Fiscal Sustainability and Financial Stability

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Abstract

The paper[1] focuses on how, as the two-way interaction between the financial sector and the government sector grows, so does the dependence between financial stability and fiscal stability. High creditworthiness in government debt represents both a significant source of certainty for the financial system and a solid basis for the pricing of assets through the supply of *risk-free* government bonds. Given the risk of a downward spiral developing between the two sectors, it is vital, in the interests of financial stability, to monitor fiscal stability in order to put a timely regulatory *block* on excessive interaction. This paper illustrates that when assessing sovereign risk on the balance sheets of domestic financial institutions, one needs to consider the dependence of debt sustainability not only on the size of the debt in relation to GDP, but also on the macroeconomic conditions affecting interest rates and economic growth. The paper then discusses current and newly proposed prudential policy tools suitable for reducing sovereign risk in financial institutions' balance sheets.

1 Introduction

Government bonds are generally regarded as risk-free (i.e. highly liquid, high-quality) assets, thanks mainly to the high credibility of the state as issuer and the high quantity of debt issued. As a debt issuer empowered to collect taxes, the state is in a unique position. Its finances are seen in an inter-temporal context, because as a debtor it can carry its debt forward from one period to the next. Such intertemporal debt servicing allows government bonds to be used as a store of value, which in turn motivates economic agents to hold them.[2] Despite this unique ability of the government, government bonds have risk-free status only if creditors are convinced that the debt will be repaid, i.e. if they believe it is sustainable. However, the relationship between the

[1] The research behind this paper was supported initially by the Grant Agency of the Czech Republic under Project No. 13-06229S.

[2] Governments can print money to pay off their debts. Their ability to do so depends mainly on the degree of central bank independence and on their ability to change it. However, Article 123 of the Treaty on the functioning of the European Union forbids central banks of EU Member States and the ECB from purchasing debt securities directly from EU institutions, bodies, offices or agencies, central governments, regional and local or other public authorities, other bodies governed by public law, or public undertakings of Member States.

creditors of government debt and fiscal policy, which affects the debt, can be very fragile, and with growing debt this relationship can quite quickly become unstable.

The current fiscal stance of many advanced countries is considered unsustainable in the long term. As a result, questions are being asked about how risk-free government bonds really are. An unsustainable fiscal stance does not mean that the government's debt is unsustainable (Cottarelli, 2012). If creditors are confident in the sustainability of the debt and continue to demand government bonds, fiscal adjustment can take place *simply* by pursuing a policy of primary surpluses (referred to as the *orthodox approach*). If, however, creditors lose confidence in the sustainability of government debt, an unorthodox approach to fiscal adjustment may become inevitable. In such a case, the debt burden is transferred from the debtor to the creditor in the form of financial repression, debt restructuring or monetisation. The unorthodox approach usually implies very high costs, often greatly exceeding those of orthodox adjustment (for example loss of the independence of authorities or the sacrifice of other policy targets). It can also necessitate the adjustment of other policies, such as the regulatory framework for the financial system or central bank collateral policy. Fiscal adjustment should thus take place in a timely manner.

The Czech Republic is a country whose government debt is currently considered sustainable. The Czech government bond market currently enjoys a high level of trust. Demand in the primary market is satisfactory and yields are very low. Around 80% of Czech government debt is issued in the domestic currency and around 70% of it is held by residents. The bulk of it is financed indirectly by domestic households, whose financial surpluses are relatively high at present (see Figure 2). Czech households have directly bought a negligible amount of the total debt issued,[3] but indirectly are estimated to account for up to 60% of total funding through financial intermediaries (see Figure 1).[4] This gives rise to a two-way interaction between financial intermediaries and the sovereign sector. In the Czech Republic, given the relatively high proportion of government bonds on financial institutions' balance sheets, this interaction can be identified as systemically important (Figure 3).

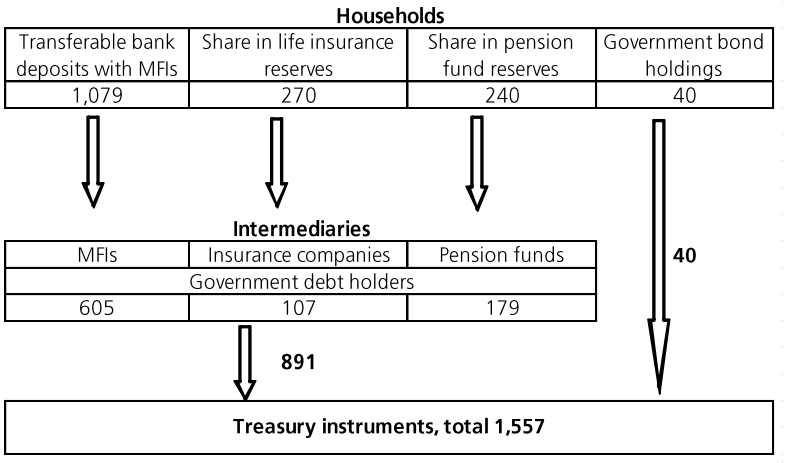


Figure 1 The Household Sector as a State Budget Funding Source (CZK billions)
Note: Data as of 30 June 2012. This is the *maximum variant*, where all government paper held by financial intermediaries is purchased with households' funds. MFI is monetary financial institutions.
Source: CNB, MF CR

[3] Government saving bonds were made available to private individuals and non-profit organisations in 2011.
[4] For example, Japanese households directly or indirectly finance around 50% of government debt (Tokuoka, 2010).

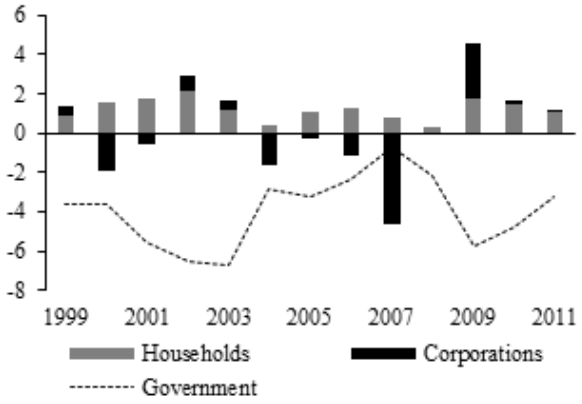


Figure 2 Financial Surpluses by Sector (% of GDP per capita, x-axis: years)
Note: GDP at PPP; general government comprises all government institutions (state organisational units, territorial governments, selected subsidised organisations, state and other extra-budgetary funds, the Railway Infrastructure Administration, transformation institutions, public universities and health insurance companies).
Source: CZSO

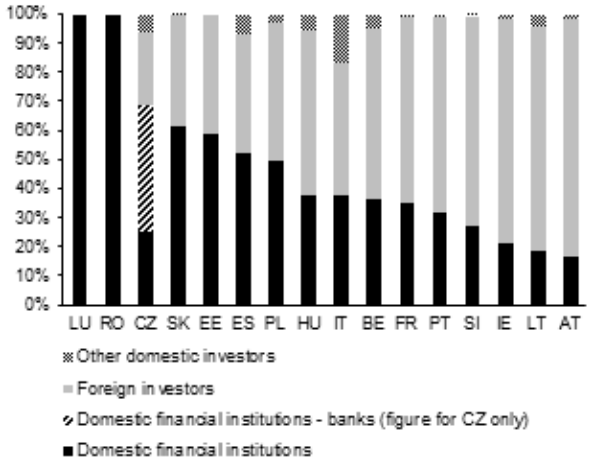


Figure 3 Government Bonds Holdings by Type of Investor (%, 2011, figure for CZ for 2011 4Q)
Source: Eurostat, CNB

The long-term Czech public finance trend can be seen as potentially risky (see Figure 3). As in other developed countries, the population of the Czech Republic is ageing. In the long term we can thus assume, on the one hand, gradually rising government spending due to higher health care costs and higher pension payments and, on the other hand, falling government debt financing capacity due to lower aggregate household savings. Moreover, as the crisis fades and the economy starts growing again, investors can be expected to return to riskier assets than government bonds. These factors indicate that the favourable environment for higher debt dynamics is only temporary and suggest a medium-term need to stabilise public debt before its absolute size significantly exceeds the domestic sector's financial capacity and it becomes necessary to issue debt to a greater extent in foreign currency and place it with non-residents. The sovereign sector may get into a situation where it cannot pay its debts. The probability of this situation arising is higher if the government debt is denominated in foreign currency (Rosenberg et al, 2005).

From the CNB's perspective, it is therefore vital to safeguard financial stability by constantly monitoring and assessing the risks arising from the interaction between the financial sector and the sovereign sector and to help mitigate those risks through prudential action. The aim of this paper is to assess sovereign risk in the context of public finance sustainability and to discuss a potential regulatory framework that might be suitable for reducing that risk.[5] The paper starts by presenting sovereign risk from the perspective of its systemic importance and in the context of the current and newly discussed financial regulation. It then analyses government debt sustainability in the Czech Republic on the basis of various scenarios. The final part of the paper

[5] In this paper, sovereign risk means the risk of government debt default or restructuring, i.e. it does not relate to short-term volatility in government bond prices (yields) manifesting itself in a change in the market or liquidity risk of this asset.

presents prudential policy tools that could be used to mitigate sovereign risk and put a notional regulatory *block* on excessive interaction between the financial sector and the government sector.

2 Sovereign exposures as a systemic risk

Financial stability depends critically on two-way interaction between the financial sector and the sovereign sector (Caruana and Avdjiev, 2012). Sovereign creditworthiness represents the ultimate source of insurance for the financial sector (through the provision of direct financial injections) and provides a basis for the pricing of other assets through the supply of risk-free government bonds, while the financial sector ensures the smooth flow of credit to the real economy as well as financing for the sovereign sector.

The current and newly prepared European banking regulation treats sovereign risk by essentially not admitting the possibility of the domestic government defaulting on its debt, and the credit risk associated with government bonds is considered to be zero up to a certain threshold. Compared to other counterparties, the regulation gives preferential treatment to sovereign exposures and, simply put, considers the sovereign sector to be permanently stable. This is evident from the following features of the regulation (BCBS, 2010a, 2011a; Nouy, 2012): (i) a low or zero capital requirement for sovereign exposures denominated in the domestic currency, (ii) a low capital requirement for exposures collateralised by government paper given the very low haircuts required for sovereigns with high ratings, and (iii) the exclusion of sovereign exposures from the existing limits on large exposures. These rules are also included in the new regulatory framework currently under preparation, which, in its new liquidity standards, additionally automatically proposes to classify government bonds denominated in the domestic currency as highly liquid, high-quality assets. Moreover, the new Solvency II framework for the insurance sector envisages a zero risk factor for sovereign exposures. The primary objective of regulation generally is to make financial institutions safer and sounder by motivating the financial system to avoid taking excessive risks and to set aside sufficient reserves to absorb losses. The sovereign exposure rules neglect this general regulatory objective. The result is that they directly motivate financial institutions to accumulate sovereign debt on their balance sheets. This strengthens the two-way interaction between the financial sector and the sovereign sector.

The current debt crisis has cast a spotlight on the negative manifestations of the two-way interaction between the financial sector and sovereign sector in the euro area and the wider world. Risks are spreading from the financial sector to the sovereign sector through two main channels: (i) the provision of government support to the financial sector (direct capital increases, government guarantees, etc.), which is increasing sovereign debt, and (ii) financial sector deleveraging, which, by amplifying the contraction in overall economic activity, is leading to falling budget revenues and rising budget expenditures. The main channels through which the growth in sovereign risk is spreading to the financial sector are (i) changes in the level of risk of other assets denominated in the same currency as sovereign exposures,[6] and (ii) government bond revaluation losses (Janáček et al., 2012). If sovereign risk is very high and manifests itself as a large capital loss or a fall in market confidence in the sovereign's ability to provide implicit and explicit guarantees, it can cause financial institutions' funding costs to go up, limit their access to domestic or foreign credit markets and/or lead them to defaulting. The above channels can operate independently or simultaneously. They can be mutually reinforcing and set in motion a

[6] Sovereign risk acts as the lower threshold for determining the level of risk of other assets denominated in a given currency.

downward spiral of loss generation and cost growth in both sectors, with major systemic implications and negative effects on the real economy. To maintain financial stability, it is vital that both these sectors are stable (Caruana and Avdjiev, 2012). It is not enough to create traditional capital and liquidity buffers within the financial sector. It is also necessary to achieve a sustainable sovereign debt level.

3 Sovereign debt sustainability

The size and nature of the sovereign sector make it systemically important. The government sector is generally regarded as solvent if the discounted present value of future public budget revenues and expenditures is equal to or lower than the discounted value of its present debt. However, the solvency of the sovereign sector depends to a large extent on creditor confidence in the sustainability of its debt. Doubts about debt sustainability can be self-fulfilling, as they bring higher risk premiums which, in turn, require larger primary surpluses and greatly complicate the government's task of achieving fiscal equilibrium (Noyer, 2012). Confidence in debt sustainability is affected by many factors, including absorption capacity and the type of creditor base, debt maturity, currency of issue, and capital market size and maturity. However, fundamental factors, i.e. the expected budget revenues and expenditures, interest rates and economic growth, are dominant.

3.1 Public finance sustainability – the traditional approach

Sovereign solvency is traditionally assessed by analysing public finance sustainability (for more details see Izák, 2008) from a purely accounting perspective by comparing government revenues (*T*) and expenditures (*E*) (excluding interest costs), while taking into account the absolute size of the debt (*B*) and the debt servicing costs, i.e. the effective interest rate (*r*):

$$B_t = (1 + r_t)B_{t-1} + (T_t - E_t) \tag{1}$$

The interaction of the absolute debt level with the performance of the economy is best analysed in relative terms, e.g. in relation to GDP:

$$\underbrace{\frac{B_t}{Y_t} - \frac{B_{t-1}}{Y_{t-1}}}_{Change\ in\ debt} = \underbrace{\underbrace{(r_t - g_t)}_{RG\ differential}\left(\frac{B_{t-1}}{Y_{t-1}}\right)}_{Debt\ servising\ costs} + \underbrace{\frac{(T_t - E_t)}{Y_t}}_{Primary\ balance} \tag{2}$$

It is clear from equation (2)[7] that the real debt level and the change therein (the *debt dynamics*) depend on the initial debt level, the real interest rate (*r*), real output growth (*g*) and fiscal policy as reflected in the resulting primary balance (*PBt* = (*Et*–*Tt*)/*Yt*). The primary balance (net of debt servicing costs) expresses whether the government budget was prepared with a surplus (*PB* > 0) or a deficit (*PB* < 0). The key factor for the debt dynamics is the RG differential (RG = r –

[7] The equation can be decomposed into parts reflecting domestic currency debt and foreign currency debt. Given the current dominance of domestic debt in the domestic currency we do not work with this dimension in the following text.

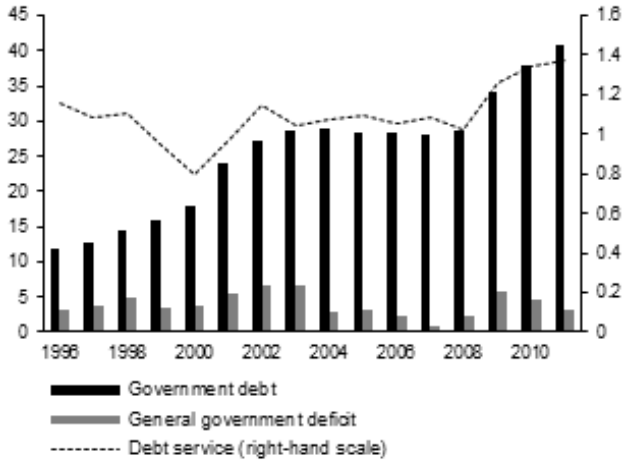


Figure 4 Public Finances in the Czech Republic (% of GDP)
Source: CNB, MFCR

g).[8] Assuming a balanced budget ($PB = 0$), if (r) is lower than (g), in the long term the debt converges to a sustainable level. This situation is referred to as stable debt dynamics. By contrast, if (r) is higher than (g) in the long term, the debt level diverges from the sustainable level. In extreme cases, if the RG differential stays positive for an extended period, or suddenly rises, the debt dynamics can explode. The key fiscal policy adjustment variable is the primary balance.[9] For debt stabilisation, the primary surplus must equal the debt service interest costs. If a primary deficit is recorded, the debt is sustainable only if $(r–g) > PB$. However, equation (2) cannot be interpreted as an optimal fiscal rule, as it is procyclical by construction and such procyclicality is inconsistent with the traditional objective of fiscal policy. If the debt is already at the limit of sustainability and the government wants to reduce it by pursuing fiscal consolidation, a negative RG differential implies a need to draw up a balanced budget. When the economy worsens and the RG differential turns positive again, the government's stabilisation efforts will build on the new lower level of debt.

Using this simple approach, we focused on analysing Czech public finances in the period 1996–2011 (see Figure 4). The debt dynamics here are unsustainable in the long term, as the debt rises from 14% of GDP in 1996 to almost 41% in 2011 and continues to go up thereafter. The debt dynamics and the contributions of the individual components, i.e. the primary balance and the RG differential, are presented in Figure 5.[10] It shows that the primary balance

[8] The unapproximated RG differential takes the form $(1+r)/(1-g)$; when (r) and (g) are low, the differences compared to the simplified version are negligible.
[9] Canada, which reduced its debt from 74% of GDP in 1995 to 34% in 2007, can be regarded as a successful case of fiscal consolidation.
[10] In addition to these components, the change in government debt is affected by stock-flow adjustment (SFA) items. However, we exclude these from our analysis (for more details on SFA, see Box 1 in Inflation Report IV/2010.

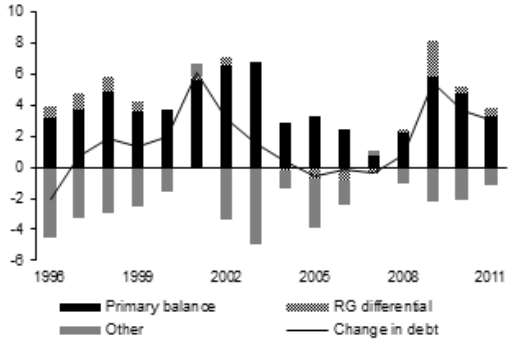


Figure 5 Czech Government Debt Dynamics (% of GDP)
Source: CZSO, CNB

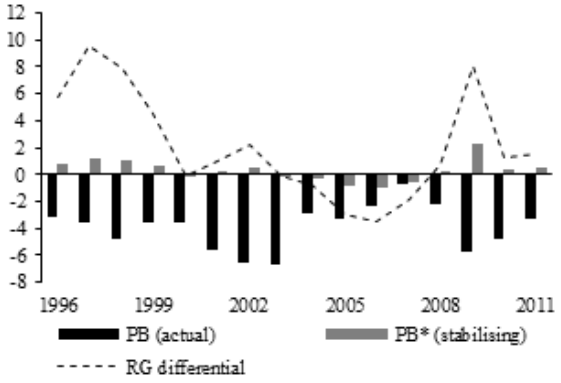


Figure 6 Fiscal Sustainability of the Czech Republic (% of GDP)
Source: CZSO, CNB

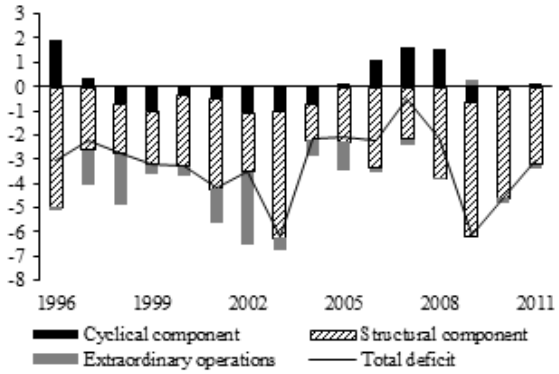


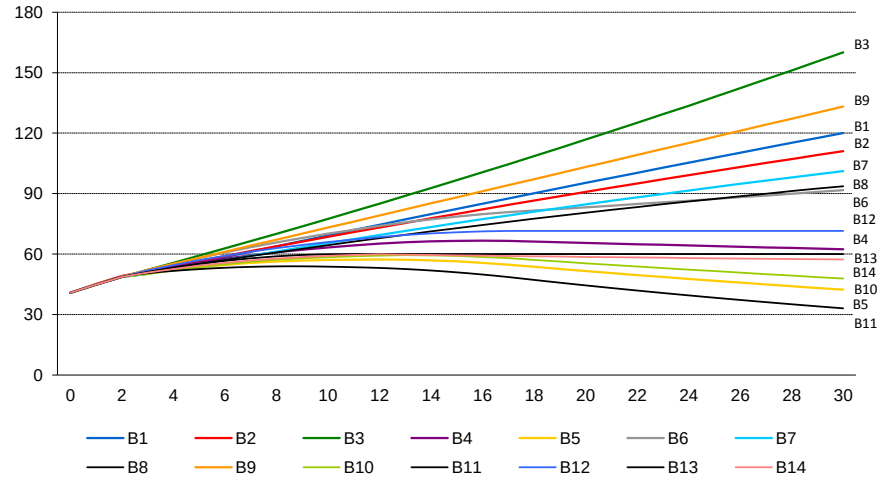
Figure 7 Government Deficit Decomposition (% of GDP)
Source: Eurostat, CNB

contributed to increasing Czech government debt throughout the period. In 2004–2007, meanwhile, real economic growth was substantially higher than the real effective interest rate and the RG differential was thus negative. The primary balance that would have led to the stabilisation of government debt in the period under review (PB*) was very different from the actual primary balance in the Czech Republic for almost the entire period (see Figure 6).

The dominance of the structural component of the government deficit (see Figure 7) reflects the fact that fiscal policy is being set procyclically on the basis of a perceived low debt level and persisting favourable market conditions. However, the gradually rising debt burden is increasingly limiting the room for countercyclical fiscal policy in the future.

To illustrate the potential long-term government debt trajectories, we prepared variant scenarios (see Figure 8) based on different assumptions about long-term economic growth (g), the effective real interest rate (r) and the government's consolidation efforts (PB). The initial state corresponds to the current debt level in the Czech Republic.

The scenarios broadly indicate that (i) fiscal efforts to keep the deficit at 3% of GDP lead in all variants to rapid growth in government debt, even given



Debt trajectory	*GDP growth (g)*	*Real interest rate (r)*	*Primary balance (PB)*
B1	*2*	1.5	deficit 3 % GDP
B2	*2*	1	deficit 3 % GDP
B3	*2*	3	deficit 3 % GDP
B4	*2*	1.5	consolidation (after 17 years PB = 0)
B5	*2*	1	consolidation (after 17 years PB = 0)
B6	*2*	3	consolidation (after 17 years PB = 0)
B7	*3*	1.5	deficit 3 % GDP
B8	*3*	1	deficit 3 % GDP
B9	*3*	3	deficit 3 % GDP
B10	*3*	1.5	consolidation (after 17 years PB = 0)
B11	*3*	1	consolidation (after 17 years PB = 0)
B12	*3*	3	consolidation (after 17 years PB = 0)
B13	*2*	2	consolidation (after 17 years PB = 0)
B14	*2.5*	0.5	consolidation (after 11 years PB = –1 %)

Figure 8 Nominal debt paths given different assumptions about economic growth, interest rates and the primary balance (% of GDP)
Source: Eurostat, CNB

relatively optimistic assumptions about the Czech economy and the interest rate level; (ii) even an ambitious fiscal consolidation (a zero primary balance in the long term) will fail to deliver fiscal sustainability if the economy does not grow fast enough and/or if real debt servicing costs rise ($r > g$).

3.2 Public finance sustainability – a more sophisticated approach

Traditional public finance sustainability analysis yields relatively quick, clear and simple information about the direction in which public finances are headed. Its first drawback is that if it is forward-looking its conclusions are relevant only insofar as the assumptions about the future evolution of the key parameters (*r*), (*g*) and fiscal policy are correct. A more sophisticated analysis is based on actually estimating or calibrating the factors that affect (r) and (g) and also on the reaction function capturing the effect of the macroeconomic conditions on the fiscal policy settings. The second drawback is the fact that besides comparing actual public budget revenues and expenditures in accounting terms, comprehensive analyses should also consider contingent liabilities (e.g. the guarantee mechanism) and implicit liabilities (e.g. projected expenditure reflecting demographic trends).

Sovereign risk assessments should consider debt dynamics in the context of the RG differential. Changes in (*r*) and (*g*) can change the debt quite quickly from sustainable to unsustainable, causing sovereign risk to materialise. The RG differential can change as a result of economic developments, including sudden shocks (e.g. a sudden rise in risk aversion increasing interest rates, or a global downturn reducing economic growth) and also as a result of fiscal policy itself. Endogeneity of the variables affecting debt dynamics arises from the fact that high debt has a feedback effect on both long-term interest rates and economic growth. The effect of high deficits on long-term rates is usually explained in the context of the neoclassical theory of saving. A government deficit reduces the saving rate and increases aggregate demand. As a result of a higher supply of government bonds, this exerts upward pressure on interest rates. In a situation where high public debt is accompanied by weak economic growth, interest rates are also driven up by a lack of market confidence in future debt repayment. This is reflected in a higher government bond credit premium. With regard to the effect of high debt on economic growth, economic theory predicts that in the long run, government consumption will crowd out private investment, leading to weaker economic performance.

In a more sophisticated analysis, we examined the relationship between the debt level and the primary balance that would stabilise/reduce the debt level.[11] Our quantification assumes an increase in the debt-to-GDP ratio of 1 percentage point per year from its current level, assuming a rise in the interest rate and a fall in economic growth. This is reflected in a constantly positive RG differential ($r > g$). The parameters for determining the level of the interest rate and economic growth were calibrated using the estimates of Baldacci and Kumar (2010) and Kumar and Woo (2010), who take into account both the existence of endogeneity and the non-linearity of the relationship. A 1 percentage point increase in debt was associated with an increase in the interest rate of 0.05 percentage points, and above a debt level of 50% of GDP a rise in debt of 10 percentage points was associated with a fall in economic growth of 0.2 percentage points. Stabilisation of the debt at 50% of GDP, which would require a budget with a primary surplus of 1.5% of GDP, is an achievable fiscal objective. The same goes for a debt of 60% of GDP. By contrast, estimated surpluses of primary balance at 3.2% of GDP, reducing the debt to 15% over 15 years (from its initial level of 50% of GDP), are apparently an unachievable fiscal objective and would additionally constrain economic growth.

[11] Eller and Urvová (2012) offer a more advanced approach to public finance sustainability in the CEE region.

4 Macroprudential policy and sovereign risk

Given the already very high sovereign exposures in the Czech financial sector (Figure 3), it is crucial from the financial stability perspective to constantly assess the fiscal sustainability of Czech government debt and discuss any change in the regulatory approach to sovereign risk on either the domestic or foreign scene. There is no consensus among economists and supervisory authorities on how to regulate sovereign risk. Proponents of regulation argue that macroprudential tools should be used to mitigate sovereign risk in the financial system and assert that exempting sovereign exposures from regulation may imply a need to monetise them in the event of unsustainability, regardless of the side-effects of a such policy. A key factor in the debate about sovereign risk regulation, meanwhile, is the actual macroprudential policy goal that is being pursued by changing the regulatory framework. If the goal is solely to safeguard the soundness and stability of financial institutions, prudential policy will be directed at motivating financial institutions not to underestimate sovereign risk and to hold an optimum level of sovereign exposures.

There is scope for revising the current regulatory framework on several levels. The first possibility is to tighten the minimum capital requirements for credit risk stemming from sovereign exposures under Pillar 1. Banks can currently set prudential capital requirements to determine risk weights for sovereign risk by using external ratings through the standardised approach or by applying the Internal Ratings-Based (IRB) approach by using their own rating systems. Under the standardised approach, risk weights are set in two variants depending on the currency in which sovereign exposures are denominated. If they are denominated in a foreign currency, the risk weights range from 0% for sovereign exposures with the highest ratings (AAA to AA–) to 150% for exposures with the lowest rating (B–). Exposures for which no rating is available have a risk weight of 100%. In the case of sovereign exposures issued by the domestic government in the domestic currency, both Basel II (BCBS, 2006, Article 54) and the European CRD directive[12] allow national regulators to assign a zero risk weight. When using the IRB approach, banks internally estimate three parameters relating to sovereign risk: (i) probability of default (PD), (ii) exposure at default (EAD) and (iii) loss given default (LGD). The estimated parameters enter the calculations for determining the risk weights of the relevant exposures. With the aid of internal estimates, this approach allows for greater diversification between individual sovereign exposures. However, for sovereign exposures (unlike, for example, exposures to firms or financial institutions) PD is exempt from the minimum value of 0.03%. So, although the IRB approach does not automatically imply a zero risk weight for sovereign exposures with a high rating, it does allow one to be used. Moreover, even if banks have chosen the IRB approach, they can under certain conditions use it only partially and apply the standardised approach with a zero risk weight to some types of exposures, including sovereign exposures. The potential revision of this regulation consists in removing the exemptions for domestic currency-denominated sovereign exposures issued by the domestic government, setting minimum PD and LGD values as in the case of other counterparties, and tightening the conditions for the permanent partial application of individual approaches.

[12] Part 1 of Annex VI of Directive 2006/48/EC of the European Parliament and of the Council relating to the taking up and pursuit of the business of credit institutions: *Exposures to Member States' central governments and central banks denominated and funded in the domestic currency of that central government and central bank shall be assigned a risk weight of 0%.*

Another possible revision is being considered in the area of the large exposure of a financial institution to a single counterparty or economically linked group of clients. This regulation is focused on reducing the concentration risk in banks' balance sheets by setting exposure limits of 25% of capital. However, EU Member States may currently fully or partially exempt assets constituting claims on central government or central banks which, unsecured, would be assigned a 0% risk weight (Article 113 of the CRD). The inclusion of risky sovereign exposures, including exposures denominated in the domestic currency, below a particular exposure limit, i.e. the abolition of the said exemption, could partially mitigate concentration risk vis-à-vis risky sovereign exposures.

Sovereign exposures are subject to interest rate risk. The regulations relating to this type of risk differ depending on whether government bonds are held in the trading or banking (or investment) portfolio. With respect to interest rate risk, Pillar 1 lays down minimum capital requirements only for sovereign exposures held in the trading portfolio.[13] One possibility, therefore, would be to require banks to hold additional capital to cover the interest rate risk of exposures held in the banking portfolio within the framework of active Pillar 2 banking supervision. If the government debt was to approach the limit at which doubts arise as to its sustainability, and the market and economic conditions for issuing and repaying such debt were to deteriorate gradually, the quality of sovereign exposures would start to be viewed as potentially compromised and the probability of sharp growth in interest rates would therefore increase. In such a situation, the national regulator should introduce prudential measures under Pillar 2 to adjust the real value of the sovereign exposure and increase the capital requirement. In such a case, however, it is not just the interest rate risk that should be adequately capitalised. Sovereign exposures in the banking portfolio are usually large, so in the event of adverse fiscal developments, timely measures should also be taken to limit exposure to the sovereign counterparty. Account also needs to be taken of the fact that credit risk materialisation due to growth in sovereign risk will affect the financial institution's entire balance sheet, not just its sovereign exposure, because the value of government bonds, as mentioned above, provides a basis for the pricing of other assets.

There is also scope for debate about potentially risky sovereign exposures in the case of liquidity standards (the liquidity coverage ratio, LCR, and the net stable funding ratio, NSFR) contained in the newly proposed Basel III (BCBS, 2010a and 2011a). Here, too, it is appropriate to take into account a prudential view in relation to sovereign risk. Assets with a standardised zero risk weight are classed as high quality liquid Level 1 assets in the case of the LCR and are assigned the lowest 5% required stable funding factor in the case of the NSFR. On the one hand, automatic classification of government bonds denominated in domestic currency among these assets, regardless of their credit quality limits the potential adverse impacts of the liquidity standards at times of stress. But on the other hand, it may increase the incentive to hold government bonds in order to facilitate compliance with the liquidity requirements, and in particular it may foster overestimation of actual compliance with the standards if such bonds are not of high quality in reality. Furthermore, in the context of sovereign risk this new liquidity

[13] Government bonds allocated to the trading portfolio are subject to two different capital requirements from the credit risk perspective: a capital requirement for general interest rate risk (linked with the general evolution of interest rates) and a capital requirement for specific interest rate risk (linked with the evolution of the interest rate demanded by the market from a specific debtor). Specific interest rate risk is thus to some extent analogous to the classic interest rate risk of a debt instrument in the investment portfolio. In the sovereign exposure context, therefore, a capital requirement is often created solely for general interest rate risk.

regulation might pose specific problems, especially in the case of European regulation. It requires reporting not only at market prices, but also the application of an adequate factor (not only 5%, but taking into account other risks at an amount at least equal to a market-required haircut), which might during market tensions contribute to the volatility of the liquidity standards LCR and NSFR (the deterioration of sovereign debt quality will lead to a decline in market price and to an increase of the required stable funding factor). This can conversely increase market volatility.

Tightening sovereign risk regulation would have positive effects not only on the stability of financial institutions, but also in other areas. These positive effects also include, for example, the suppression of the crowding-out effect that arises when the public sector is given preferential access to credit ahead of the private sector. The government might also be motivated to stabilise or reduce its debt owing to a relative decline in domestic demand for the bonds it issues.

However, the impact of the stricter regulatory approach to sovereign exposures is critically dependent on the initial situation when it is implemented. The regulation will not necessarily have an unambiguously positive effect and could even lead to market or macroeconomic instability if significant sovereign risk has already accumulated on the balance sheets of banks and other financial institutions. Before introducing stricter regulation, one needs to analyse how the size and structure of the government's creditor base and overall market conditions will change if domestic financial intermediaries face constraints in buying more domestic government bonds or are even motivated to reduce the amount of such bonds on their balance sheets. Assuming inadequate consolidation of public finances and the application of stricter regulation, it is likely that domestic government debt would be offered to non-residents on the primary market at a higher yield. This would expose the government sector and indirectly the entire economy to substantial risks.[14] The holding of debt on foreign balance sheets opens the door to higher debt price volatility and therefore to growth in the market and liquidity risk of the debt. This generally leads to higher debt service costs, shorter average debt maturities and constant concerns about future debt refinancing. In other words, if stricter treatment of sovereign risk is introduced in an adverse initial situation when it is too late for preventive action, it may have destabilising effects. The main argument against regulating sovereign risk is that it is systemic, i.e. it cannot be diversified or isolated, especially if the sovereign debt on financial institutions' balance sheets is highly concentrated. Sovereign risk is regarded as systemic because materialisation of the risks (interest rate or credit) arising from sovereign exposures affects all financial institutions at once.

We should also point out how difficult it is to estimate the capital requirement needed to absorb losses stemming from concentrated sovereign exposures (Nouy, 2012),[15] as sovereign risk is itself very difficult to evaluate given the dependence of government debt sustainability on market sentiment (Missale, 2013). Moreover, the impact of sudden sales of government bonds on the balance sheets of creditors and other intermediaries (especially institutional investors) when strict limits are applied to banks' exposures to the sovereign sector can destabilise the system.

[14] Global investors are more sensitive to uncertainty about the economy and are not very willing to distinguish in detail between economic conditions in different countries. They usually hold foreign assets in the trading portfolio, and their significant investment opportunities mean that the probability of future domestic debt refinancing is significantly lower.

[15] The probability of default of a sovereign exposure is close to zero in the long term, i.e. the capital requirement for such an exposure will be very low in the long term. This probability is quite difficult to estimate, as experience tells us that government debt default can occur at various levels and under various conditions. A situation can therefore arise where, given a sufficiently large sovereign exposure, the capital requirement is de facto an ineffective tool for absorbing the loss given default, as the potential loss always exceeds the level of capital.

These arguments imply that the macroprudential policy approach to sovereign risk should be defined more broadly than *just* to mitigate risks preventively and increase the loss-absorption capacity of financial institutions' balance sheets. At any given moment in time, the settings of the regulation of sovereign exposures should respect the existence of the two-way interaction between the financial sector and the government sector, i.e. the current level and structure of government debt. If this interaction is already systemically significant, i.e. the debt is already very high, prudential regulation should be introduced cautiously and gradually so that both sectors have time to adjust to the changes, thereby eliminating any serious negative side-effects of the stricter regulation on the real economy. On the other hand, prudential policy, and de facto also central bank collateral policy, should not deliberately motivate the financial sector to give the government preferential funding treatment at times when the above relationship is not yet systemic.

5 Conclusions

The high government debt levels in many advanced countries and the existence of a close and systemically significant relationship between the financial sector and the government sector have made sovereign risk an important economic topic. Although the current and newly discussed European regulation of financial sector assumes that sovereign exposures are risk-free and essentially ignores sovereign risk, adverse fiscal trends in many developed countries have cast doubt on the risk-free status of government bonds. In addition, negative manifestations of the two-way interaction between the financial sector and the sovereign sector, with their impacts on the real economy, have revealed the fragility of financial stability and its dependence on the stability of both these sectors. As the state is in a unique position as a debtor, its solvency and debt sustainability cannot be analysed solely in the context of the absolute debt level. Investor confidence should also be taken into account, as it reflects investors' expectations about the future development of the economy, which in turn affect the sovereign's ability to manage its accumulated debt. The current situation across countries demonstrates clearly how perceptions about the sustainability of government debt are relative to the absolute level of debt.

This paper has illustrated that government debt can quite quickly change from sustainable to unsustainable, thereby causing sovereign risk to materialise. This rapid change is fostered primarily by a change in the confidence of creditors investing in government debt. The speed of this change depends on creditor type, debt maturity and the currency of issue of government debt. However, the fundamental sustainability factors are the quality and structure of budget revenues and expenditures, interest rates and economic growth. The government's efforts can thus be severely impeded by the prevailing economic situation. This indicates the need to begin consolidating in a timely manner, as soon as debt unsustainability rears its head. A combination of high debt and weak economic growth can set in motion a downward spiral of loss and cost generation between the financial sector and the sovereign sector, leading to long-term debt unsustainability. In such a case there will be pressure to implement unorthodox solutions in the form of the redistribution of wealth between debtors and creditors. This, however, can limit the independence of the central bank and stop it achieving its targets (Leeper, 2013). In addition, according to the demographic outlook, population ageing will contribute significantly to a deterioration in public finances in the future. This will directly affect budget revenues and expenditures and thus further limit the scope for achieving the primary balances needed to safeguard debt sustainability.

Supervisory authorities thus still face the challenge of adopting a suitable prudential regulatory framework that will adequately reflect the accumulation of sovereign risk on financial institutions' balance sheets in a timely manner, while not creating negative externalities for the real economy. The macroprudential policy objective vis-à-vis sovereign risk should be, on one level, to protect individual financial institutions against the materialisation of sovereign risk, but also, on a wider level, to prevent the excessive accumulation of sovereign risk in the system. The first level involves reducing the size of sovereign exposures and increasing the capacity of financial institutions' balance sheets to absorb losses arising from such exposures. The second level entails sending out a signal to governments about the need to stabilise public finances and coordinate economic policies. As shown by the experience of countries with high government debts (USA, EA, UK, JP), such coordination is vital for maintaining financial stability and achieving fiscal and monetary policy goals.

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