

## **Financial Stability and the Sovereign Default Risk**

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### ***Abstract***

*The paper firstly discusses<sup>1</sup> the channels of contagion of sovereign default risk to the financial system. Secondly it 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. Thirdly, the 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. Fourthly, the paper then discusses current and newly proposed prudential policy tools suitable for reducing sovereign risk in financial institutions' balance sheets. Finally, this paper also discusses the experience of countries hit by debt crises as well as the channels of contagion of sovereign default risk to the financial system.*

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**Key words:** Financial stability, sovereign Risk, fiscal policy.

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## **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.<sup>2</sup> Despite this unique ability of the government, government bonds has 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 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.

Sovereign default risk is an old type of risk that has been brought back into the spotlight by the persisting financial (debt) crisis in advanced economies. The materialisation of this risk can be described in the narrower sense as a situation in which a central authority (usually a national government) is unable to honour its pre-agreed financial obligations unaided and the country therefore defaults. In the wider sense, an escalation of sovereign default risk can be seen as an excessive rise in the costs of financing government debt, manifesting itself either in repayment difficulties or in the secondary macroeconomic costs of resolving the situation. In

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<sup>2</sup> 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.

the strict sense, sovereign default risk should not arise, because central authorities (central banks) can print money in order to pay their debts. This solution, however, generates macroeconomic destabilisation in the form of escalating inflation, which can grow into hyperinflation with negative impacts on long-term economic prosperity. There have been many cases of sovereign default in history. The most recent include Argentina (2001), Russia (1998) and Ukraine (1998). Crises in Mexico (1982), Greece (2011), Iceland (2008) and other countries have also had strong features of debt crisis. However, the current problems associated with the euro area debt crisis have increased perceptions of sovereign default risk, as the existence and threat of transmission of sovereign default risk pertain to a group of countries (the euro area) of greater economic strength than was the case in the past. At the same time, the current debt crisis in some euro area countries shows that there can be a strong interaction between the sovereign default risk situation and the situation of the financial sector. On the one hand, an escalation of sovereign default risk causes difficulties for financial institutions. On the other hand, the need to rescue ailing financial institutions can lead to sizeable government expenditures and to an increase in sovereign default risk.

The purpose of this paper is to summarize countries' experience of tackling sovereign default risk and to point out potential channels of contagion for a small open economy. The paper is structured as follows. Section 2 briefly discusses the phenomenon of sovereign default risk including above mentioned sovereign risk contagion channels. Section 3 describes Sovereign exposures as a systemic risk and section 4 analyses sovereign debt sustainability of a small open economy. Section 5 discusses the sovereign risk from the macroprudential policy perspective. Section 6 provides a summary and recommendations.

## **2. The phenomenon of sovereign default risk**

The history of modern debt crises<sup>3</sup> shows that contagion very often spreads internationally from the country of origin of a crisis to geographically and economically similar economies. Asset (and especially housing) price bubbles have played a significant role in the escalation of crises. For many countries dependent on commodity exports (for example Russia) crises have been caused by, among other things, falls in the world (dollar) prices of those commodities. Both over-regulation of financial sectors and the precipitous abandonment of such regulation have contributed to the escalation of crises. Sovereign debt crisis have often been by triggered by currency crises, especially following attacks on fixed exchange rate regimes, or by a combination of currency and banking crises. The most recent crises (Iceland and Ireland 2008–2011) have shown that sovereign debt crises can stem from previous excessive growth of the financial sector, from an excessively large financial sector relative to the size of the economy, and from excessive links to other countries. Analysis of

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<sup>3</sup> An overview of individual episodes can be found, for example, in Reinhart and Rogoff (2009).

public sector debt sustainability (see, for example, Gray et al., 2008) point to, among other things, the role of uncertainty and non-linear changes in credit risk and take into account for the market value and currency composition of debt. Studies attempting to predict debt crises (see, for example, Manasse et al., 2003) emphasise the role of macroeconomic variables (such as high foreign debt levels, debt-servicing measures and profiles, low GDP growth, current account imbalances and tight liquidity and monetary conditions), fiscal variables (such as the ratio of debt to GDP) and political economy variables (political uncertainty and the effect of the political cycle on the economy). The consequences of sovereign debt crises tend to last longer and be more persistent than those of currency crises.

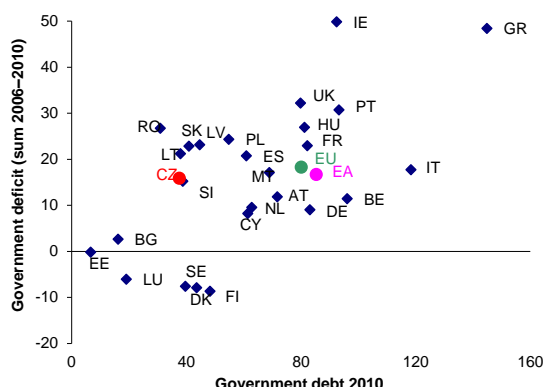
The ways of eliminating sovereign default risk range from bankruptcy declaration (Argentina), to forced debt restructuring (Ukraine 2000, Pakistan 2001, Uruguay 2003) to debt forgiveness by London and Paris Club<sup>4</sup> creditors (Poland and Hungary in the early 1990s as well as, for example, Montenegro). Another method – and, in a way, also a means of preventing sovereign default – is for an international financial institution to provide financial assistance. This approach has been applied in countries that were still relatively solvent but were illiquid at a particular point in time (Mexico 1994–95, South Korea 1997–98, Brazil 1999 and 2002, Turkey 2001, Uruguay 2002 and the recent example of Iceland). Nevertheless, empirical studies (see, for example, Cruces and Trebesch, 2011) show that debt restructuring is associated with a long period of restricted access to global financial markets for the countries concerned, as there is a link between haircut size and bond spreads after a crisis.

Other indicators besides the debt level itself are important in assessing the level of sovereign default risk. In Table 1, selected EU countries are classed into groups with similar levels of sovereign default risk. It is evident from the table that although some countries are much more indebted than the Czech Republic, the depth, size and liquidity of their markets, assisted by their currencies accepted as reserve currencies, help them achieve lower risk premiums (e.g. DE and UK; the same goes for US and JP). According to the criteria in Table 1, the Czech Republic is in the same group as France, Austria and Belgium, whose sovereign default risk is assessed by the markets as being similar to that of the Czech Republic. In this classification, Poland could be classed alongside Spain and Italy, and Hungary alongside Ireland and Portugal, but they are analysed separately because they are both in the Central European region.

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<sup>4</sup> The London Club is an informal group of around 1,000 international commercial banks which negotiates as a creditor with debtor countries regarding private loans (without public guarantees). The Paris Club is currently a group of 19 creditor governments whose role is to negotiate debt restructuring and debt relief.

Figure 1: Public finance sustainability ratios in EU countries (in % of GDP)



Source: Eurostat.

Table 1: Bond market pricing of sovereign default risk (EU country groups)

Country	Rating	Govt debt/GDP (%)	Credit premium volatility	5Y govt bond yield
SE	1	33	29.3	1.3
FI	1	50	24.1	1.4
DE	1	82	28.0	0.8
UK	1	85	40.9	1.1
CZ	3	43	63.3	2.0
AT	2	74	57.1	1.8
FR	2	89	57.0	1.7
BE	3	94	89.1	2.4
PL	6	56	90.8	4.9
ES	6	70	130.0	3.6
IT	8	121	134.3	3.4
HU	11	75	174.4	8.3
IE	8	115	276.5	5.2
PT	12	112	354.7	17.2
GR	23	189	1026.3	54.9

Source: Eurostat, Bloomberg.

Note: S&P rating conversion scale: 1=AAA, 6=A, 11=BB+, 23=D. Country abbreviations according to list of abbreviations. Highlighting indicates country groups (SE, FI, DE, UK, together, etc.).

In this section we identify – on the basis of CGFS (2011) – eight main types of sovereign risk transmission channels affecting the cost and availability of bank funding. These channels can also be triggered purely by external events and their effects can be significantly reinforced by international transmission.

## 2.1 The channel of sovereign debt in the financial sector's asset holdings

The close relationship between the financial sector and the government sector has proved to be a growing systemic problem in recent years (OECD, 2012). The financial sector – consisting largely of the banking sector – is a major government creditor. Increases in sovereign default risk can therefore affect banks through direct holdings of sovereign debt in balance sheets. Losses on government bond portfolios weaken banks' balance sheets and expose them to increased risks, especially on the funding source side. The impact on individual banks' balance sheets depends on how banks value their government bonds – i.e. at market prices or at amortised cost. If a bank holds government bonds for trading, it revalues them at market prices and a fall in their value has a direct effect on its profit-and-loss statement and on its equity and funding sources. If, however, a bank holds government bonds to maturity, it values them at amortised cost and a change in value is recorded only if the securities become permanently impaired (e.g. when sovereign restructuring or default becomes highly likely). Nonetheless, even these exposures may affect bank funding conditions well before a negative public finance event occurs. Acting out of caution and on the basis of historical experience, banking sector creditors may revise their investment plans and initiate a run on the bank or restrict their credit lines over concerns about the solidity of a banking sector that is over-exposed to the public sector.

In advanced economies, the banking sector mostly holds domestic government bonds (CGFS, 2011). Insufficient risk diversification in banking sector balance sheets – especially during a crisis – can increase the risks of illiquidity and insolvency and start a vicious circle between the banking sector and the government sector. On the one hand, the banking sector is a major government creditor and often uses government bonds as security in money markets. On the other hand, during a crisis some banks may need help from their home government in the form of guarantees and recapitalisation (OECD, 2012). The government's ability to help the banking sector during a crisis depends on it having high enough budget revenues in relation to the size of the banking sector and a sustainable level of government debt.<sup>5</sup> Otherwise, helping the banking sector would involve excessively high costs in the form of excessive debt (excessive growth in debt as a percentage of GDP) accompanied by unsustainably high debt servicing costs (excessive growth in debt interest). The government, being unable to issue new debt and facing a rapid fall in the market value of previously issued government bonds, could become insolvent. As mentioned earlier, the principal government bond holder is the banking sector, to which these problems would feed back. In simple terms, while the government can try to help some ailing banks, the situation can lead to a systemic crisis across the entire banking sector due to subsequent sovereign debt unsustainability or even government insolvency.

The empirical evidence shows that the escalation of contagion between the banking sector and the government sector depends to a large extent on the size of the banking sector's exposures to the public sector (CGFS, 2011). Derivatives market data show an increased correlation between the CDS of some European banks and those of ailing countries to which those banks had high exposures, or for which the risk of sovereign debt concentration in their balance sheets was high.<sup>6</sup> The transmission of foreign public sector funding problems to the local banking sector through open exposures is another potential channel of contagion (see the international contagion channel below). Nonetheless, by its nature it, too, belongs in the first channel of shock transmission via sovereign debt holdings. However, there can be a difference from the point of view of the implications of shocks for the local banking sector. The local banking sector may get into a difficult liquidity situation as a result of holding troubled countries' government bonds. If, however, its domestic public sector does not have problems (i.e. its public finances are sustainable), it can help the local banking sector with liquidity in emergencies and fend off contagion from abroad.

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<sup>5</sup> Ireland is an example of a small country which has a large banking sector relative to its public budget and whose banking sector has needed help. On the other hand, Greece is an example of a country which had an extremely high debt level, exposed its banking sector as the main creditor to difficult liquidity conditions, and became unable to help its banking sector in any way. In the first case the adverse spiral went from the banking sector to the public sector, whereas in the second case it went in the opposite direction. An adverse spiral arises between these two sectors due to the inability of neither of them to absorb the credit risk of extreme debt. Both countries were forced to seek international financial assistance.

<sup>6</sup> This relationship strengthened after the publication of the CEBS stress test results in July 2010.



## **2.2 The cross-country contagion channel**

Due to the close links among the financial markets of advanced economies, the distress of one sovereign can spill over indirectly but quickly to other countries and their financial institutions. Key roles – in addition to direct holdings of foreign government bonds (see the channel of sovereign debt in the financial sector's asset holdings) – are played by banks' cross-country exposures, banks' claims on foreign non-financial entities and the vulnerability of other public sectors to foreign sovereign risk shocks. Global interbank exposures are particularly large for banks in key advanced economies. Banks with sizeable exposures to the banking sector of a country in distress are more exposed to contagion risk, since on the asset side they face increased credit risk stemming from potential default and on the liability side they face increased funding risk (the high risk of counterparties holding bad debt can make interbank markets too expensive or cause them to freeze up). Both these risks expose banks with international exposures to a more difficult liquidity position. Cross-country contagion can also spread through banks' irrecoverable claims on non-financial corporations in troubled countries. However, this contagion is longer term in nature. Both these indirect cross-country contagion effects play only a minor role in the Czech Republic, because the Czech banking sector's exposures to the financial and real sectors in other countries are currently low.

Cross-country transmission of sovereign risk can also occur through contagion among sovereign markets of countries whose public sectors are perceived to be vulnerable. Some studies have found that the transmission of shocks from one sovereign market to another strengthens considerably in periods of turbulence (Diebold and Yilmaz, 2010). This transmission channel may therefore be relevant to any country, including the Czech Republic. During the recent crisis, the correlation between European sovereign CDS premiums increased sharply, albeit temporarily, after the collapse of Lehman Brothers, owing mainly to psychological contagion (BdF, 2009). After a time, negative sovereign risk perceptions transferred to countries, such as the Czech Republic, whose financial systems had been hit either not at all or only marginally by the crisis. Several empirical studies (Schuknecht et al., 2010; Ebner, 2009) attempt to quantify cross-country contagion. The transmission of negative shocks to the Czech Republic is analysed by Vašíček et al. (2012). Using a method based on a vector autoregression model, they conclude that up to 44% of the dynamics of Czech credit premiums can be explained by the dynamics of foreign premiums.

## **2.3 The channel of change in the attitude to risk**

Sovereign tensions may cause a rise in investors' risk aversion, which in turn may increase the risk premiums demanded on sovereign and bank securities and reduce banks' funding availability. An increase in risk aversion can, in the short run, cause a decline in asset prices, reflected in lower profits or in losses for banks. Heightened risk aversion can also be

expected to have a larger effect on banks than on non-financial corporations, as the former are more leveraged than the latter. Empirically, changes in the attitude to risk can be followed by means of the difference between the banking sector's stock market returns and options, which represent risk-neutral behaviour. Sovereign default risk problems can also lead to complete loss of availability of the risk-free asset on whose existence most market risk management models are based. A loss of the power of such models can in turn lead to a further increase in risk aversion and to knock-on effects on banks' portfolios.

#### **2.4 The sovereign and bank rating channel**

Sovereign ratings are important for commercial banks in two main respects. Sovereign downgrades have direct negative repercussions on the cost of banks' debt and equity funding and also often lead to downgrades of domestic banks. Sovereign ratings generally represent a ceiling for the ratings of domestic banks. Rating downgrades cause banks to pay higher spreads on their bond funding, which, in the event of large downgrades, may reduce access to funding in financial markets. Sovereign downgrades also affect the behaviour of institutional investors, who are restricted by regulations to investing in high-quality securities. This narrows the set of securities eligible as collateral, which are therefore more in demand.

#### **2.5 The channel of assets as collateral**

Sovereign securities are used extensively by banks as collateral to secure funding from central banks and repo markets. Increases in sovereign risk and haircuts can both cause the value of collateral to fall. Increases in sovereign risk reduce the availability or eligibility of collateral, and hence banks' funding capacity. The haircuts applied to sovereign securities are determined by collateral valuation uncertainty, market liquidity and credit risk. The central bank's liquidity-providing policy, and in particular its eligible collateral policy, plays a significant role here. The central bank faces a dilemma – on the one hand it may face problems with insufficient liquidity in some financial institutions, but on the other hand it should not take on the credit risk associated with such liquidity provision.

#### **2.6 The channel of the effects of government guarantees on bank funding**

Explicit and implicit government guarantees can significantly affect banks' funding options. Systemically important financial institutions have traditionally had implicit government guarantees, which have lowered their funding costs relative to other institutions. After the escalation of the financial crisis, authorities have also explicitly codified these guarantees in law. The worsening of sovereign fiscal positions could reduce the value of both implicit and explicit guarantees. The potential liabilities of deposit insurance funds, which generally do not have enough money to cover the majority of insured deposits, can also be regarded as an implicit government guarantee. Disruption of the perceived risk-free nature of



insured deposits could undermine depositors' confidence in the local banking sector and lead to massive outflows of deposits abroad or into cash.<sup>7</sup>

## **2.7 The channel of the impact on banks' non-interest income**

Sovereign tensions may also negatively affect banks' fee and trading income. Higher sovereign risk is associated with greater investor risk aversion and lower asset prices and financial market transactions, which together reduce banks' revenues. The effect of higher sovereign risk also reduces the value of the portfolios which banks manage on behalf of customers, which implies lower bank income from fees from clients. This effect may be exacerbated by investors rebalancing their portfolios towards low-risk assets, which have lower management fees.

## **2.8 The channel of crowding-out effects on banking sector debt issuance**

The rise of sovereign issues may crowd out private debt issuance by increasing the cost or reducing the availability of funding. This effect is not limited to the banking sector, but could be more relevant for banks given their sizeable funding needs. The extent of crowding out depends on whether investors view government bonds as substitutes for bank debt, and on the overall supply of savings.

## **3. 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

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<sup>7</sup> For example, Greece recorded an outflow of deposits from the banking sector of more than 20% in 2011. According to the Financial Times, Greeks transferred as much as EUR 200 billion abroad.

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,<sup>8</sup> 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 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.

#### **4. Sovereign debt sustainability**

The size and nature of the sovereign sector make it systemically important. The government sectors 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

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<sup>8</sup> Sovereign risk acts as the lower threshold for determining the level of risk of other assets denominated in a given currency.

(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.

#### 4.1 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):

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

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:

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

It is clear from equation (2)<sup>9</sup> 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 ( $PB_t = (E_t - T_t)/Y_t$ ). 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 ( $RG = r - g$ ).<sup>10</sup> 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.<sup>11</sup> 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

<sup>9</sup> 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.

<sup>10</sup> 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.

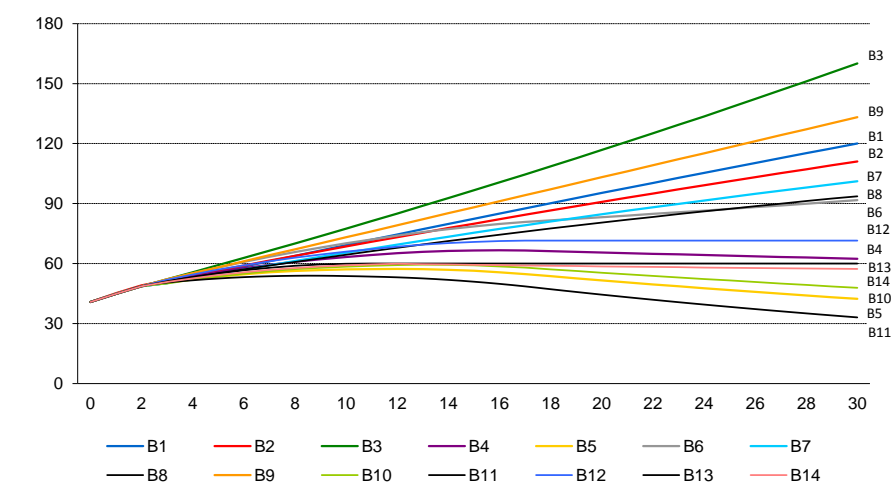
<sup>11</sup> Canada, which reduced its debt from 74% of GDP in 1995 to 34% in 2007, can be regarded as a successful case of fiscal consolidation.

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. The dominance of the structural component of the government deficit 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 2) based on different assumptions about long-term economic growth ( $g$ ), the effective real interest rate ( $r$ ) and the government's consolidation efforts (PB).<sup>12</sup>

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 relatively optimistic assumptions about an small open 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 ( $r > g$ ).

Figure 2: Nominal debt paths given different assumptions about economic growth, interest rates and the primary balance (% of GDP)



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

<sup>12</sup> The initial state corresponds to the current debt level in the Czech Republic.

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 %)

Source: Eurostat, CNB

#### **4.2 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 stabilize (or reduce) the debt level. 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), is apparently an unachievable fiscal objective and would additionally constrain economic growth.

## **5. Macroprudential policy and sovereign risk**

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. 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<sup>13</sup> 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.

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.<sup>14</sup> One possibility, therefore, would be to require banks to hold additional capital to cover the interest rate risk of

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<sup>13</sup> 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%.*

<sup>14</sup> 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.

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 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.<sup>15</sup> 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),<sup>16</sup> 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.

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<sup>15</sup> 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.

<sup>16</sup> 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.

## **6. Conclusions**

The change in global investors' attitude to sovereign default risk, reflected, among other things, in the increased sensitivity of credit premiums to sovereign debt, may significantly increase the costs of irresponsible fiscal policy in the future. This is another factor which has a role in the monitoring of financial stability. The interconnectedness of the various risk transmission channels both within single countries and across national boundaries means that sovereign default risk can have significant implications for systemic risk.

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 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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