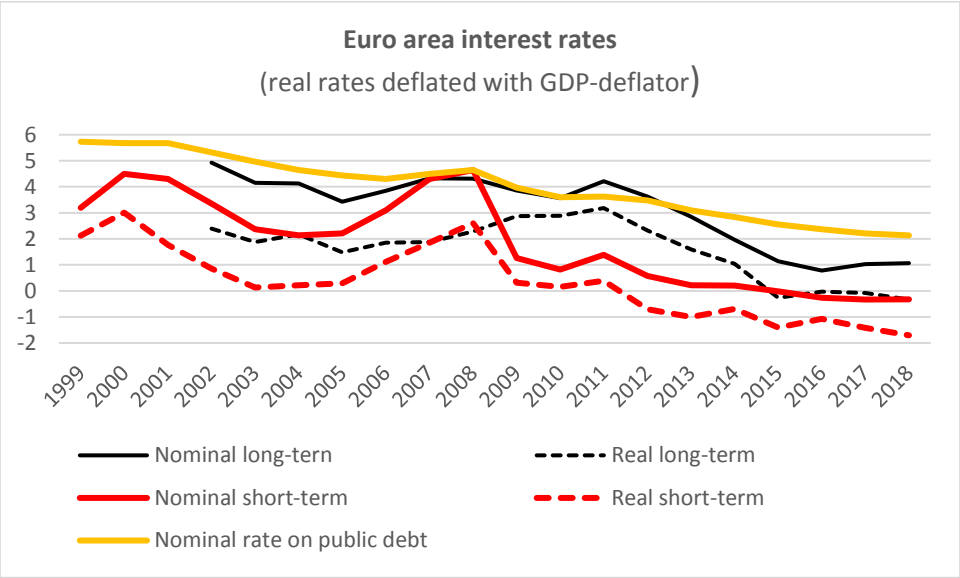
For the Euro area, it seems obvious that the fragmented bonds market alongside the borders of 19 member states is a barrier to higher liquidity and to uniform and transparent risk. In the same vein, the loss of national central banks with the capacity to avoid default has led to a void, which is widened by the lack of a central treasury in the Euro area. Hence there is a vulnerability to default due to the loss of a national LoLR or a similar stabilizing mechanism. The European Stability Mechanism can fill the gap only partially. This implies higher rollover risks for weaker countries compared to countries with a stand-alone currency.

A genuine capital market union would benefit from a unification of bond markets with risk-free bonds which are attractive to international investors. This would lead to the internationalisation of the Euro towards a global reserve currency. It would require not only a common currency and common central bank but also a common treasury backing the central bank and the market for Euro-denominated sovereign bonds. Abandoning re-denomination risks in the EMU by making sovereign bonds safe and granting LoLR-service to governments is probably the most important measure to reduce interest rates on public debt and make the r-g differential more favourable.

A quick look at interest rates in the Euro area shows the trend to falling nominal and real rates, both short- and long-term rates (figure 7.1). Interest rates on public debt tend to lie between short- and long-term rates, but it takes long until new rates feed into the average of interest paid on the stock of debt which comprises old and new issuance of bonds with different maturities. In the Euro area, interest rates on public debt tend to fall in a long trend following the trend to lower inflation, but are still high compared to long-term actual rates.

If there is a negative inflation gap of almost 100 basis points in 2018, we might expect in the future 2.0 to 2.5 percent nominal long-term rates (instead of 1.0 percent in 2018) and correspondingly higher nominal growth. This could lead to slightly negative r-g differentials or r = g scenarios, at least much more favourable than in the past. Such trends would not exclude higher or lower rates in boom or recession phases, respectively. The yield curve shows always temporary hikes mainly of the nominal short-term rate in inflationary phases. A key problem in EMU is that there are marked differences among member states regarding interest rates on public debt despite common short-term rates.

Figure 7.1



Source: AMECO

Now we turn to the key determinants of long-run nominal growth, seen in the fiscal policy context. The standard determinants can be summarised in four broad groups:

a) potential output growth (supply side)

- technical progress with product and process innovations, traditionally embodied in capital goods, innovative intangibles
- human capital improvement
- infrastructure with positive externalities
- increase of employment (less unemployment, population growth, higher participation rates)
- capital accumulation, i.e. the share of fixed investment in GDP

b) aggregate demand growth

- small or no negative output gaps, counter-cyclical fiscal policy with built-in stabilisers and discretionary fiscal policy

c) income distribution that allows balancing consumption and investment with a balanced current account and limits potentially inflationary distribution-conflicts.

d) avoidance of institutional mis-regulation that hampers growth and employment, aggravates negative external effects or triggers financial risks.

Government policies are involved in all four groups, especially innovation and/or industrial policies, fiscal stabilisation, promotion of education and other infrastructure-related "state capital" and "social capital". The main avenues in the EMU to improve growth by

fiscal policy action are simple: avoiding procyclical fiscal policy, no tolerance with negative output gaps, defining potential output as the output at target inflation, therefore changing the measurement of OG as this tends to under-estimate negative OG and to over-estimate positive OG; allow the golden rule for public investment, at least those seen as critical for growth. In other words, targeting growth and employment with the means of fiscal policy and giving the debt level less priority.

Clarifying the true fiscal stance of member states is paramount. Normally, only an increase (decrease) in the structural primary balances is considered contractionary (expansionary). Once the level of the intended primary balance is reached, it is considered neutral (cp. Claeys 2017, see also European Fiscal Board 2016, p. 90). However, the evidence that few countries run high primary surpluses over longer periods is telling. The first contractionary impulse results indeed from an increase in the primary balance: tax revenues are – to a higher degree than before – transferred to bondholders rather than used as primary outlays, presumably mainly for demanding domestic goods or services; this causes a negative effect on aggregate demand if bondholders have a marginal propensity to consume < 1 (for consumption of domestic goods) and do not invest the coupons received in fixed investment domestically. This is very likely to happen, even more if a large share of bondholders are not residents. If primary surpluses are maintained, the contractionary effects continue (subdued aggregate demand), but are not increasing (similar to high but not increasing real interest rates in monetary policy). In other words, the level of aggregate demand for domestic output is reduced, i.e. a one-off level effect occurs, if the primary structural balance rises, and the reduced level of aggregate demand is maintained as long as the primary surplus is maintained, everything else constant.

This argument holds if a higher continuous primary balance is paid by sacrificing primary spending. But does this hold also if the increase of the primary balance is paid with higher taxes or fees? It is not clear whether it has contractionary effects, neither in the moment of the increase nor afterwards when the elevated primary balance is maintained. Taxpayers lose disposable income which they would have spent for consumption or investment to a certain extent which is likely less than the additional tax. If the government uses the additional revenue to pay for interest service, creditors get the same amount back. The potential contractionary or neutral effect depends on the share of foreign bondholders, the tax rate on coupons for resident bondholders and their marginal propensity to spend the net revenue. It is likely that the short-term and also the long-term

effect on aggregate demand is close to zero (unless there is a high share of foreign bondholders). Hence, the demand-side effect of increased primary balances depends very much on whether primary spending is sacrificed or resident bondholders' disposable income when additional taxes have to be paid. Much depends on the kind of taxation and who is taxed. This proposition is in contrast to Alesina, Favero and Giavazzi (2019) who hold that austerity is expansionary if expenditure is curtailed and not when taxes are increased.[13]

If the private sector flourishes with buoyant growth, the contractionary effect of the primary balance increase can be neutralised or more than offset. If this is not the case, the economy is at risk of *self-defeating austerity*: the primary balance rises, growth falters. What is gained with p, is lost with a higher r-g differential. If our propositions are correct, then we would have to face a certain degree of continuously subdued aggregate demand the higher the debt ratio with corresponding positive primary balances, facilitated with spending cuts rather than higher taxes. This a Keynesian demand-side argument against high debt ratios; it needs further research for robust evidence.

The interdependence between r and g runs in both directions. Low real interest rates tend to support real growth, to a smaller extent at the zero-lower bound; the causality is more pronounced with high real interest rates which have the capacity to kill business cycle upswings. The flatter the Phillips-curve, the less tightening of monetary policy is necessary close to full employment so that nominal interest rates may remain below nominal growth. In recessions or depressions, the r-g differential is highly positive also in countries with a r < g trend.

Interest rates have also a bearing on exchange rates and hence on net exports, also directly on consumption in many though not all countries. In sum, there are many channels how real and nominal interest rates can influence nominal and real growth, mostly in inverse relation.

Continued high growth close to full capacity and full employment with moderate inflation, apart from some limited inflation tolerance, furthers a negative r-g differential and tends to improve the country ratings of rating agencies which would dampen interest rates.

[13] The authors' main models of asserted success are Ireland and UK, the former a tax haven for attracting foreign direct investment, the latter a financial hub for multinational banks, both certainly not representative models.

7.3 Sovereign and private debt dynamics

The usual focus of all concepts of debt sustainability is the narrow view on sovereign debt, ignoring the macroeconomic environment of fiscal policy. However, the sovereign debt trajectory is different when there is a buoyant private sector or a sluggish one. In the former, the interest-growth differential is favourable for the prospect of reducing the public debt ratio. The private sector is incurring new debt, for investment and/or consumption, and tends to run a sectoral saving deficit (or less surplus), i.e. excess of spending over saving. This raises aggregate income and tax revenues, the higher the elasticity of revenues with respect to income growth. In turn, this lifts the primary balance of the government sector and allows the overall deficit to shrink, thus debt is falling relative to GDP. A typical private sector upswing comes from external demand (real devaluation or rising growth of export markets, or a modernisation of the domestic private capital stock with an investment boom). Employment and/or wages tend to rise in such episodes.

The government sector's surplus (or reduced deficit) is matched by the private sector's deficit, so that the aggregate budget balance, the sum of the two sectoral balances, is zero – as in a closed economy or an open one with an external balance of zero. The improved primary balance of the government sector is then not the result of discretionary fiscal austerity, i.e. raising tax rates or cutting expenditure. As long as there is no inflation risk and still unemployment, discretionary expansionary fiscal policy can even improve the overall macroeconomic upswing with an improved interest-growth differential and a fiscal multiplier above 1. What looks at first glance like a *temporary* cyclical improvement of the budget deficit as well as the primary deficit, may turn out in the end as – at least partly – *permanent*, especially if the subsequent cyclical slowdown remains mild and short. This way the seemingly temporary improvement dominates the temporary aggravation, so that a long-term "structural" improvement materialises with lower debt. Vice versa if the downward phases predominate, exacerbated by discretionary fiscal austerity geared to shrink the structural primary deficit or twisting it into a surplus.

If both the private and the government sectors attempt to deleverage simultaneously by reducing their sectoral budget deficits (or raising their primary surpluses), the economy might turn to deflationary risks, less growth, aggravated interest-growth differential and external surplus (due to reduced imports and concomitant capital exports). This is a path of self-defeating fiscal policy, geared to achieve debt sustainability but doomed to

raise the debt ratio – an example of the saving paradox (cp. Koo 2009, Fatás/Summers 2015). The gist of the matter is that the success of fiscal austerity which intends to shrink primary deficits or achieve primary surpluses, depends on the state of the private sector. The latter's situation should not only be considered as a mere cyclical issue, since economic history shows that there are extended episodes of semi-stagnation or episodes of private debt overhang where paying back old debt, hence deleveraging, has priority over incurring new debt. If in such a state of the private sector the government sector deleverages as well for the sake of alleged "debt sustainability", economic pain, i.e. loss of welfare, is maximised.

7.4 Budget balance and current account balance – twins

The overall budget balance has an effect on the current account balance. The starting point for the analysis is the following National Accounting identity. Private saving, both households and firms, in a specific period is equal to private fixed investment, the budget deficit G-T and the trade balance with exports and imports of goods and services (equation 11). Assuming that private saving and G as well as T include primary or secondary net savings from abroad, the trade balance mutates into the current account balance CAB. The budget balance T-G can be understood as government net saving S_g, as shown in (11a). Solving for CAB leads to (12), in which the domestic CAB is the mirror image of the CAB* of the rest of the world, i.e. saving minus investment abroad (denoted with *), but with a negative sign since the sum of both current account balances has to be zero. In (12a) we have all variables in lower case letters – investment as inv – as a share of GNI (if GDP is used then we would have to assume that the primary and secondary income balance in the current account sum up to zero).

(11) $S_p = I_p + G\text{-}T + X\text{-}M$

(11a) $S_g + S_p = I + CAB$

(12) $S_g + S_p - I_p = CAB = - CAB^* = - (S^*_g + S^*_p - I^*_p)$

(12a) $d + s_p - inv_p = cab = - (d^* + s^*p - I^*_p)$

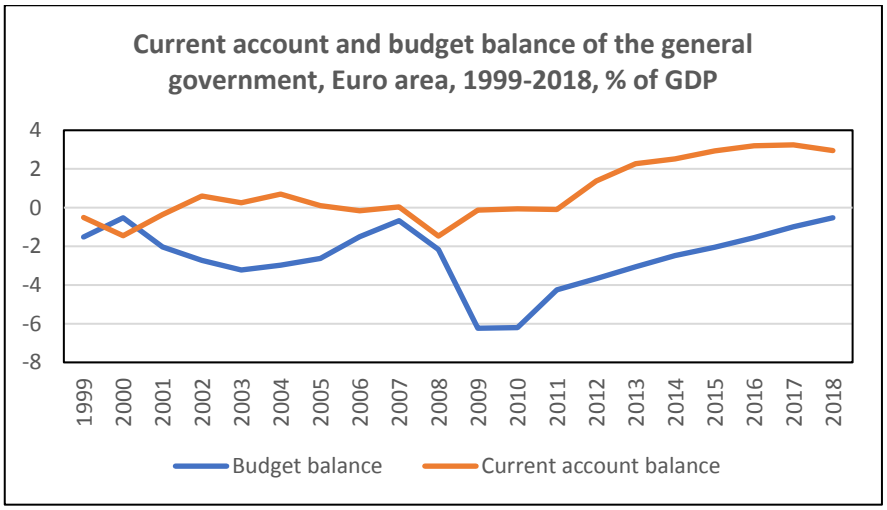
(12b) $d = cab = - cab^*$

Assuming – only for simplicity – that private saving and investment cancel out, the budget balance equals the current account. We obtain twin deficits or surpluses. Equation (12a) excludes all other determinants of the current accounts (or takes them as given),

such as exchange rates, interest rate differentials, growth rates etc. Since the budget balance is strongly influenced by domestic policies, and the rest of the world comprises some 200 or so current accounts of other countries, it can be assumed that there is some causality from d to cab, but also reverse causality from cab* to d may occur. Of course, many more combinations of d and s_p are possible rather than only twin balances.

For instance, after the financial crisis of 2008-10 the EMU current account turned into surplus, mainly due to private surpluses, but also budget balances rose in twin-mode (figure 7.2). Before the crisis, domestic-demand driven budget deficits prevailed, more than compensated by private savings thus leading to a small external surplus. Often the size of the current account balance and the budget balance differ. Huge current account imbalances result mostly from double or triple sectoral imbalances, e.g. concurrent surpluses from households, firms and the government, and vice versa in deficit countries. Reducing current account imbalances is difficult, since private imbalances are not easily influenGCEAble so that budget balances should contribute to preventing severe external imbalances. Especially in a currency union like the EMU without nominal exchange rates and without fiscal federalism, external equilibria of member states should have high priority and require policy rules.

Figure 7.2



Source: AMECO

7.5 Deficit spending for public investment – the "golden rule"

Most macroeconomic concepts for debt sustainability do not care about the usage of fiscal deficits, i.e. the type of spending. If this usage has a bearing on the public capital

stock which is in part complementary to the private capital stock, it matters for the interest-growth nexus and the debt ratio whether debt is used "productively" in the sense of having positive external effects on aggregate growth and technical progress. Domar emphasised this in 1944: "… the problem of the burden of debt is essentially a problem of achieving a growing national income." (Domar 1944, p. 9) and repeated it almost half a century later: "… the proper solution of the debt problem lies not in tying ourselves into a financial straight-jacket, but in achieving faster growth of the GNP…" (Domar 1993, p. 478) This follows on the one hand out of the microeconomic conventional object-oriented concept of public debt, similar or identical to the "golden rule" of public finance: credit financing only for public investment or similar types of expenditure. On the other hand, it is a modernised Keynesian concept promoting deficit-financed spending in the case of a lack of aggregate demand, now combined with structural deficits for growth-enhancing expenditure. Akin to the concept is Keynes's and others' "capital budgeting", meaning the balanced budget rule for current (consumptive) expenditure, debt for fixed investment or non-current expenditure. This can in principle be combined with a cyclically balanced budget. In a more sophisticated version one could concentrate on only net investment (depreciation being tax-financed) or spending for special categories considered growth-enhancing, like research and development or higher education (see for a discussion of different forms of "golden rules" GCEA 2007).

For the sake of simplicity, let us assume we have a concept how to identify productive government spending which can be called public investment, no matter whether in terms of National Accounting or in a more sophisticated concept. Therefore, it matters for long-term output growth whether a primary deficit is used for public investment, or whether a persistent primary surplus reduces public investment. In both cases, the usage of the primary balance is a relevant determinant of growth and hence the inflation-growth differential. There are good micro- and macroeconomic reasons for debt-financed public investment, grounded in intertemporal distribution of the costs for public capital and in smoothing spending and taxes over time (Musgrave 1939, Truger 2016) and in various growth theories.

Even if public investment in the definition of National Accounting cannot necessarily be considered as more productive than consumptive expenditure, it can make sense to prefer debt-financing to tax-financing if it is implemented in a non-inflationary manner. This implies that for the aim of fair intertemporal distribution of the burden of costs, the

costs of public investment could be smoothed and distributed over time, and thus taxes as well. If full-employment output were given, hence debt-financing would exceed potential output leading to inflation, then other spending has to be curtailed or taxes must be raised. The bottom line is that funding current expenditure, hence public consumption, permanently with debt rather than taxes – no matter how productive – is not a sensible policy even if current spending has strong innovative potential for growth.

If only net public investment is supposed to be debt-financed, hence replacement investments by depreciation and therefore by taxes, two aspects have to be considered:

First, new investment in contrast to replacement must be measurable which is difficult in practice since it requires measurement of the lifespan of public capital and distinguishing maintenance from replacement costs and innovative investment from pure replacement. Normally, replacement incorporates better technology and innovative knowledge so that replacement is partly also net investment. Simple calculative measurement may overvalue replacement investments and undervalue net investment. Focussing on net investments as candidates for the "golden rule" of debt-financed public investment would then require looking on the net capital stock of government which can be as misleading as using the gross capital stock even it is still in use (cp. Dullien/Rietzler 2019). Furthermore, neglect of replacement investments may increase maintenance costs which are counted as current expenditure.

Second, public (as well as private) investment evolves often in bouts of high reinvestment surges and subsequent moderate periods, and similarly with net investments. Long waves of investment cycles prevail, and waves of innovation may require waves of innovative infrastructural investments. Strict tax financing of replacement investments would contradict the postulates of tax smoothing and intergenerational equity. Therefore, the golden rule might apply at times also to gross public investment. This would imply that discretionary decision on tax or debt-financing can be recommendable rather than rigid rules which does not fit all circumstances. Such considerations could perhaps justify certain debt targets – temporarily higher debt ratios, followed by lower ones, however, in the framework of specific r-g scenarios. Examples may be reconstruction periods after World War II in Europe, let alone periods of war, or modernisation periods in Eastern European countries after the demise of socialism, or new infrastructure needs for ecological or digital transition which involve both the modernisation of the old state-capital stock as well as the addition of new vintages. Constraining structural deficits usable for

investment, be it replacement or net investment, to events like disasters, severe economic crises, events beyond the control of governments (as in the EU fiscal rules) misses the evolutionary perspective.

Yet, if debt financed public investment, net or gross or something in between, is sensible in principle, a higher gross debt to GDP ratio is sensible as well, but requires permanently a higher primary balance (in r > g regimes) if the debt level is to be kept stable in order to finance the increased interest service. Let us take the example of a strongly needed additional infrastructure over a certain period which would be debt-financed according to the golden-rule. We start with a 60 percent b' as in trajectory D with r > g by 1 pp in table 7.1. The structural deficit in D allows public investment up to 1.8 percent of GDP. Now we increase debt to 80 percent of GDP with strong investment dynamics, and keep it then stable (or return to a lower debt level). In D, the sustainable p' and d' are 0.6 and -1.8 percent, respectively, in F the primary surplus increases to 0.8 percent, and the deficit to 2.4 percent. The deficit is needed to pay the increase of interest payments (z) from 2.4 to 3.2 percent of GDP, given the numerical assumptions used in table 7.1. The costs of the increased golden rule is visible, but we have assumed no increase in growth for simplicity. The alternative option would be tax-financing with a strong but temporary increase in taxes (or with spending cuts) without burden-sharing with future generations. In other words, a substantial golden rule requires higher budget deficits than otherwise, meaning a higher permanent debt level and higher interest burden. However, the higher debt level can be kept stable. Opting for 1-2 pp of GDP for a golden rule is consistent with debt ratios of 33 and 67 percent, respectively, under a r-g differential of 1 pp (scenarios K and L in table 7.1). It becomes clear that the structural balance norms of the EU rulebook are stock-flow-inconsistent (cp. Bofinger 2019).

Of course, if r were exceeded by g, there is much more scope for debt financed public investment at the same debt level as before. Permanently debt financed public investment, unscathed in recessions or slow growth episodes, would be a support to automatic stabilisers, rather than an automatic destabiliser which it often is in reality, when cutting public investment is given priority to contain budget deficits or achieve primary surplus (also criticised by Ostry et al. 2010).

Concepts of optimal debt focus on the public capital stock, hence on *net debt*. If investment-oriented deficit rule with a limitation to net debt is implemented, the stock-flow consistent benchmark would be net debt, so that net investments would increase the

public capital stock. The debt-financed net investment is compatible with a stable public balance of assets and liabilities. One of the problems is measuring depreciation and the net capital stock of the general government. Focusing only on net investment without considering the net debt ratio is incomplete and raises doubts whether depreciation and hence net investment can be measured properly. We cannot delve deeper in this debate here (cp. Chowdheri/Islam 2010).

The German GCEA proposed in 2007 a golden rule for net investments, at the time of a size of 1.0-1.45 percent of GDP, roundabout half-half for the central and local governments (German Länder including local governments), combined with a cyclically balanced budget rule and an option for discretionary fiscal policy in cases of severe recession. The proposal was implemented in a watered-down version in the German Constitution in 2009, with a maximum structural deficit of only 0.35 percent in the federal budget and balanced budget rules (including a cyclical component for built-in stabilisers) for Germany's 16 Länder. The GCEA argued vocally that strictly balanced budget concepts would lack any economic reasoning and resemble prohibition of credit for individuals and firms (GCEA 2007, p. 1).

The golden rule for public investment could also be implemented in a reduced form within the present fiscal policy framework of the EMU (cp. Hüther 2019). Regarding the Stability and Growth Pact and the Fiscal Compact, they apply to "General Government" which is the central and local government as well as social security institutions. "Government" includes funds, enterprises and other institutions which are considered "non-market-producers" according to the main criterion of having less than 50 percent of the turnover from markets; hence, public- or semi-public funds and enterprises with more than 50 percent turnover from markets are considered "market producers", and are – as public corporations – entitled to incur debt (a few other criteria have to be met too, especially being an "institutional unit" under the control of the government (Eurostat 2019, p. 11ff. and 21). Such institutions could finance a special part of public goods which generate sufficient income to pass the 50 percent market-test (Eurostat 2019). If such semi-public market-producers incur debt and finance interest partially with current fiscal contributions from the core public budget, one could call this debt "semi-public debt". Whether continuous rollover of debt is possible for such institutions is not clear. For credit-financing of pure public investment without market-based sales this type of golden rule is not usable. Proponents of a National Wealth Fund for a broad set of public infrastructure projects

hold that debt-funding would not violate the 60 percent debt rule and the Fiscal Compact. However, if the debt service or other current costs require tax revenues it is questionable whether such projects are compatible with European laws (cp. Boysen-Hochgrefe/Fiedler 2019).

The deficit and debt rules of the EU are inconsistent regarding debt-financing of investment according to the golden rule and debt-financed financial transactions such as purchases of financial assets. In the EMU fiscal rulebook, the latter are possible irrespective of the debt level since debt and assets increase. If debt-financed public net investment increases and raises the public capital stock, it can only be debt financed to the narrow margin of 0.5 or 1.0 percent of GDP – when debt is below 60 percent – for structural deficits. Hence, a public balance sheet extension – assets and liabilities rise in tandem – can only be done with financial assets, and this without limitations, but is strongly restricted regarding the public capital stock. From this angle the EU regulation functions as a brake for public investment (cp. Truger 2019 for the case of Germany). Moreover, the brake is harder for countries with high debt which are normally in stronger need of more and better infrastructure which might dampen their GDP growth and worsen their r-g differential.

The usual criticisms of golden rules for debt financing of public investments rest on four arguments: deficits are inflationary, crowd-out private investment and burden future generations with debt service. And: debt options give politicians the power to abuse for self-interest or partisan interest to the detriment of future generations. The third makes little sense because present and future generations benefit from these investments and should participate in costs, and they participate also as present and future creditors in receiving interest on debt (if ownership of bonds is passed on to the next generation). If the golden rule applies permanently as a structural deficit, i.e. not only in periods of negative output gaps, taxes need to be lower (or current spending less) than under a regime of fully tax-financed public investment so that inflationary risks can, in principle, be avoided. However, crowding-out of private investment in a specific sense can occur in periods of rising infrastructural needs requiring a higher share of public spending as a share of GDP. In this transition period, a smaller share of private spending (investment and consumption) under full-employment conditions is needed. Avoiding inflation requires under such circumstances higher taxation and/or appreciation of the currency (typically in the late 1960s until the late 1970s in the U.S., Germany and in other European

countries when spiralling inflation was not prevented).[14] If inflationary impulses can be avoided, there is no reason for higher nominal or real interest rates. Eventually the three arguments against the golden rule collapse, and only the fourth argument remains, rooted in public choice theory. That is based on political economy reasoning; hence it wilfully abstains from giving an economic justification for not using debt for public investment; the economic reasoning is replaced by political reasoning with sweeping criticism of politicians (cp. Feld/Reuter 2019).

7.6 Fiscal policy against inflation and deflation

The ECB targets the overall inflation rate in EMU and cannot pay attention to deviations in member states. Since national central banks have lost their function for national monetary policy, there seems to be no inflation control tool in case of inflation deviating from the target. This void can be filled in part by national fiscal policy if it targets the same inflation rate as the ECB or tolerates only small deviations (cp. Bofinger 2003). Therefore, fiscal policy at the member state level would follow an inflation reaction function so that too high inflation is countered with increased primary balances and vice versa in the case of lower inflation. Such a policy rule would coincide with stabilising output at potential output if the latter would imply target inflation. However, there is often a disconnect of output gaps and inflation. Then fighting inflation or deflation should have priority. This could mean that even at a positive budget balance tighter fiscal policy is warranted to fight against inflation. In the case of deflationary risks, hence inflation forecasts below target inflation, fiscal policy should be expansionary even if fiscal sustainability targets have to be breached. This way, fiscal policy in member states would follow some kind of adapted Taylor-rule (see below in more detail). Conflicts of goals may occur, especially if also the current account-related targets are added. Rules for priority in case of conflicts of goals are necessary. Strict rules tied to the 3 percent deficit-floor or to MTO which disregard inflation goals would have to be adjusted. One should have in mind the quest of the European Council in 1997 which is quite topical also in 2019 in times of persistent undershooting of the inflation target: "The European Council underlines the importance of safeguarding sound government finances as a means of strengthening the conditions for price stability and for strong sustainable growth conducive to

[14] The period after the German re-unification in the 1990s is a similar example, however not under full-employment conditions. A well-balanced financing of the unification costs with debt and taxes was missed.

employment creation. It is also necessary to ensure that national budgetary policies support stability oriented monetary policies." (European Council 1997)

Therefore, a monetary union needs common rules for deficits, above all contributing to preventing inflation and deflation, minimising output gaps and indirectly promoting inflation-free employment. Many have been accustomed to believe that only the central bank is in charge of inflation and carries the sole responsibility for inflation as well as deflation. This is true for the EMU as a whole, but does not apply for each member. Inflation rates differ, mainly for non-tradable goods and services, but even to some extent for tradeables. Tolerating higher inflation in some countries and subduing inflation below target has a bearing on the real interest rates and the transmission mechanism of monetary policy. The effectiveness of common monetary policy would be hampered. For these reasons, fiscal policy and also wage bargaining, to some extent influenced by governments, should have responsibility for price stability. The 3 percent rule for deficits in the Maastricht Treaty was mainly designed to prevent inflation in some member states with too high inflation.[15]

7.7 60 percent does not guarantee "debt sustainability"

Debt sustainability is understood by the EU Commission and other authors as no or low risk of sovereign debt default or synonymously as fiscal solvency, meaning "solvency of the state" or "no state bankruptcy". We reject this definition for six reasons.[16]

(1) If fiscal solvency and sustainability are used as synonyms, why this semantic redundancy? If the implicit meaning is that a certain debt threshold prevents debt default, we need robust empirical evidence and sound theoretical reasoning. Even if there were such an identifiable threshold that the probability of default rises (we have seen that this is not the case) it would very likely only be a necessary but not a sufficient condition because defaults can have other or several reasons. Since we never had sovereign debt defaults of central government debt since the end of World War II in advanced countries with own currency and indebted in this currency, the theory is without historical evidence.

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[15] This is also a response to the "Walters' critique" of the EMU. Walters, chief economic adviser to Margaret Thatcher, criticised the Euro project in the 1980s because common monetary policy would be hampered by diverse inflation rates in member countries. The critique was widely accepted, also by many Keynesians.

[16] To avoid misunderstandings, our analysis applies only to advanced countries with debt in own currency. Hence it excludes debates about sovereign debt restructuring of emerging economies as proposed prominently by Anne Krueger and the IMF in 2001 (see Rogoff/Zettelmeyer 2002).

The cases of Greece or Italy are specific because these states have a common currency; so, they are specific for vulnerability in a currency union. Iceland had a sovereign debt crisis (2007-2011) but was indebted in foreign currency.

(2) Second, government or "state insolvency" analogous to insolvency of corporations is not a sensible idea. Corporations pass away if the debt exceeds equity (cp. Schmidt 2014 and Lindner 2019). States do not have equity in their balance sheets. Instead they are endowed with the power to tax citizens. If there is a risk, that governments cannot serve their debt or cannot rollover their debt at affordable interest rates, normally a liquidity crisis occurs which requires a full-fledged LoLR. Since this function of national central banks is abandoned, the ECB should take over this task or other supranational institutions. If a country loses access to bond markets, whatever the reasons are, it needs support from supranational institutions. In principle, this cannot be ruled out even if debt ratios are initially low. Shocks in the financial sector, asymmetric or symmetric ones, can hit vulnerable countries more than robust ones. Vulnerability may have many reasons and cannot be overcome by having debt below the 60 percent cap (see Ireland and Spain before the global financial crisis). One specific cause of vulnerability is the lack of a national central bank. This institutional void cannot be closed by the 60 percent rule but needs action from the side of the ECB or other institutions like the ESM.

(3) The costs of having low debt ratios, clearly below 60 percent, for having wide leeway in case of future financial crises, catastrophes or natural disasters, may in case of emergency not be efficient to cope with these problems, hence an insufficient and very costly insurance. More specific pre-emptive regulations especially regarding banking crises and subsequent depressions are much more important. In the EMU with heterogeneous members, rules for practicing solidarity are much more important. Risk-sharing involves mutual responsibilities. Yet, in the case of grand emergency discretionary action is necessary.

(4) Sovereign bonds in EMU should be safe assets in the sense that they are rated high, much above the margin of losing investment grade. Making them safe means reducing risks, especially rollover risks and redenomination risks. The former requires in most advanced countries various institutional arrangements, ranging from interventions on secondary bond markets to open-market policy of central banks prioritising outright purchases, Quantitative Easing or rules for social security funds to hold government bonds. The ECB and the other European institutions tend to rely primarily on the willingness of

bondholders, hence on financial markets. This abets uncertainty, subsequently the emergence of diverse expectations and multiple equilibria, optimistic and pessimistic ones. Prevention of uncertainty on sovereign bonds is key. Member states suffering from high interest rate spreads and higher costs of interest payments are exposed to redenomination risks. Such uncertainty may arise from various reasons, among others fears of discontent of citizens which might prefer exit.

(5) If there is no clear threshold for debt-to-GDP ratios which raises the risk of default, the meaning of debt sustainability is an empty phrase. If thresholds for debt are set arbitrarily, as apparently the case in the EMU in the early 1990s, the term debt sustainability is arbitrary as well (or has to be redefined). Theories on debt sustainability are diverse and not a robust basis for strict rules. The practice of the IMF in this regard is telling and prudent.

(6) Identifying the term debt sustainability with a certain uniform debt level, such as 60 percent, can distract attention from the main causes and problems of high debt and debt default or future potential hikes of debt.

Summing up, the 60 percent rule is not well justified by the wish to maintain "fiscal solvency" and by honouring this term with another not well-defined term such as "fiscal sustainability" or "fiscal discipline". If there is no such thing as a general margin for safe public debt, condensed in one number, then there is also no need to have the same margin in all member states irrespective of their heterogeneity.

7.8 Results

We summarise the main findings of this chapter in five points as follows.

(1) The role of r-g scenarios is of paramount importance. There is not only one game in town, namely the r > g scenario. There is ample evidence of countries benefitting from a negative r-g differential, most importantly the U.S.

(2) Keeping interest rates on public debt low helps to active a favourable r-g differential. The example of the U.S. is telling. Reduced interest rates in the foreseeable future make it realistic to reach close to a r = g regime.

(3) Country-specific debt and deficit caps incorporating the golden rule can help to better cope with high legacy debt without sacrificing growth.

(4) Fiscal rules should be made stock-flow consistent. Presently, they are not, on three counts: a) Once the debt cap is reached, structural deficits are targeted and debt

levels are treated as the endogenous result. This tends to lead to very low debt levels, under strict structural deficit rules even down to zero. There is no economic justification for very low debt levels and hence also no justification for balanced structural balances with a strict floor of -0.5 or -1.0 percent of GDP. b) Countries with debt above the 60 percent cap, are required to run sizable primary surpluses and low budget deficits (or surplus), which limits counter-cyclical space and leaves no or very little leeway for debt-financed public investment. It is more likely that the latter is crowded out. Such rules lock countries in a *debt hangover dilemma*. In order to reduce public debt, productive public investments is sacrificed. c) Sectoral flows have to be consistent on a macroeconomic level, so that public sector balances do not cause or increase on private and external sector imbalances. Over the years when flows are accumulating, stocks of public, private and external sector debt are connected.

(6) Coping with rollover risks: The biggest uncertainty regarding the rollover risk is the perception and behaviour of financial investors at bond markets. Instead of believing in the rationality of bondholders, institutional safeguards should reduce uncertainty and risks.

A *fiscal Taylor-rule* with four goals can summarise many of our proposals. A fiscal policy rule analogous to the Taylor-rule for monetary policy shows four targets for the deficit d:

(13) $d = \delta(p' - z) - \alpha(\pi - \pi') - \beta(\frac{Y-Y'}{Y'}) + \gamma(\frac{CAB-CAB'}{CAB'})$ condition: $d \geq d_{min}$

It should be forward-looking, hence forecasted or expected values should be used on the right-hand side of equation (13). The budget balance d (as a ratio to GDP) is aligned to four targets: the primary balance p' that is required to keep a targeted debt-to-GDP ratio stable, i.e. b' in the earlier equations, given the specific r-g differential that is foreseeable for the medium term. The interest payment on debt z (as a share of GDP) has to be added (since p + z = d by definition). δ would normally be 1 if the prevailing debt level is to be maintained but could be lowered if a higher debt level is targeted, for instance to finance a period of strong infrastructural demand, or raised if the debt level should be reduced. If the other three terms on the right side of equation (13) are of no concern and therefore zero, the budget balance would be the structural balance, i.e. cyclically adjusted. $\pi - \pi'$ is the inflation gap, Y-Y' the output gap and CAB-CAB' the current account gap with α, β and γ as the weights of each term ranging between zero and unity. Note, that even if the structural balance is zero, the inflation gap may be negative, hence

a lower budget balance is advisable. To what extent the budget balance should respond to imbalances regarding inflation, output and current account targets has to be decided by political discretion.

The fiscal Taylor-rule does not directly target a certain debt ratio but focuses on the deficit. The debt level is implicitly addressed in p' but should be set by the member states for the medium-term like "forward guidance" in monetary policy –as long as a European Treasury is absent. If d were interpreted as the average budget balance, a floor on d could be set at, say, -1.0 or -2.0 percent for a golden-rule. The eventual debt ratio would be dependent on the initial debt level and of course the r-g differential.

All EMU-countries could trend to 67 percent debt level if average growth were 3 percent and the average budget balance were 2.0 percent (scenario L in table 7.1). This way, a soft cap on b were built-in, but other parameters could be used as well. However, cyclical flexibility would require lower budget balances than -3 percent due to cyclical deficits. They might reach -5 percent, if 3 pp are needed for cyclical room to manoeuvre. In the Taylor-rule a floor on budget deficits is set at d_{min}. Yet, escape clauses are necessary for special circumstances. The golden rule is directly not addressed in equation (13). But targeting a certain debt level – 67 percent in our example – allows a 2.0 percent average budget balance, sufficient for the golden rule.

Can the budget deficit serve four targets at the same time? Probably not. There will be trade-offs, and all targets require several tools and coordinated action. Yet, due to the size and macroeconomic impact of the state budget in modern economies in Europe the budget balance plays a prominent role for all four targets. In order to gauge how much the fiscal balance can contribute certain goals, relative to other instruments, discretion is necessary. There is no robot function with an ideal Tinbergen-rule.

8. Summary and policy conclusions

We have searched for economic justifications for the Maastricht 3 and 60 percent rules for deficits and debt ratios. Both rules came in the late 1980s by incidence. For deficits it is perspicuous that same kind of rule or criteria should exist, even in countries with stand-alone currency. But which number? The 60 percent cap was interpreted as maintaining the then average debt ratio of the EU12 countries. This could be understood as targeting 60 percent, not as a cap. If 3 percent were understood as the average deficit, the 3/60 twin rule would make at least some sense if the nominal growth trend were 5

percent. Transposing this fairly simple logic – that in the years of the making the Maastricht Treaty did not really play a role – into the year 2019, one might conclude the following: the average debt ratio among EU19 countries – unweighted/weighted mean – was in 2018 around 75-85 percent, nominal growth trends came down to around 3 percent, hence average deficits could be 2.3-2.6 percent which would keep the debt level stable. If 1.8 or 2.0 average deficits were accepted, the debt level would slowly converge to 60 or 67 percent (cp. table 7.1, scenario L). It would even incorporate a golden rule for public investment. A rule of this kind would be stock-flow consistent, meaning targets for deficits and stocks of debt were congruent. However, the convergence to the 60 or 67 percent debt level would take long, and the question would remain: why these numbers? They are just a reminiscence to 1990, although incorporated in the Protocol 12 of the TFEU and in more detail in the secondary EU-law. We have not found sound economic justification for any fiscal debt target or cap, despite reviewing a large body of literature.

How about the fiscal balance? There is broad consensus, at least conceptually, that cyclical deficits are justified and even necessary to weather cyclical shocks of aggregate demand. The heaviest of such shocks in EU came with the financial crisis and had a magnitude of up to 6 pp change in nominal GDP requiring a fall in the budget balance by around 3 pp if discretionary counter-cyclical fiscal policy is excluded, hence only automatic stabilisers are accepted. With a budget semi-elasticity of 0.5, around 3 pp are needed for budget deficits (much more in other countries where discretionary measures are applied). Cyclical deficits vanish but do not necessarily turn into surplus if output is kept at potential and balanced structural balances were prescribed. The interest burden from cyclical phases of deviation from potential output have to be carried continuously, but this is not too heavy a burden since recessions are seldom. Allowing a golden rule for debt-financing of net or even gross public investment up to 2 percent would be consistent with a 60 or 67 percent debt level under plausible assumptions (cp. table 7.1). However, a 3 percent cap would be too narrow for cyclical additions to the structural deficit. A cap of 5 percent might be better.

In this respect, another key idea of the Maastricht-architects seems to have been forgotten: at the time, deficits were seen critical because they were suspected to be inflationary which would hamper the solidity of the common currency and undermine common monetary policy. Hence budget balances should be streamlined to curb national deviations from target inflation of the ECB. Therefore, even a small deficit or a budget

surplus would not be sufficiently tight to maintaining national price stability, absent national monetary policy.

In principle, we follow this simple and easily understandable rough guideline for fiscal policy reforms in EMU. We summarise the main conclusions in the following seven points, elaborated in more detail in chapter 7.

(1) The present EMU rulebook is not stock-flow consistent. The too small structural deficit caps of 0.5 and 1.0 percent are leading to extremely low debt ratios in the long run, require contractionary primary surpluses, allow a limited space for the golden rule and function as barriers to public investment and therefore to economic growth. We assume that infrastructure has a bearing on growth.

(2) The r-g differential is key for fiscal policy. The EU rulebook relies implicitly on the traditional scenario r > g. However, in the past decades there was diversity in the EMU and also diversity among other advanced countries. The most prominent country benefitting since many decades from g > r is the U.S., with a r-g differential of less than -2 pp on average since 1950 and around -0.6 since 1990, even if the latest years with low-interest-rate policy of the Fed is excluded. Both higher nominal growth and lower interest rates have contributed to this constellation. If the EMU would turn to more expansionary fiscal policy with promoting the golden rule for more public investment, if country-specific risks could be reduced by making all sovereign bonds safe and unifying the presently segmented European bond market and changing it into a global market, a r = g or even a g > r regime is possible, at least for the medium term. Even if the interest rates on public debt rise (from presently 2 percent average in EMU) to 3 percent, a r = g trend is more likely than a r > g trend. Lack of counter-cyclical fiscal policy due to too tight rules, reliance only on automatic stabilisers and mis-measurement of potential output have contributed to subdued growth with long spells of low growth and unemployment, especially after the financial crisis.

(3) Countries with a high legacy debt, stemming either from times before the Euro or from the financial crisis, should have the options to reduce their debt quickly or slowly or to carry the burden for a longer period (as in the S2 indicator of the EC for debt sustainability), following the example of Belgium. In order to do this, improving growth and lowering spreads due to rollover risks are needed. This way, fiscal management would be partly re-nationalised, absent an EMU-Treasury.

(4) Increasing the primary balance to reduce the debt ratio leads normally to a contractionary fiscal stance. This happens not only when increasing the primary balance but also when running continuously a primary surplus, especially when this is facilitated by cutting growth-relevant expenditure (cp. chapter 7.5). The case of self-defeating fiscal austerity is relevant in several EMU countries, in particular if growth of the private sector is weak.

(5) Justifying the 60 percent cap with "debt sustainability" is misleading. Equating debt sustainability with no or low risk of "fiscal insolvency" distracts from the most important factors that lead to risk premia on sovereign bonds or to debt default. In countries outside EMU spreads on high sovereign debt are small. In EMU, risks emerge mainly from the redenomination risk, i.e. fear of Euro-exit, or from a lack of a LoLR which exists in all countries with a stand-alone currency, indebted in own currency. The key issue is that the EMU-rules implicitly count on the financial markets to discipline member states' fiscal policy. Since bondholders are diverse and follow quite different and also changing risk attitudes, lack of support of countries with high debt make them – in this respect – worse-off than other countries with own currencies. Limiting the LoLR-function of the ECB or assigning it to the ESM in its present institutional setting, increases uncertainty, exposes countries to multiple equilibria, among them "bad" ones, and endangers the entire EMU. There are various ways how high-debt countries can be protected against the vagaries of financial investors if the ECB is considered having no proper mandate. A European Treasury assigned – among other tasks – to providing rollover-support for maturing sovereign debt would be of great help, but also other institutional arrangements are imaginable. Such support can be bound to mild conditionality as long as this is not reducing growth.

(6) The key ideas mentioned here are summarised in a fiscal Taylor-rule proposed in chapter 7. A key element of this rule is including the current account balance into the set of fiscal policy targets. Fiscal imbalances and external imbalances are most of the time twins, twin deficits or twin surpluses. Ignoring or tolerating current account imbalances is a key shortcoming the EMU economic governance.

(7) The present set of fiscal rules incorporates not only a contractionary bias, especially after the reforms of 2011, but also an anti-evolutionary bias. Strictly rule-based fiscal policy is a one-size-fits-all design. Problems differ in different historical episodes, and they differ across the now much more heterogenous spectrum of countries compared

to EU12. Hence, more flexibility and discretion are needed, besides basic rules. Too strict and inappropriate rules will likely not be enforGCEAble. Calling for sanctions does not render false rules to good ones. Countries exposed to more to asymmetric shocks need other rules, so do countries with high legacy debt or those with high current account surplus. Catching-up countries need higher public investment, and also countries facing new challenges like climate change policies. Finally, regime change in the relationship of r and g needs different rules. Much of the straitjacket-type of rules in EMU is caused by the lack of a common European government, in particular a treasury.

The simplest but very important first step to reforming the fiscal rules of the EMU is increasing the deficit limit for public investment, hence re-defining structural deficits and thus dethrone the 60 percent cap as the main target from which the other targets, especially the MTOs, are derived. Furthermore, better techniques to estimate potential output and output gaps would help preventing under-estimation of negative output gaps and over-estimating positive ones. This is key for improved counter-cyclical fiscal policy.

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