

Spoor A2:

Balancing public debt division in Belgium: how to assign (part of the) federal debt to the regions?

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Balancing public debt division in Belgium: how to assign (part of the) federal debt to the regions?*

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Abstract

This paper investigates the optimal *vertical* division of public debt between the different levels of government in a federation. Besides looking into the trade-off between arguments pro and contra debt decentralisation, more practical scenarios of debt devolution in order to avoid turmoil on financial markets are documented. Different criteria for vertical debt division and for an optimal *horizontal* division of debt between the different regional governments are discussed and classified according to the degree of accountability and solidarity involved. An empirical application is made to the Belgian case, providing recommendations for debt reallocation between the different governments.

JEL Classification: H60, H71, H72, H74, H77

Keywords: fiscal federalism, political economy, public debt

1 Introduction

One of the most challenging tasks of the Belgian government nowadays is balancing its budget and controlling its public debt. In its most recent report¹, the Federal Planning Office published rather discouraging public finance forecasts. Over the period 2010-2015, public deficits will keep hovering around 5% of GDP, and, if policy is not changed, further debt accumulation will lead to a debt level of 106% of GDP by 2015. During the six-year period under consideration, the interest burden will increase by 0.7% of GDP. To comply with the Belgian Stability Program, which imposes a 3% deficit by 2012 (which is the European Stability and Growth Pact

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¹Economic projects 2010-2015. May 2010.

threshold), and a balanced budget by 2015, severe fiscal efforts will be needed. Reducing the high Belgian debt level, which recently again surpassed the psychological level of 100% of GDP, will not be easy, especially because a new snowball effect may accelerate debt accumulation.²

During the Belgian asymmetrical federalisation process over a period of 40 years, tax-raising competences and the large historical debt were kept at the federal level, while substantial funds and assets were transferred to regional governments. This created a situation where regions are only responsible for 20% of their financing and for their own debt issued since 1989, amounting to about 6% of total Belgian debt³ in 2009. This situation may lead to moral hazard problems; the lack of responsibility for their own revenues lowers the regions' incentives to enlarge their tax base and to stabilize the debt ratio, which is detrimental for Belgian public finances.

The demand for more regional fiscal autonomy in Belgium is part of the negotiations for the formation of a new government. However, debt regionalisation is not considered, even though the issue is inextricably linked to the devolution of fiscal competences. In the negotiations about a new Special Finance Act (SFA) for the financing of regional governments, debt decentralisation could be an important part of the discussion involving *enhanced regional accountability* and *refunding of the federal government*. Another key issue is the *sharing of interest rate risk* in the Belgian federation, which is one of the action points of the Flemish government, since it was written in the five resolutions of the Flemish parliament (1999), and in the Octopus Note (2008) attached to the Flemish Governmental Agreement⁴.

When looking at the empirical data in Figure 1⁵, it is noticed that the debt share of the Belgian regions and communities is quite small compared to e.g. the German Länder and the Swiss kantons. The large differences across federations can be explained by the fact that federations which were formed by a centrifugal process such as Spain and Belgium traditionally kept debt at the central level, while in federations formed by a gathering of independent states like Germany and Switzerland the historical debt remained at the regional level. A criterion of optimal debt sharing in a federation is to be developed to answer the question whether this means that there is scope for the Belgian regions to assume more debt.

This paper contributes to the theory of optimal public debt sharing between the different governments in a federal state. First, the optimal *vertical* division of public debt between higher and lower tier governments in a federation is investigated. After a brief discussion of the arguments pro and contra debt decentralisation in section 2, the choice of a vertical division key is addressed in section 3. This section also

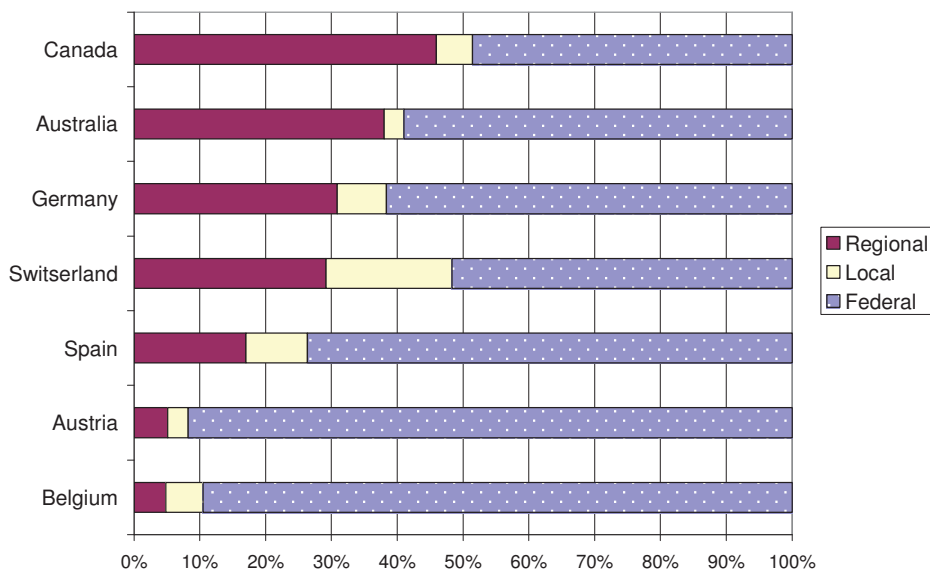
²A snowball effect occurs when interest payments have to be financed by new debt issuances, leading to an ongoing process of debt accumulation.

³Total debt is the sum of local, regional, federal and social security debt (no consolidated figures) for 2009.

⁴Which says that “*The regions should take part in the positive and negative consequences of interest rate fluctuations on the federal government debt without proceeding to a formal debt division*”.

⁵Figures are for 2007 except for Belgium, Canada and Switzerland, whose figures are for 2006.

Figure 1: Debt division in federal countries: shares in total debt in 2007 (Source: IMF GFS Yearbook 2008 and own calculations)



derives some practical scenarios of debt devolution, showing how to avoid turmoil on financial markets. In section 4, an elaborate search for an optimal *horizontal* division rule between the different regional governments is conducted, leading to a classification of criteria according to the degree of accountability and solidarity involved. Theoretical considerations are applied to the Belgian case in section 5, providing recommendations for debt reallocation between the different authorities. Section 6 concludes.

2 Rationale for debt decentralisation

Before elaborating on the optimal *vertical* division of debt between higher and lower tier governments, we first look at the rationale for debt decentralisation. The question whether debt devolution is favourable or not was first discussed in the Belgian context in the preliminary work of De Grauwe (1991), Van Rompuy (1992), De Broeck and Heremans (1993) and Heremans and Philipsen (1998). As we saw in Figure 1, debt was usually kept at the federal level in defederalisation processes. It may be explained by the larger weight attached to the contra-arguments in *traditional normative economic theory*. Renewed attention for *political economy arguments*, however, emphasizing accountability, transparency and autonomy, may tip the balance to the other side. As it is argued, in many cases the trade-off depends on the particular federal institutional and fiscal framework of a country, and on the international framework in which it operates. A summary of the arguments pro and contra debt decentralisation is presented in Table 1.

Table 1: Overview of pros and cons of debt decentralisation

PRO	CONTRA
<i>Traditional/normative arguments</i>	
Debt autonomy	Financial markets
<ul style="list-style-type: none"> - More efficient regional allocation policy - More effective macro-economic stabilisation policy 	<ul style="list-style-type: none"> - Increased total cost of debt - Negative spillovers of a regional debt crisis
<i>Political economy arguments</i>	
Debt responsibility	Federal fiscal framework
<ul style="list-style-type: none"> - Enhanced accountability - Transparency 	<ul style="list-style-type: none"> - Lack of regional fiscal autonomy

2.1 Arguments pro

2.1.1 More efficient regional allocation policy

In line with the subsidiarity principle, which claims that a higher government level should not exercise functions which can be carried out efficiently by a lower government level, decisions about productive investments and their financing should be taken at the regional level.

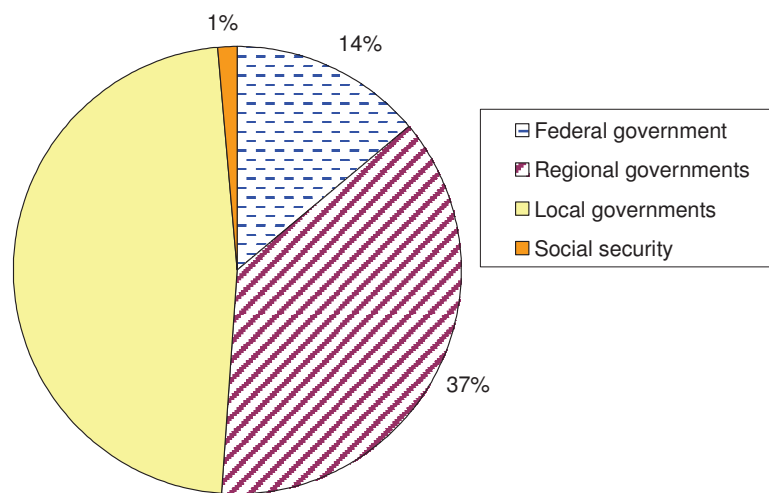
Enhanced regional debt competences allow investments to be tailored to local needs, in line with the “heterogenous preferences” argument. Another advantage is that investments will be more economically efficient when regions bear the full responsibility for their funding. Negotiations between the federal and regional level about regional projects will be avoided, ruling out asymmetric information problems, moral hazard problems and logrolling in investment decisions. *Asymmetric information problems* arise when regional governments have superior information about the necessity and productivity of investments, which they can hide if they want to obtain extra financing from the center. *Moral hazard problems* occur when regions free-ride on the federal budget, which is considered a “common pool” of finances, for which regions only have indirect and partial repayment responsibility. In Belgium, negotiations between the federal and regional authorities often lead to logrolling in investment decisions, where money is only granted to one region, if the other receives a comparable amount of funding for its own projects. This practice, the so called Belgian “Waffle Iron Politics”, leads to very inefficient outcomes.

Another important argument in favour of debt decentralisation can be derived from the division of “investment needs” in a federation. In line with the *golden rule*, which states that debt should only be issued for investment purposes and not for covering current deficits, we look at the share in capital expenditures of the different government levels. The situation for Belgium is depicted in Figure 2.⁶ Clearly, the

⁶The data were collected from the National Accounts 2008 of the National Bank of Belgium.

largest need for investment funding is observed at the subcentral level, since federal and social security investments only represent 15% of the total. 37% and 48% of capital expenditures are situated at the regional and local level respectively.⁷ This larger regional need for investment funding is a natural consequence of the division of competences between federal and regional governments. In Belgium, regional competences include public works, infrastructure, transport, housing, urban planning, environment and development.⁸ Given this division of competences, regional governments are best qualified to make productive investments in Belgium, and consequently should be given the means to finance them.

Figure 2: Share in capital expenditures (2008) (Source: NBB and own calculations)



Regionalisation of debt provides regional governments with the appropriate tools for productive investments to stimulate their economy. At the moment, regional projects in Flanders are often financed by “expensive debt” by means of Public Private Partnerships (PPP). This is a consequence of the federal limitation on Flemish debt, aimed at cutting the consolidated Belgian debt ratio. This off-budget project financing costs 60 to 80 basis points more in comparison to the interest rate of direct public debt, resulting in an extra yearly interest cost between 15 and 20 million euro for Flanders, as was indicated in the “Policy Note of the Flemish government 2009-2014”.

We added the entries “bruto investments in immovable property” and “other net purchases of non-financial assets”, but excluded “capital transfers to other sectors and governments”.

⁷Remark that the share of regional capital expenditures is probably even underestimated, since public private partnerships (PPP) constructions, or off-budget operations are not taken into account.

⁸Regional governments are also responsible for education, which can be considered as a productive investment in human capital. Other regional responsibilities are welfare, economy and foreign trade, employment, energy, sports, media, culture, agriculture, control of municipalities and provinces. The main responsibilities of the federal government are justice, defense, foreign affairs, pensions and health insurance.

2.1.2 More effective macroeconomic stabilisation policy

Debt regionalisation provides regional authorities with the appropriate tools for smoothing out temporary fluctuations in income, employment and prices. When a shock is *asymmetric*, which means that its impact varies between regions, it should be corrected by regional stabilisation policy. *Temporary* shocks, which are likely to only have a transitory effect, should be stabilized by lending and borrowing on credit markets, rather than by adjusting taxes or expenditures. If shocks to regional economies are negatively correlated, regions can borrow from each other or from the federal government in order to reach a more balanced distribution of taxes and expenditures over time.⁹ In this way, regions bear the consequences of risk-enhancing policies.

An alternative for providing insurance against adverse macro-economic shocks is the establishment of a federal tax and transfer system.¹⁰ However, such a central tax and transfer system is vulnerable to moral hazard problems, when regional efforts to avoid risky situations are decreased. Moreover, it reduces the regional need to adjust¹¹ when shocks have a permanent character and hence often leads to a permanent redistribution.¹²

In Belgium, recent empirical research shows that the current tax and transfer system is characterized by long term redistribution rather than short term stabilisation of *household income*. The federal solidarity mechanisms in the Special Finance Act are especially redistributive in the long term and are hardly stabilizing w.r.t. *regional government incomes* (Van Hecke, 2009).

When shocks are *symmetric*, which means that they are common to the entire country (or to the whole Euro area), a national (or European) policy is appropriate because of externalities and synergy effects. However, research showed that only a small proportion of shocks are country-specific, and that a significant proportion is industry-specific (De Grauwe, 2000). Measured in terms of employment effects, 80% of shocks have been either common to the whole EU area or region-specific (Patterson and Amati, 1998). Hence, with regional budgetary stabilisation policy and European monetary stabilisation policy, the rationale for an additional national policy evaporates.

⁹*Permanent* shocks, on the other hand, should not be financed by ongoing debt issuance, but should be corrected by changes in expenditures or taxes, or by structural adjustments of a.o. the labour market. Regions should therefore be given fiscal autonomy to deal with permanent shocks.

¹⁰Such a system could be more appropriate when we assume a Ricardian world. If rational consumers anticipate future tax liabilities when regions issue debt, and reduce their consumption accordingly, the demand effects of debt-financed transfers will be neutralized by these savings, and this can exacerbate an adverse macroeconomic shock (Von Hagen, 2007).

¹¹These transfers become a substitute for wage and price adaptations and for the mobility of labour, reducing the need to adjust to the new economic circumstances.

¹²It was argued that these kind of improper transfers contributed to historical debt accumulation in Belgium (De Broeck and Heremans, 1993).

2.1.3 Enhanced accountability and transparency

Assigning part of the federal debt to the regions enhances regional budgetary responsibility and effort by confronting each government with the *right budget constraint*.¹³ A correct budget constraint dictates that regional revenues should correspond to regional competences or expenditures, and that a corresponding part of debt servicing (interest payments and amortization) should be allocated to the regional level. The right budget constraint of a region at time t is illustrated formally in equation 1 (cf. De Broeck and Heremans, 1993).

$$\Delta B_t = G_t - T_t + r_t B_t \quad (1)$$

With G_t a region's competences or expenditures at time t

T_t a region's revenues at time t

B_t a region's debt at time t

r_t the interest rate at time t

In a federal state, a region's revenues mostly consist of own revenues T_t^1 and federal grants T_t^2 . The outstanding debt can be decomposed into own regional debt B_t^1 and federal debt B_t^2 which should be assigned to the region.

$$\Delta B_t = G_t - T_t^1 - T_t^2 + r_t(B_t^1 + B_t^2) \quad (2)$$

We argue that T_t^1 should be enlarged to bring own regional revenues into line with expenditures G_t . Hence, B_t^2 can be enlarged too (cf. infra). Regional participation in federal debt servicing can consist of a reduction in federal grants to the regions, which results in budget constraint 3.

$$\Delta B_t = G_t - T_t^1 - (T_t^2 - r_t B_t^2) + r_t B_t^1 \quad (3)$$

Where ΔB_t and T_t^1 are important tools for setting regional policy.

A larger debt assignment B_t^2 provides the right incentives for regional fiscal effort and makes regions participate in the risk of increasing interest rates.

Debt responsibility is a necessary condition for enhanced regional fiscal effort, in a sense that the right incentives are provided, but is it also a sufficient condition? We refer to the empirical research of Rodden (2006), who investigated the effect of irresponsibility, measured by the level of vertical fiscal imbalance (VFI)¹⁴, on the performance of subnational governments. He showed that an increase in VFI reduces subnational surplus as a share of expenditure by -0.084 if it is a constituent in a federation.¹⁵

Debt decentralisation also enhances transparency w.r.t. the question who is servicing the cost of the outstanding debt. Implicit interregional transfers through federal debt financing disappear, which is in line with enhanced accountability. Not

¹³Besides problems of unaccountability for cutting the Belgian debt rate, the problem of an increasing marginal cost with further fiscal efforts at the federal level is also solved in this way.

¹⁴Which is calculated by the ratio of grants over regional revenues.

¹⁵This result is significant at a 5% level for a cross-section analysis

only should debt be sustainable on an aggregated basis, but also in each region, such that situations where one region redeems debt, while the other triggers extra debt emissions, are avoided.

On the other hand, an argument in favour of national debt stabilization is the more diversified income base of the federal government, as is argued by De Broeck and Heremans (1993). From a political accountability perspective this is not a good idea, since it would lead to moral hazard problems and permanent transfers.

2.2 Arguments contra

2.2.1 Increased total cost of debt

An important argument against debt decentralisation is that such an operation could increase the interest cost on outstanding public debt considerably, since regional governments face higher credit and liquidity premiums, and thus higher interest rates. The higher *sovereign risk* of regions is a consequence of their lower ability to raise taxes, their smaller and more mobile tax bases, lack of risk diversification of centralized debt management and lack of access to monetary policies.¹⁶ *Liquidity risk* occurs because the secondary market for regional government debt is less developed. The number and amount of trades is limited in comparison to the federal public debt market, and expected costs and price effects for trading regional government bonds are reflected in the interest rate.¹⁷

Indeed, in literature it was shown that, on average, regional governments issue debt at a higher interest rate than central authorities do. Lemmen (1999) examines the explanatory factors of the mainly positive yield differentials between state and federal governments in Australia, Germany and Canada. In his dataset¹⁸, yield differentials for Australian states and Canadian provinces have at times exceeded 100 basis points, but they turn out to be smaller for the German Länder. Schulz and Wolff (2008) find out that the average yield spread between regional and central government debt in Germany is 8-28 basis points over the time period 1992-2007. Schuknecht, Von Hagen and Wolswijk (2009) show that over the period 1991-2005, German state governments paid a premium of about 26 bps over the benchmark

¹⁶The latter argument can't explain the extra sovereign risk of regional governments in comparison with the federal authority for countries which are a member of the Eurozone, since in those countries federal governments have no access to monetary policy either.

¹⁷Liquidity is characterized by four dimensions following Harris (1990): (1) *width*, or the bid-ask spread for a given number of bonds and commissions and fees to be paid, (2) *depth*, or the number of bonds that can be traded at given bid and ask prices, (3) *immediacy*, or how quickly trades of a given bond can be done at a given cost, and (4) *resiliency*, or how fast prices revert to former levels after they changed in response to large order flow imbalances initiated by uninformed traders. Although some economists in the past disapproved of liquidity, because of the financial instability of a liquid system, the encouragement of diffuse ownership and the discouragement of active investing (Keynes, 1935), a mere positive view prevails at the moment, since lower costs and easy trading are valued as more important, thereby attracting more participants which limit the price impact of trades and therefore increase stability in the market.

¹⁸The dataset covers the time period 1989-1997, 1992-1998 and 1993-1997 for respectively Australian, Canadian and German data.

Table 2: Credit ratings of the different Belgian governments (Source: Moody's Investors Service and Standard&Poor's)

	Moody's	S&P's
Belgium	Aa1	AA+
Flanders	Aaa	AA+
Walloon Region	Aa2	/
French Community	Aa1	/
Brussels	/	AA

bond, while Spanish regional governments paid an extra 70 bps. However, these premiums fell significantly after the introduction of the Economic and Monetary Union in 1999, which could be explained by a reduced liquidity premium after the introduction of a common currency, which increased the substitutability of bonds of different countries and the market size.

De Grauwe (1994), however, points out that this outcome of higher regional interest rates is not inevitable; much depends on the creditworthiness and fiscal performance of regions, which are also important determinants of the interest rate. A more balanced division of debt responsibilities over higher and lower tier governments could improve fiscal performance at both levels of authority, and therefore lower interest rates. The sovereign risk premium of an accountable region is therefore not necessarily higher than that of the federal government, as is shown in Table 2 by the better credit rating of Flanders in comparison with the Belgian federal government.

2.2.2 Negative spillovers of a regional debt crisis

The fear for debt explosions in economically weak regions, with negative externalities for the rest of the country, is a strong argument for keeping debt management at the central level in Belgium. Debt accumulation in one region could increase interest rates in the other regions or could lead to a full-blown financial crisis. Especially under the current Special Finance Act with very limited regional fiscal competences, regional governments' only recourse is a bailout from the federal authority. The risk of debt distress in weaker regions can be lowered substantially when granting more fiscal autonomy to the regions and when dividing the debt horizontally according to the ability-to-pay of regions. However, supervision and monitoring of regional debts by the High Council of Finance, which performs this task since 1989 when the Belgian regions were given some debt competences, will remain necessary. As a consequence of the recent Greek and Irish debt crises, this debt monitoring becomes more and more a European task.

2.2.3 Lack of regional fiscal autonomy in the federal framework

An important condition for debt regionalisation is a sufficient amount of *regional fiscal autonomy*. It makes no sense assigning debt to regional governments who, by lack of substantial own fiscal revenues, are not able to repay and manage this debt themselves. In that case, a reliance on federal bailouts would result, and the desired accountability and increased fiscal effort will not be realized. Regions could not even be blamed for these bailout expectations, because they lack the means to solve the problem themselves¹⁹, and so they should be given the appropriate tools to make accountability for debt work. Like Alexander Hamilton already stated in the 18th century: “*The creation of debt should always be accompanied with the means of extinguishment*”. The inextricable link between debt responsibility and fiscal autonomy is also intuitive if debt is regarded as an intertemporal shifting of taxes.

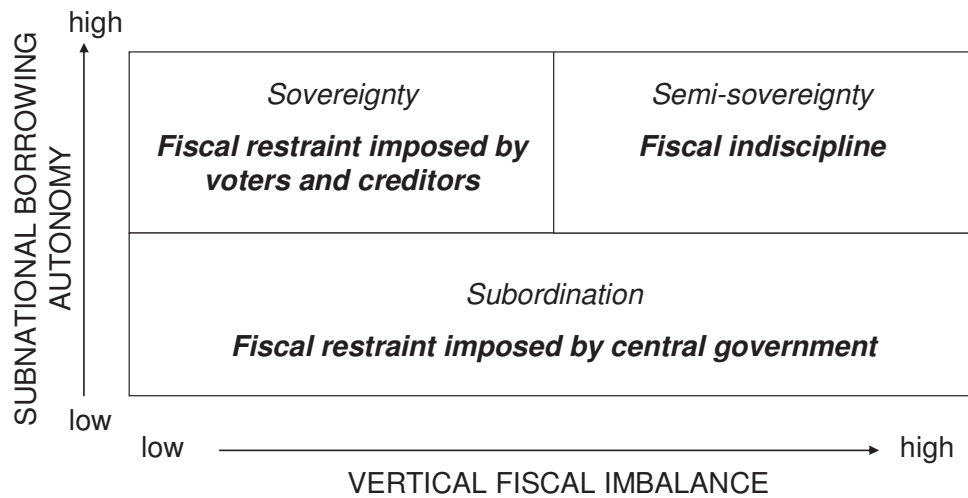
The importance of regional fiscal competences for regional fiscal effort is also illustrated in Figure 3, where “*Vertical Fiscal Imbalance (VFI)*” measures grants-based financing and is the opposite of fiscal autonomy. The importance of a federation’s fiscal framework for debt regionalisation becomes clear. When VFI is high, or fiscal autonomy is low, fiscal indiscipline results when debt autonomy is not constrained by centrally imposed rules. More fiscal autonomy involves a shift towards fiscal discipline, as can be seen in the upper left quadrant. For accountability, it is important that a region is perceived to be “*sovereign*”.

Debt regionalisation should be accompanied by more tax autonomy, since fiscal competences are also important for the credibility of regional governments on financial markets. One’s own reputation of creditworthiness, independent of the federal level, is established through the ability to raise taxes; if investors believe that the federal government implicitly guarantees regional debt, bailout expectations lead to *investor moral hazard*, with investors asking a too low interest rate (in this case, the regional risk premium will be as low as that of the center). The market loses its function of signalling unsustainable regional debt paths, because regions are not considered to be sovereign.

Debt decentralisation should therefore be linked to more regional fiscal autonomy, but the reverse reasoning also holds: the transfer of fiscal autonomy to lower tier governments should be linked to more debt responsibility. As the fiscal capacity of the federal government becomes more and more eroded, its debt servicing capacity shrinks too. Devolution of fiscal autonomy triggers federal difficulties w.r.t. debt servicing, which should be solved by eventually relieving the federal government from part of its debt burden.

¹⁹As A. Hamilton stated “*Mostly, it is impossible to decide whether the pecuniary delinquency of states had proceeded from disinclination or inability, but the pretence of the latter would always be at hand*” (Rodden, 2006).

Figure 3: Effect of federal fiscal framework on regional fiscal performances (Source: Rodden (2006))



3 Vertical debt sharing

Looking at the current vertical debt sharing in federal countries in Figure 1, we notice that the amount of Belgian regional debt seems rather limited at first sight. However, to be able to evaluate whether this amount of regional debt is large or small, more information is needed, such as the degree of decentralisation of revenues and expenditures in the particular federation. In other words, a criterion of optimal debt division should first be defined.

3.1 Criteria for optimal vertical debt division

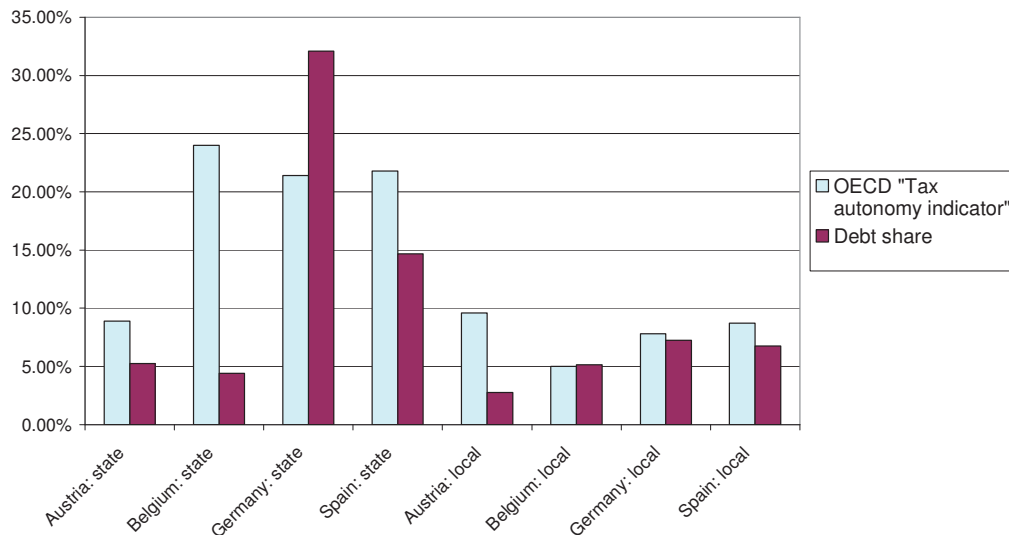
3.1.1 Fiscal capacity

In the previous section it was argued that debt competences should be linked to the fiscal competences of a particular government level. Hence, the degree of regional fiscal capacity limits the scope for debt decentralisation, making fiscal capacity our first criterion of optimal vertical debt division.

As a first indicator of fiscal competences of higher and lower tier governments, we use the *OECD tax autonomy indicator*, which is defined as the share of sub-central government tax revenues in total tax revenues of the general government (Blochliger et al., 2009). Tax revenues include social security contributions, but neglect intergovernmental grants. Remark that this OECD indicator comprises all tax receipts of regional authorities, regardless of the regional power to set rates and reliefs. It thus also includes all kinds of tax sharing arrangements between higher and lower tier governments, in a way that it doesn't reflect *real* or *direct* tax autonomy. Therefore it is more correct to call this indicator a measure of "tax receipts" rather than "tax autonomy". Figures for 2005 are shown in Figure 4, which also includes

the share of regional and local debt in 2008. When comparing the share of fiscal receipts to the share of debt, the ratio of debt to fiscal autonomy is remarkably low for the Belgian regions, especially in comparison to that of the German Länder and the Spanish regions. Belgian regional authorities receive about one fourth of total government tax income, but their share in total debt is only 4.4% in 2008. The relationship is more balanced for the Belgian local governments: 5% of tax autonomy corresponds with 5.1% of debt which is local in origin. When considering tax receipts as a criterion for vertical debt reallocation, debt could be regionalized to the extent that relative regional tax receipts exceed the relative regional debt burden.

Figure 4: Share in total tax revenues versus share in total debt of subnational governments (Source: Eurostat, OECD and own calculations)



However, since the OECD measure doesn't reflect *real* fiscal capacity, we want to exclude all kinds of tax sharing arrangements between the federal and regional authorities. More detailed information about regional discretion on tax rates and tax bases is provided in Figure 5, which indicates the composition of the regional tax share in Figure 4. Redrawing Figure 4 by only including taxes if subcentral governments have *full discretion on rates and reliefs*, produces the picture in Figure 6. Apparently, after the exclusion of tax sharing arrangements and other tax receipts when regional competences are limited, the regional share in Belgian debt turns out to be proportional to the share of real fiscal autonomy. The counterintuitive result for Germany can be explained by the fact that the tax receipts of the Länder are large, but direct competences to change rates and reliefs are limited.²⁰

A clear definition of which fiscal competences are important for debt division is

²⁰Although the Länder indirectly influence federal decisions through their representation in the Bundesrat.

Figure 5: Taxing power of regional governments in European federations (Source: OECD and own calculations)

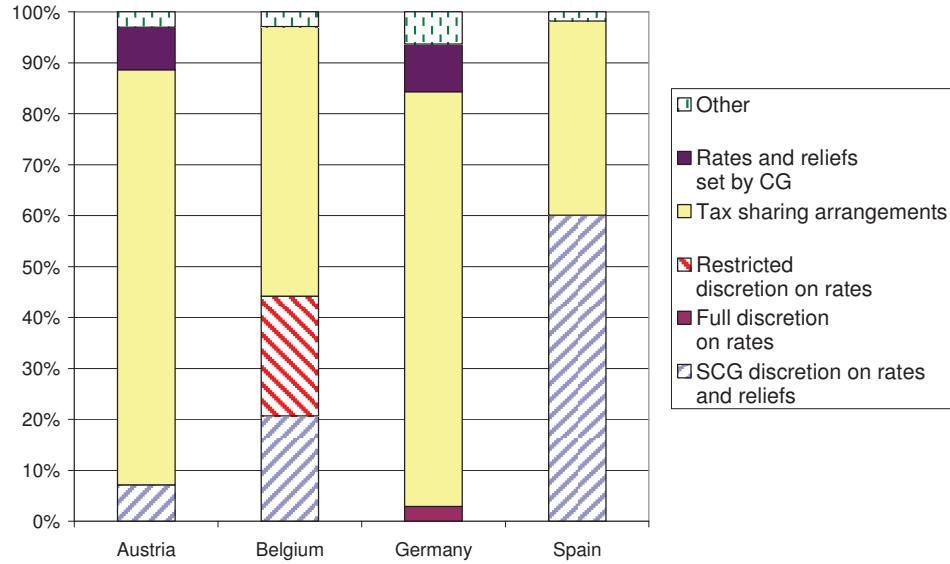
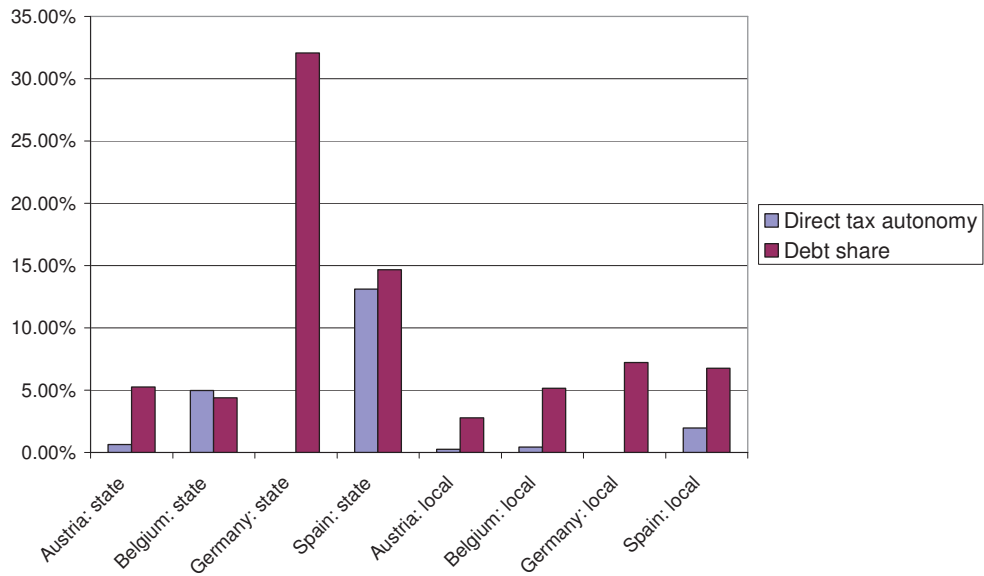


Figure 6: Share in fiscal autonomy versus debt share of subnational governments (Source: Eurostat, OECD and own calculations)



thus essential. Thinking about the German case, tax collection competences or indirect tax setting power through regional representation in the federal governments, can be taken into account to evaluate the debt-bearing capacity of the Länder.

Table 3: Overview of devolved tangible immovable assets to the Belgian regions in 2000 (Source: Balance sheet of the federal government at the end of 1999.)

[!h]

	Asset value (in billion euro)	Share of total (in %)	Share of government (in %)	Share in regionalized assets (in %)
Federal government	10.9	17.8	18	/
Flanders	25.3	41.3	82	50.4
French Community (incl. German Comm.)	2.4	3.9		4.8
Walloon Region	16.4	26.8		32.7
Brussels	6	9.8		12.0
Community Commissions	0.2	0.3		0.4
TOTAL	61.2	100	100	100

3.1.2 Ownership of assets

If governments abide by the *golden rule*, which dictates that debt should only be issued for investment purposes and not for covering current deficits, debt issuances are counterbalanced by assets on the other side of the balance sheet.²¹ The ownership of these assets can be used as a criterion for vertical debt division.

Data about the division of assets in the Belgian federation can be found using the “Commission for the inventory of the assets of the state”. In its most recent report, providing data for 2000, it indicated that 82% of total tangible immovable assets were devolved to the regions and the communities, including 75% of land areas, 49% of buildings and almost all infrastructures. Table 3 shows the distribution of assets across governments.²²

With a regional debt share of only 4.4% in Belgium in 2008, the opportunity for debt regionalisation is quite large when the optimal regional debt level is derived from the ownership of assets. The large capital surplus on the balance sheet of the regional government level is the result of the asymmetric Belgian federalisation process, which devolved many assets, but kept liabilities at the federal level.

²¹Not only liquidation costs but also the “going concern value” could generate income for debt repayment and interest costs. The *going concern value* is the value of a project or company as an operating venture. The difference between the liquidation value and the going-concern value is the value of intangibles associated with the running of the business, such as goodwill and intellectual property.

²²Note that immovable assets, which are included in financial participations, are neglected. The 32.9 billion euro of assets, which the French community transferred in 1993 to the provincial public companies for the administration of school buildings are not included, as well as the 5.5 billion euro which Brussels transferred to the public company for the administration of Brussels school buildings. The community commissions in Table 3 are administrations of the Flemish and French Community in the region of Brussels, responsible for community matters in the bilingual capital area.

3.1.3 Need for investment funding

Instead of looking at the revenue side or at the debt servicing capacity, a last criterion of vertical debt division could be derived from the expenditures side, or from the need for debt competences. As was already shown in Figure 2, the regional level is best qualified to make productive and efficient investments in the economy, and should therefore be given the tools to finance these. According to Figure 2, there is room for a regional debt load of 37%. Since this criterion lacks any concern for the repayment of debts, it is only mentioned here for reasons of completeness.

3.2 Financial-technical scenarios of debt decentralisation

This section deals with the different ways in which debt decentralisation can take place in practice. An important concern is how this can be done without making financial markets lose confidence in these public debt investments. We refer to Boothe and Harris (1991) and De Broeck and Heremans (1993) for some earlier reflections on possible scenarios for regionalizing debt. The liabilities transfer can be formal, by replacing federal securities with regional ones, or by putting them into a common debt agency which is financed by the regions. In other scenarios, debt is only indirectly devolved, for example when regions participate in federal interest burdens or take on pension obligations to discharge the federal government from part of its “future” debt.

3.2.1 Debt conversion

A first option is the mere replacement of federal debt by regional securities. The conversion can take place immediately, but in order to avoid liquidation costs of federal securities, a gradual replacement when federal debt matures seems to be more appropriate. The maturity scheme of Belgian federal debt, which can be found in Figure 12 in Appendix A, indicates that in this way, most of the Belgian federal debt can be replaced over the next ten years.²³ Since in this scenario regions don't bear any responsibility for debt assigned to the other regions, this could make investors lose confidence, particularly in the debt of economically weak regions. Higher risk and liquidity premiums could significantly increase the total cost of debt.

3.2.2 A common debt agency

A second scenario consists of the establishment of a common debt agency, which takes on debt management on behalf of the regions. In this way, the transfer of part of the historical federal debt will be smoother: securities must not be replaced and interest rates are kept at the same level when a federal guarantee remains or when regions are jointly liable²⁴. Debt servicing obligations (i.e. interest and amortization

²³In the meantime, the subnational entities could issue debt with the same maturity as federal debt, which is held as an asset by the federal government (Boothe and Harris, 1991).

²⁴If parties have a *joint liability*, then they are each liable up to the full amount of the obligation, in contrast with a *several liability*, where the parties are only liable for their respective obligations. We advise, in this case, a *joint-and-several liability*, which means that each of the regions can be asked to pay the full amount (joint liability), but they have recourse to payment by the other

payments) are divided between the regions on the basis of a fixed division key.

This arrangement has a precedent in Belgian history, since it was already applied to the regionalisation of liabilities from the National Housing Corporation and the National Land Corporation.²⁵ After the devolution of social housing competences to the regions in 1980, an amortization fund was established to transfer the national debts attached to these competences to the regions. In 1987, the *Amortization Fund for the Liabilities in Social Housing (ALESH)* was established in order to manage former national debts on behalf of the regions. Debt servicing obligations were horizontally divided across the three regions proportional to the regional investments that were financed by these debts.²⁶ Debts are formally attributed to the regions, but the rolled-over debts are again given a federal guarantee.

Furthermore, such a common debt agency can also be used for pooling new debt issuances of regions, analogous to the German Jumbos, which are joint debt issuances of German Länder. The lower interest rate, because of enhanced liquidity and a better diversification of risks, could be beneficial to each region. Regions could pay their own interest rate in the market for these emissions, in accordance with the proposal for the issuance of Eurobonds of De Grauwe and Moesen (2009).

3.2.3 Participation in interest rates or future liabilities

In contrast to both former scenarios, where part of the federal debt is formally assigned to the regions, debt regionalisation could be restricted to the indirect transfer of debt servicing liabilities. These arrangements are particularly preferable under the current situation in Belgium where the limited amount of regional fiscal autonomy does not allow for true debt decentralisation.

First, regions may only contribute to federal interest payments. This arrangement involves less practical and legal problems, since fiscal autonomy and debt responsibility can be kept at the center, and it can be done by a simple reduction of federal grants to the regions. Regional participation can also be limited to the risk of increasing interest rates, for example De Witte (1997) proposes to let the regions participate in the extra burden when rising interest rates frustrate a given federal repayment scheme.

Secondly, regions can also participate in the *implicit* –or *future*– debt, which is contained in expected extra expenditures in the future. In Belgium, for example, pension liabilities for public servants of regional governments could be devolved to the regions. Moreover, this is beneficial from an accountability perspective, since the size of these obligations depends on regional policy.

regions afterwards.

²⁵KB 18/12/1990 houdende verdeling van het vermogen van de Nationale Maatschappij voor de Huisvesting aan het Vlaamse Gewest, aan het Waalse Gewest, aan de Brusselse Gewestelijke Huisvestingsmaatschappij en afsluiting van de ontbinding.

KB 18/12/1990 houdende verdeling van het vermogen van de Nationale Landmaatschappij aan het Vlaamse Gewest en aan het Waalse Gewest en afsluiting van de ontbinding.

²⁶In other words, the “historical benefit principle” was applied, cf. *infra*.

4 Horizontal debt sharing

In this section an elaborate search for an optimal *horizontal* division rule between the different regional governments is conducted. First, it is investigated whether there are legal criteria for the division of debt of seceding states established in international law. Second, inspiration is drawn from historical precedents, showing which rules are feasible in practice. Third, an elaborate overview is given of the available economic criteria of debt division, which we classify according to the degree of accountability or solidarity involved. The choice of a particular rule will be discussed, providing a horizontal division principle which will be applied in simulations in section 5.

4.1 Legal criteria in international law

The separation of assets and liabilities with the break-up of states presents a vacuum in international law. In 1963, an International Law Commission (ILC) started to work on the codification of law w.r.t. the succession of states, but concluded after a decade that such work was too difficult “in a field where there was no general doctrine and state practice and custom had not yet produced well established and consistent precedents” (Hasani, 2006).²⁷ In search of an international common rule for debt division, one often refers to the *Vienna Conventions I and II (VC I and II)*²⁸. These international treaties, promulgated in 1978 and 1983, contain provisions w.r.t. the succession of states, which however remain at the level of guiding principles. The “*principle of agreement*” states that all succession issues should first be settled through an agreement between the successor parties. In case of failure of consensus, the “*principle of equity*” should apply, which says that successor states have to assume an “equitable” portion of general debt.²⁹ VC II adds that the “equitable” division should establish a balance between the division of assets and debt undertaken by the successors (Hasani, 2006). The vague definition of “equity” is the reason that the concept turns out to be of little practical help since it is susceptible to divergent interpretations. Furthermore, the authority of these treaties can be questioned, since only 15 states³⁰ have ratified VC I and so few states have consented to VC II that it has not yet entered into force.

However, Rowlands (1997) points out that, even if a clear explicit rule would have been established in international law, no such rule can be imposed on a seceding region, since this infringes the principle of “*state sovereignty*”. State sovereignty implies that, once seceded, no supranational authority can impose a settlement.³¹

²⁷Some of the work of the ILC was used afterwards however in the Vienna Conventions.

²⁸VC I: Vienna Convention on Succession of States in respect of Treaties (1978).

VC II: Vienna Convention on succession of states in respect of state property archives and debt (1983).

²⁹This was not the case for post-colonial states, which are subject to the “clean slate” rule, which says that the new state does not inherit obligations of the colonial power.

³⁰Which are Bosnia, Croatia, Cyprus, Czech Republic, Dominica, Ecuador, Egypt, Estonia, Ethiopia, Iraq, Liberia, Morocco, Saint Vincent and the Grenadines, Serbia, Seychelles, Slovakia, Slovenia, Macedonia, Tunisia, and Ukraine.

³¹Also because new states submit to supranational institutions only on a voluntary basis, no countermeasures by other successors and creditors can be used against states that act in bad faith.

In practice, political, economic or military pressure to submit to a supranational institution can be exerted on the new state.

International pressure on the way assets and liabilities are divided, can also come from creditor lobbies (Paris Club, London Club, ...) and international lender institutions (IMF, World Bank, ...). Since the interests of the private creditors are not subject to international law³², the defense of creditor rights takes place by lobbying. Creditors are mainly interested in securing their assets, thus advocating a division of debt according to the ability-to-pay of the successor states.

4.2 Historical precedents

When studying the historical precedents, it is found that no customary rule can be derived from the variety of applied rules. The actual division often depends on the particular situation and the bargaining strength of seceding regions. War situations result in each party trying to gain at the detriment of others. Theoretically, bargaining over debt division can be seen as a Rubinstein game, in which delay in agreement imposes costs on both parties. In that case, the division rule will reflect the relative penalties endured by each party (Rowlands, 1997).

Czechoslovakia Only three years after the “Velvet Revolution”, which was a non-violent revolution that initiated the overthrow of the Communist regime in 1989, Czechoslovakia negotiated a peaceful break-up with its “Velvet Separation” on January 1st, 1993. Dedek et al. (1997) point out that, because of constructive cooperation, difficult issues such as the division of federal property were solved in an exceptionally short period of time.³³ Most federal assets and liabilities were divided according to the population share of the Czechs and Slovaks within former Czechoslovakia. The richer Czech Republic assumed 2/3rd of total debt.³⁴ It was agreed that the successor states Czech and Slovak Republic would conclude new agreements with the creditors. Claims and liabilities of the Czech and Slovak Federal Republic (CSFR), resulting from repayable financial grants and from guarantees for domestic bank loans, were assigned to the republic in which the debtor resides.

Yugoslavia Hasani (2006) points out that, following a war situation in the early nineties, the agreement on succession issues between the five successor states³⁵ that emerged from the dissolution of former Yugoslavia in 1992, was not an easy matter. Only in 2001, with the signing of the Succession Agreement (SA) between all parties, a comprehensive agreement about the division of assets and liabilities was reached.

³²See Hasani (2006). Only interests of the parties taking over the debt (debtors) are considered.

³³Rowlands (1997) remarks that the size of the Czechoslovak foreign debt was relatively small (\$9.3 billion in 1992), so under these circumstances foreign creditors would be willing to accept almost any division rule.

³⁴A special agreement was reached concerning the liabilities vis-à-vis the IMF, where a ratio of 2.29 to 1 was used instead of 2 to 1.

³⁵The five successor states are Slovenia, Macedonia, Bosnia-Herzegovina, Federal Republic of Yugoslavia and Croatia.

The division formula was based on a proposal by the IMF, containing several factors, such as the relative contribution to GDP and to Yugoslav exports.

Soviet Union After several failed attempts³⁶ to divide the assets and liabilities of the former Soviet Union, a modified “zero option agreement”³⁷ was reached, in which the total foreign debt (except for the 16.4% share attributed to Ukraine), as well as all property and financial assets were taken over by Russia (Rowlands, 1997).

Kingdom of the Netherlands With the separation of Belgium from the Kingdom of the Netherlands in 1830, the discussion regarding the division of debt was prolonged and rather fierce. During the negotiations, a per capita division rule was proposed by the Dutch party. Since the Belgian population was twice as high as the Dutch population, and because this would mean that Belgium had to assume 2/3rd of a debt, which was for 7/8th issued to finance the Dutch colonies, public works and exclusive needs of Holland, this rule was not accepted (Janssens, 1998). The continuation of the negotiations had to be enforced by an embargo against Holland, with the French and British barricading the Dutch coast. The final agreement encompassed a more or less fifty-fifty division of the common public debt, taking into account the relative tax contributions of Belgium and Holland over the period 1827-1829.

Other examples Great Colombia and the Central American Federation used a per capita division rule, while the debt of the Austro-Hungarian and the Ottoman Empire was divided by a division key based on relative tax contributions. For the split-up of the Central African Federation, relative GDP was used (Rowlands, 1997).

Future break-ups? We can also refer to counterfactual studies conducted by regions pursuing secession. Quebec, a region seeking independence from Canada, has already studied the particular issue of debt division. Debt division rules can be found in the reports³⁸ of the Bélanger-Campeau Commission, which is an institution established by Quebec to examine its political and constitutional status and to make recommendations for change. In the original proposal, different division rules are used for different categories of debt, as was described by Boothe et al. (1991).

- The *basic method* of calculation of the debt share that Quebec has to assume is based on the relative asset share. After the division of each type of asset, the share of debt corresponds to the weighted average of these asset shares.
- *Pension liabilities* are divided on the basis of federal government employees residing in Quebec. For parliamentarians and judges, the share in the Canadian population is used.

³⁶The joint-and-several liability, in which all successor states share responsibility for ensuring the repayment of pre-existing debts, led to serious moral hazard problems (Rowlands, 1997).

³⁷Other examples of the zero option rule are Panama’s separation from Colombia, Bangladesh’s separation from Pakistan and most cases of decolonization.

³⁸The Commission published a report in 1991 and a revised one in 2002.

- The *accumulated deficit*, which points at the liabilities related to the provision of goods and services, is divided according to the share of future taxes that the federal government expects to raise in the region³⁹.

4.3 Economic criteria

4.3.1 Historical benefit principle

When applying the *historical benefit principle*, the central question is: “Who benefited from federal debt accumulation in the past?” The idea is that seceding regions should pay for the benefits they received from being part of the federation. This rule is intuitively appealing from an accountability point of view, but it can also be criticized because it is only backward looking. This criterion of debt division disregards the environment in which the debt was built and it holds regions responsible for *national* policies. Also the fact that it assigns the responsibility of past debt creation to current generations can be questioned. Since in most cases the historical benefit principle assigns a disproportionate large part to economically weak regions, its application is not recommended if one cares about debt repayment and fiscal sustainability.

With the practical implementation of the historical benefit principle, another important question arises: “to what extent is federal debt attributable to a region?” In the literature, we distinguish three different ways to apply the historical benefit rule in practice, depending on the interpretation of “benefits” that are attributable to a region. Firstly, in a very broad sense, benefits could refer to the difference between relative contributions and benefits of a region’s inhabitants (*allocation principle*). Secondly, more narrowly defined, benefits are only measured by investments or expenditures that are attributable to a region (*benefit rule*). Thirdly, a very narrow interpretation of benefits leads to the allocation of debt to the recipients of interest payments on federal debt, or to a division based on *regional debt ownership*.⁴⁰

When discussing the alternative implementations of the historical benefit principle hereafter, we refer to two studies. First, the study of Van Rompuy and Bilsen (1988) simulates a regionalisation of interest burdens in Belgium, in order to be able to calculate interregional transfers through the financing of federal public debt. Second, we refer to the elaborate study of Jurion et al. (1994)⁴¹ about the regionalisation of interest payments in Belgium, which implements the historical benefit rule in the above defined ways. More particularly, Jurion et al. (1994) calculate the part of the interest burden the Walloon Region would have to assume if interest payments were totally (separatist view) or partially (federalist view) divided based

³⁹These expectations are based on historical data.

⁴⁰Of course, besides direct financial transfers, other benefits from being part of a federation can be considered, for example economies of scale, international market power, being one country with an important area of distribution, ... In this respect, rich regions could have also benefited from a union with poorer regions. These kinds of benefits, however, are very difficult to measure, and therefore mostly neglected.

⁴¹Which was published by the economic and social council of the Walloon government and the universities of Lige and Mons-Hainaut in 1994.

on, respectively, the relative budgetary situation of regions when debt was divided in the past (allocation principle), when the relative participation in historical public expenditures is considered (benefit principle), and when the regional share in debt ownership is used as a horizontal division rule.

Allocation principle The allocation principle focuses on the *net recipients* of public expenditures and investments, considering the regional share in contributions and expenditures. The full regional responsibility for both contributions and spending adheres to the principle of “juste retour”. The applied methodology is the following; first, it is assumed that all debt is regionalized some time in the past. After the debt split in that particular reference year, equation 4 is applied. Regional debt grows with the interest rate⁴² and with (negative) regional primary balances, which are calculated by regionalizing all government revenues and expenditures. The resulting relative debt burdens in a particular period T , as illustrated in equation 5 are used as a rule of horizontal debt division.

$$D_{t+1}^i = (1 + r)D_t^i - PB_{t+1}^i \quad (4)$$

With D_t^i debt in region i at time t

PB_t^i the primary balance of region i at time t

$$\delta^i = \frac{D_T^i}{\sum_i D_T^i} \quad (5)$$

Van Rompuy and Bilsen (1988) observe the budgetary situation of the Belgian regions over the period 1975-1985 under the assumption that debt was divided in 1975, based on a simple key such as the regional share in total government revenues. Adding deficits to the regionalized debt, and deducting surpluses, leads to a situation where 31.2% of the debt belongs to Flanders, 61.8% to Wallonia and 7% to Brussels after the considered time period of 10 years. Notice that the initial theoretical division in 1975 was based on the ability-to-pay of regions, which is beneficial to Wallonia and Brussels from the start.

Jurion et al. (1994) also make a reconstruction of the hypothetical debt situation of the regions, if all federal debt was decentralized in 1952. The initial division in 1952 is based on the population share. Interest burdens are assigned pro rata of the debt situation of regions, taking into account the budgetary constraints they would have faced. This results in a Walloon debt share varying from 10% to 45%, depending on the assumptions, which include corrections for “good governance” and “solidarity”. *Good governance* puts a maximum on regional expenditures, assuming a correcting action of Wallonia when debt burdens explode. *Solidarity* puts a minimum on Walloon revenues, under the assumption that a solidarity mechanism would have been installed in favour of economically weaker regions.

⁴²Using the yearly implicit interest rate on federal debt as regional interest rate.

Benefit principle Instead of considering *net recipients* of federal public expenditures, the benefit principle only takes into account the expenditures side or, in other words, the *recipients* of federal expenditures are considered.

Jurion et al. (1994) first assign national expenditures (without interest burdens) to the regions, making use of the incidence principle, which looks at the place of residence of the beneficiary.⁴³ Over the period 1953-1974, only capital expenditures are regionalized, since in that period debt was only issued for investment purposes (golden rule). From 1975 onwards, debt was also used for covering current expenditures (Keynesian view), and both capital and current expenditures are regionalized.⁴⁴ A mixed division key, weighing capital and current expenditures with their relative contribution to debt accumulation, allocates 33.2% to the southern part of Belgium. Alternatively, the share in immovable assets (34.2%) or the relative share in government investments (34.8%) was used.

Van Rompuy and Bilsen (1988) also assign interest payments by the benefit principle, looking at the localization of the different categories of income earned from government expenditures. With respect to *investments*, the benefit principle looks at the place where the infrastructure was realized. *Public services and social security transfers* are assigned to the regions where the beneficiaries live. *Interest payments* are allocated to the region of residence of the creditors.⁴⁵ The results allocate 53.4% of federal debt to Flanders, 35.6% to Wallonia and 11% to Brussels.

Regional debt ownership In a very narrow sense, the benefits of federal debt accumulation can be defined by the interest payments that investors in public debt securities receive, although the rationale of allocating debt to the people who finance it, is not very clear. Since creditors have the opportunity to invest in other assets in international capital markets as well, and to the extent that the investment conditions are not considerably better, no one really “benefits” from investing in public debt securities. However, one could argue that this rule is the *default sharing rule*, or the way debt will automatically be divided when no agreement is reached, analogous to the division of assets and liabilities in bankruptcy cases. This judicial logic is nevertheless not supported by any rational economic principle, although some argue that, to the extent that regional debt ownership reflects the financial strength of a region, this rule implicitly measures the ability-to-pay.

Since a large share of Belgian public debt is held by foreigners and because data concerning the region of residence of the investors is unavailable, the practical implementation poses some problems. In most studies, foreign debt is either ignored or detracted from the assets that have to be divided, under the assumption that foreign debt is senior debt. Jurion et al. (1994) combine the Walloon share of

⁴³In contrast to the localization principle, which assigns expenditures to the region in which the expenditures were made.

⁴⁴In 1975, there was a transition from a double budget (separating capital from current expenditures) to a single budget in Belgium.

⁴⁵Since no data about regional ownership of federal debt is available, regional dispersion of movable property is used as a proxy.

movable property and of gross value added of the financial sector to determine its shares of regional debt ownership. Consequently, 20% of the federal interest burden is assigned to the Walloon Region.

Overview The results of the previous sections are summarized in Table 4. Depending on the interpretation of the historical benefit principle, the share of Flanders varies from 31% to 53%, while that of Wallonia varies from 10% to 62%.

Table 4: Regional debt share dependent on the interpretation of the historical benefit principle (in %) (Source: Van Rompuy and Bilsen (1988), Jurion et al. (1994))

		Flanders	Wallonia	Brussels
Allocation principle	VR-B	31.2	61.8	7
	JU		10-45	
Benefit principle	VR-B	53.4	35.6	11
	JU		33.2	
Regional debt ownership	JU		20	

4.3.2 Ability-to-pay principle

The *ability-to-pay principle* refers to the question “what is the capacity of a region (or its population) to bear debt?” The purpose of assigning debt to the one who is most able to service it, is intuitive if one cares about stabilization and repayment of debt without a major increase in the tax burden on the inhabitants of poorer regions. As we saw in the previous section, in historical break-ups the applied debt division rule always included some form of the ability-to-pay principle.

Per capita rule Debt can be divided according to the share of the population in each region, supposing that it is the individual who should bear the costs of past federal expenditures. Assigning an equal share of the debt to each citizen equalizes the debt per person ratio across regions. This static rule however ignores population prospects (f.e. due to ageing)⁴⁶ and migrations between regions.

Per employed worker This rule is more in line with the fiscal capacity of the inhabitants, taking into account the economic structure of the population. A division according to the relative size of the regional workforce is in line with the intuition that taxpayers will repay the debt. Solidarity with low employment areas is contained in the debt division formula.

⁴⁶Including population prospects can significantly influence the debt division rule. For example, following the population prospects of the Belgian federal planning office, the Flemish population share will drop from 57.6% to 55.3% over the period 2010-2060.

GDP/GNP rule A static GDP/GNP rule equalizes the current debt-to-GDP/GNP ratio across regions, while a more dynamic rule includes economic prospects, eventually also capturing the effect of secession on *future* economic performances.⁴⁷ In practice, one often calculates average *past* shares of regional GDP, although this could lead to strategic behaviour when deciding which years are to be considered for calculating this average. When a large part of regional GDP is produced by commuters and people pay most taxes in their place of residence, it is more appropriate to base debt division on regional GNP.

Regional tax base/ tax shares Since fiscal capacity is important for the repayment of debt, a division according to the regional share in the tax base or in tax contributions is a realistic option.

Overview The resulting debt shares when applying the above described division keys to the Belgian federation are illustrated in Table 5. Depending on the measure of ability-to-pay under consideration, the Flemish share in regionalized debt varies from approximately 58% to 63%.

Table 5: Debt division based on the ability-to-pay principle (in %) (Source: Ecodata, WSE, regional accounts and own calculations)

	Flanders	Wallonia	Brussels
Per capita rule (2008)	57.8	32.4	9.8
Per employed worker (2008)	61.4	29.6	8.9
GDP rule (2008)	57.9	23.4	18.7
GNP rule (2007)	63.2	26.9	9.9
Tax base (primary household income 2007)	62.7	28.2	9.2
Tax revenues (personal income taxes, 2008)	63.3	28.3	8.4

4.3.3 Sustainability principle

Sustainability of debt is a particularly important principle for creditors, since it minimizes the risk of debt distress. For defining “sustainability”, generally a reference is made to the condition that the “debt burden should not become problematic in a way that a country can no longer service it”. In the eighties, a significant strand of literature w.r.t. *debt servicing capacity* was developed to investigate how sustainability (especially of developing countries) can be measured.⁴⁸ In general, debt sustainability is measured by the *ratio of debt to GDP*, but Wyplosz (2007) stresses that it is the source of revenues which is used to service the debt that matters.

⁴⁷Taking into account expected relative GDPs. For example, Vaillancourt (1995) predicted a 2% decline in Quebec GDP and a 1% increase in the GDP of the rest of Canada after a Quebec secession from Canada.

⁴⁸In general “debt servicing capacity” or “debt capacity” could refer to either the optimal level of debt a country should take on, or to the sustainability of debt policies.

Therefore, it is better to look at government revenues (which depend on tax rates and economic growth) for internal debt and at exports for external debt. External factors such as interest rates and exchange rates also play an important role. Debt sustainability is influenced by a myriad of factors, and consequently measured by many different criterions.

In practice, debt sustainability analysis is mostly based on the combination of a general framework and a country-specific analysis. In this respect it is interesting to consider the methodology of credit rating agencies for assessing debt sustainability when setting credit ratings on regional governments. As is shown in Appendix B, for regional governments, besides a region’s intrinsic credit strength, the likelihood of extraordinary support from a higher-tier government is also important.

The IMF and the World bank, dealing with debt sustainability as official lenders, use a standardized *Debt Sustainability Analysis* (DSA) framework (Cassimon et al., 2008). The IMF defines debt sustainability as follows: “An entity’s liability position is sustainable if it satisfies the solvency condition without a major correction in the balance of income and expenditure, given the costs of financing it faces in the market” (IMF, 2002). Solvency is measured by equation 6, requiring that the present discounted value of current and future primary fiscal balances (or future revenues, net of non-interest expenditures) is larger than the present value of all future public debt servicing obligations. The *solvency condition* is formalized in equation 6.

$$\sum_{i=0}^{\infty} \frac{R_{t+i} - E_{t+i}}{\prod_{j=1}^i (1 + r_{t+j})} \geq D_t \quad (6)$$

With R_t revenues at time t

E_t non-interest expenditures at time t

r_t the discount rate at time t

D_t outstanding debt at time t

In other words, the government should have a *positive net worth*, which is imposed by an *intertemporal budget constraint*.⁴⁹ A situation where debt is accumulated faster than the borrower’s capacity to service these debts increases, is ruled out by this definition (IMF, 2002). On top of solvency, the definition of sustainability rules out a “major correction” in primary balances, making it a more demanding concept. Hence, sustainability also excludes situations where illiquidity causes a solvent government to default on its debt.

For measuring debt sustainability in practice, the IMF also looks at the *debt-to-GDP ratio*, or more specifically at the change of this ratio over time. A five year forecast of the evolution of the debt-to-GDP ratio is made, judging whether it is too high, in comparison with a certain threshold, which varies with the Country Policy and Institutional Assessment (CPIA) ranking of a country. The *debt dynamics equation 7* indicates that the growth of the debt-to-GDP ratio d depends on the

⁴⁹For extensive critique on this interpretation of sustainability, see Wyplosz (2007).

implicit interest rate r , the growth of GDP g , and the primary balance PB . Whenever the interest rate exceeds the growth rate, and the difference is not covered by primary balances, debt accumulation is an unstable process. Stress tests affecting these forecasted policy variables are incorporated.

$$d_{t+1} - d_t = \frac{(r - g)}{1 + g} d_t - PB_{t+1} \quad (7)$$

We conclude that the sustainability principle is to some extent based on the ability-to-pay of regions, but moreover often incorporates the expenditures side. Equation 6 not only takes into account tax revenues, but makes a correction for expenditure needs, which means that regions must be able to service the debt with current and future revenues, without adapting their current spending pattern, i.e. it says also something about the “sustainability” of current expenditures.

4.3.4 Budgetary distributive neutrality

A rule which makes use of particular sustainability conditions, comparable to the ones in equations 6 and 7, is the *budgetary distributive neutral rule*. This rule was first developed in the seminal contribution of Drèze (1993). Budgetary distributive neutrality (BDN) is based on the hypothesis that the rationale for secession could not be based on financial gains resulting from less transfers to the rest of the pre-existing state. Hence, the division of debt should ensure that the current aggregate transfers between the regions are not affected. “Budgetary neutrality” refers to the fact that after the break-up every region is able to maintain the same level of contributions and expenditures as before. In this way, secessions are win-win situations or *Pareto improvements*, meaning that no region is worse off than before.

This rule of debt division is applied in two Belgian studies. Drèze’s (1993) BDN rule is based on the status-quo, considering primary balances of regional governments, which are determined by regionalizing all public revenues and expenditures, as the appropriate indicator of regional “economic ability” to service the debt. Regional differences in primary balances are held constant over time, neglecting future economic and demographic developments. Cattoir and Docquier (2004) developed a *dynamic generalisation* to the static rule of Drèze, taking into account demographic changes via the technique of *generational accounting*. Instead of considering revenues and spending patterns of *regional governments*, Cattoir and Docquier (2004) focus on contributions and expenditures of the *representative inhabitants* in the different regions. Holding per capita discrepancies between regions constant, but taking into account demographic changes, their rule is more dynamic than Drèze’s, also because it allows for shifting the burden between current and future generations. We shortly summarize the methodologies of both contributions, and give some critical remarks.

Static rule of Drèze Drèze (1993) imposes a constant debt level, assuming level-stationarity of income, population and interest rates over time. The stability condition 8 ensures that fiscal policy is made sustainable, in a way that it doesn’t lead

to an increase in public debt over time. If budgetary policy is not sustainable, the fiscal effort parameter π is positive in equation 8.

$$\Delta B^N = rB^N - \pi PB^N = 0 \quad (8)$$

With B^N national debt

r the interest rate

PB^N national primary balance

Assuming that each region exerts the same effort π that results from equation 8 and imposing the same stability condition to each region⁵⁰, federal debt B^N is divided according to formula 9, which says that each region i should be given a share of federal debt δ^i , which equals the ratio of a region's primary budget balance PB^i and the national balance PB^N .

$$\delta^i = \frac{PB^i}{PB^N} \quad (9)$$

Which can be seen since

$$\forall i \quad \Delta B^i = r\delta^i B^N - \pi PB^i = r \frac{PB^i}{PB^N} B^N - \pi PB^i = \frac{PB^i}{PB^N} (rB^N - \pi PB^N) = 0 \quad (10)$$

After the debt has been divided, the regions are able to maintain the same level of revenues and expenditures.⁵¹

Drèze (1993) also adapts this rule to the case of stationary growth with growth rate g , where sustainability is defined as the constancy of the debt-to-GDP ratio. The new stability condition 11 equals the earlier mentioned debt dynamics equation 7.

$$gB^N = rB^N - PB^N \quad (11)$$

If condition 11 is satisfied, debt is divided following equation 9. If primary surplus doesn't make up for the excess of the nominal interest rate over the nominal growth rate, a percentage adjustment γ in both receipts R^N and expenditures E^N brings along the constant debt-to-GDP ratio.

$$PB^N = (1 + \gamma)R^N - (1 - \gamma)E^N \quad (12)$$

The larger $R_t^i + E_t^i$, the smaller γ , or the smaller the effort needed to adjust an absolute amount. Hence, when applying a fiscal effort parameter equal to all regions, we implicitly assign more to the larger region, because its ability-to-adjust

⁵⁰No correction is made for initial regional debt, but regional debt could be contained in B^N , which is the amount of debt to be divided.

⁵¹It can be seen that budgetary distributive neutrality accounts for interregional transfers. If you think of a national primary balance equal to zero, regional primary balances reflect real transfers. A positive regional primary balance is a net contribution, while a negative one reveals a net receipt. If the national primary balance is larger than zero, transfers can be defined by looking to what extent the primary balance of a region exceeds or underperforms w.r.t. its "normal share" of the interest charges rB^N in equation 8, which can be defined in various ways.

is larger. Or, in other words, besides the ability-to-pay, the ability-to-adjust is considered. Equation 13 illustrates that if this is the case the BDN debt sharing rule is a weighted average of two ratios: *ability to pay* (ratio of primary balances) and *ability to adjust* (ratio of revenues plus expenditures).

$$\delta^i = \frac{PB^i}{PB^N} \left(\frac{PB^N}{(r-g)B^N} \right) + \frac{R^i + E^i}{R^N + E^N} \left(1 - \frac{PB^N}{(r-g)B^N} \right) \quad (13)$$

This formula leads to different, but constant debt-to-GDP ratios in the regions. The way in which the debt is divided allows each region to maintain the same level of spending and receipts without increasing the debt-to-GDP ratio.

Finally, Drèze relaxes the assumption that the *level* of the debt-to-GDP ratio doesn't matter, as long as it is constant over time. Therefore, results were calculated for the case where an absolute ceiling was put to this ratio after some time period, which is the Maastricht value of 60% from the European Stability and Growth Pact.

In the numerical illustration of the budgetary neutral rule, Drèze (1993) finds that, when applying equation 9, Wallonia inherits a negative share (-22%) of the debt, in accordance with its share in the national primary balance in 1985. Admitting that this result is unreasonable, the only sensible formula seems the one which includes the objective of bringing down the debt-to-GDP ratio to the 60% level. Consequently, the share of Wallonia in Belgium's public debt is assessed at 12% when a time horizon of 15 years is considered to reach the objective.⁵²

Dynamic rule of Cattoir and Docquier Cattoir and Docquier (2004) build on the budgetary distributive neutrality concept of Drèze, starting from the national intertemporal budget constraint 14 of the government, defined in terms of *generational accounting*. Generational accounting, based on the theory of Auerbach et al. (1991) and Kotlikoff (1992) is a way to calculate the financial capacity of current and future populations by means of generational accounts and population prospects. A *generational account* measures the capacity of a person of a particular age category (generation) to contribute (net contributions, or the difference between tax contributions and received benefits) during the rest of his lifetime, given the current budgetary policy. The derivation of current generational accounts $\sum_{s=0}^D N_{t,t-s}^i$ and future generational accounts $W_t^i n_{t,t}^i$ is briefly illustrated in Appendix C. For a more detailed explanation, we refer to the paper of Cattoir and Docquier (2004). The national intertemporal budget constraint 14 states that present and future generations have to repay all the government debt.

$$\sum_{i \in I} B_t^i + B_t^N = \pi_P \sum_{i \in I} \sum_{s=0}^D N_{t,t-s}^i + \pi_F \sum_{i \in I} W_t^i n_{t,t}^i \quad (14)$$

⁵²The effort parameter needed to balance the national budget is in this case large enough to make Walloon primary balances positive, resulting in a nonnegative debt share. The result depends on the length of the time horizon (and thus the effort parameter applied) since the Walloon share is, respectively, 18%, 12% and 8%, when the length of the time horizon to reach the objective is 10, 15 or 20 years.

Table 6: Dynamic distributive neutral division rule: results of Cattoir and Docquier (2004) (Source: Cattoir and Docquier (2004))

In 1999	Wallonia	Brussels	Flanders
LG sharing rule	-0.4%	2.6%	97.8%
FG sharing rule	-17.7%	-1.4%	119.1%
EQ sharing rule	4.0%	3.7%	92.3%

π_P and π_F reflect the fiscal effort of, respectively, current and future generations to balance the budget. Altering these parameters contains a political decision about the intergenerational sharing of the burden of debt repayment, which will affect the resulting horizontal debt shares, dependent on current and future expected relative positions of the regions.

Holding the regional discrepancies in living and future generations' accounts constant over time, δ^i is derived from the regional intertemporal budget constraint 15 with (π_P^i, π_F^i) equal to (π_P, π_F) , which is derived from equation 14.

$$B_t^i + \delta^i B_t^N = \pi_P^i \sum_{s=0}^D N_{t,t-s}^i + \pi_F^i W_t^i n_{t,t}^i \quad (15)$$

Since an infinity of combinations (π_P, π_F) can be chosen to balance the national intertemporal budget constraint 14, Cattoir et al. (2004) look at the two extremes of shifting all effort to, respectively, current and future generations, and at the case where the effort is shared by both generations in an equal way. For calculating the Future Generations (FG) debt-sharing rule, $\pi_P = 1$ is imposed in equation 14. Subsequently, π_F can be derived and implemented in the regional budget constraint 15 to derive δ^i . Living Generations (LG) and Equal Generations (EQ) debt-sharing rules are derived analogously by setting respectively $\pi_F = 1$ and $\pi_F = \pi_P$.

The resulting debt shares are illustrated in Table 6. Notice that Flanders has to bear more than 100% of federal public debt in case of the FG debt sharing rule. The differences in Flanders' debt share under respectively the LG and FG sharing rule can be explained by the fact that the share of Flanders in future generational accounts is smaller than its share in the total net tax of current generations, due to a larger ageing of its population relative to the other regions. Therefore, it is expected that the share of Flanders is larger when the effort is shifted to current generations (LG sharing rule). However, Cattoir and Docquier (2004) find that the total net tax of living generations exceeds the initial total public debt, leaving a surplus for future generations. The extra margin to be distributed over current and/or future generations explains the results in Table 6.⁵³

⁵³Causing the debt share of Flanders to be larger when the FG sharing rule is applied, since in this case it receives a smaller share of the surplus.

Comments The BDN rule minimizes the risk of debt distress in poor regions and it is claimed that it is applicable in practice since in negotiations every party can agree to this rule, which includes a Pareto improvement. Cattoir and Docquier (2004) argue that this rule would also be internationally acceptable, since it eliminates all budgetary reasons for regions to secede. Other states, victim to secessionist attempts, could agree on this rule as a precedent.⁵⁴ On the other hand, a positive value can be attached to independency, regardless of lost transfers. Furthermore, it is not inconceivable that a former transfer-receiving region, initially loosing from separation, gains from it in the end.⁵⁵ Separation can have a beneficial effect on a region's economy, for example when less transfers lead to more responsibility which brings along better fiscal performance.⁵⁶

A very partial theoretical approach raises more questions than it solves. First, an important flaw of budgetary distributive neutrality is that it contradicts accountability, since moral hazard problems are not only neglected, but are even rewarded.⁵⁷ It could be questioned whether current transfers are justified, since they can be the result of free-riding behaviour. Drèze (1993) admits that his assumption of "accepted and honestly applied national legislation", which justifies the current transfers, is a strong one, and adds that even if this is the case, this does not mean that a region is automatically entitled to "a capital transfer equal to the present value of future national contributions to that deficit". Second, it starts from an implicit assumption of the continuation of transfers into eternity. This conflicts with the basics of transfers and the purpose of solidarity, which is granting *temporary* assistance to help poorer regions "catch up". Permanent redistribution always gives the wrong incentives for adaptation and enhanced fiscal effort in recipient regions.⁵⁸ Third, another important flaw of budgetary neutrality is the fact that debt servicing capacity is actually derived from the *capacity to balance budgets*, neglecting the real economic ability-to-pay of a region. By taking the difference of regionalized public revenues and expenditures, crucial information about the size of a region's tax ability is lost; for example, a small region with a large surplus is assigned more debt than a very large region with a small surplus. The same argument goes for the generational accounts of Cattoir and Docquier (2004), which measure the difference between an inhabitant's tax contributions and received benefits, and thus

⁵⁴Buchheit (1979) in Young (2002): A state's response to a particular situation will most often be determined solely by its own political interests. Thus, the articulated reaction of most states to a secessionist attempt in an area of the globe which does not directly concern them will tend to be critical of the secession because of its possible use as a precedent for disaffected groups within their own borders.

⁵⁵Drèze (1993) admits that, for a poorer region to secede, the formula sets an upper bound to its claims, leaving the final settlement to political negotiations.

⁵⁶Persyn et al. (2009) show that more redistribution between regions leads to subsequent lower growth and to slower interregional convergence.

⁵⁷To the extent that the increasing solidarity and the moral hazard involved is an argument for secession, it may seem counterintuitive to compensate for moral hazard in the debt division formula.

⁵⁸Of course, even though budgetary neutrality allows for the continuation of lax fiscal policies, once the debt is divided, results of better performances directly benefit the regions, eliminating some problems of accountability *ex post*.

don't reflect the true ability-to-pay of a person. Finally, we draw attention to some technical implementation problems of the BDN methodology when primary balances (or generational accounts) are not strictly positive, or when fiscal effort parameters are used to balance budget constraints. The former problem is illustrated by some numerical examples in Table 7. The figures for two hypothetical Regions 1 and 2 are primary balances in absolute amounts. Equation 9 is used to calculate regional debt shares from these primary balances in the last two rows of Table 7.

Table 7: Technical implementation problems with non-positive primary balances

Primary balances					
	Scen1	Scen2	Scen3	Scen4	Scen5
Region 1	20	30	-10	11	20
Region 2	0	10	-30	-9	-9
<i>National value</i>	<i>20</i>	<i>40</i>	<i>-40</i>	<i>2</i>	<i>11</i>
Relative share: theoretical debt allocation					
Region 1	100.00%	75.00%	25.00%	550.00%	181.82%
Region 2	0.00%	25.00%	75.00%	-450.00%	-81.82%

First, when in scenarios 4 and 5 only one of the regions' primary balances is negative, the bad performing region inherits a negative share of the federal debt. This is in line with the theory of budgetary neutrality, which states that the rich region has to fill the deficits of the poor region, or in other words, take on more than 100% of the debt. However, when comparing scenarios 4 and 5 it is observed that, the closer the national value in the denominator is to zero, the larger the solidarity⁵⁹ and the more sensitive the results are to small changes in the figures.⁶⁰ This sensitivity raises serious questions about the reliability of the method. A second problem is found in scenario 1, where Region 2, which reaches a break-even in its primary balance, will never have to take on part of the public debt, whatever the performance of Region 1.

In situation 3 with negative primary balances, no calculation of realistic results is possible. The mechanical application of formula 9 delivers counterintuitive results, since the best performing region receives a lower debt share. Adding an absolute effort of 40 to each region (cf. scenario 2) will reverse the debt shares.

To rule out the problem in scenario 3, it is assumed that aggregated primary balances are positive and different from zero, a condition which is usually met by using fiscal effort parameters. This brings us to the second technical problem; a percentage adjustment γ in both receipts and expenditures, as in equation 12, is applied to hypothetical regions 1, 2 and 3 in Table 8. Table 8 illustrates that,

⁵⁹When the national primary balance in the denominator approaches zero the debt share approaches infinity.

⁶⁰Cattoir & Docquier (2004) also mention in a footnote that "Debt shares depend on a ratio of generational accounts, and when the generational accounts used in the denominator are close to zero, any small change in the parameters leads to tremendous changes in the results."

although the share of revenues and expenditures is not influenced by a percentage adjustment, the share of primary balances is very much affected. A larger fiscal effort, which is the same for the three regions, tremendously decreases the share of the better performing Region 2, at the expense of poor Regions 1 and 3. Since results are clearly sensitive to the effort parameter, the assumptions in the budget constraint (covering whole or only part of the debt, forcing a debt-to-GDP level decrease to which standard, which time period to consider) determine the results in an imperative way. Also the share of a region whose primary balance is closer to zero increases disproportionately. Or, in other words, applying a fiscal effort parameter to a small primary balance has a relatively much larger effect, e.g. when the primary balance of Region 3 goes from 0.6 to 7.2, its share increases disproportionately with 16%points.⁶¹ In short, the robustness of results from the budgetary distributive neutral rule can be questioned.

Table 8: Sensitivity of results to the applied effort parameter

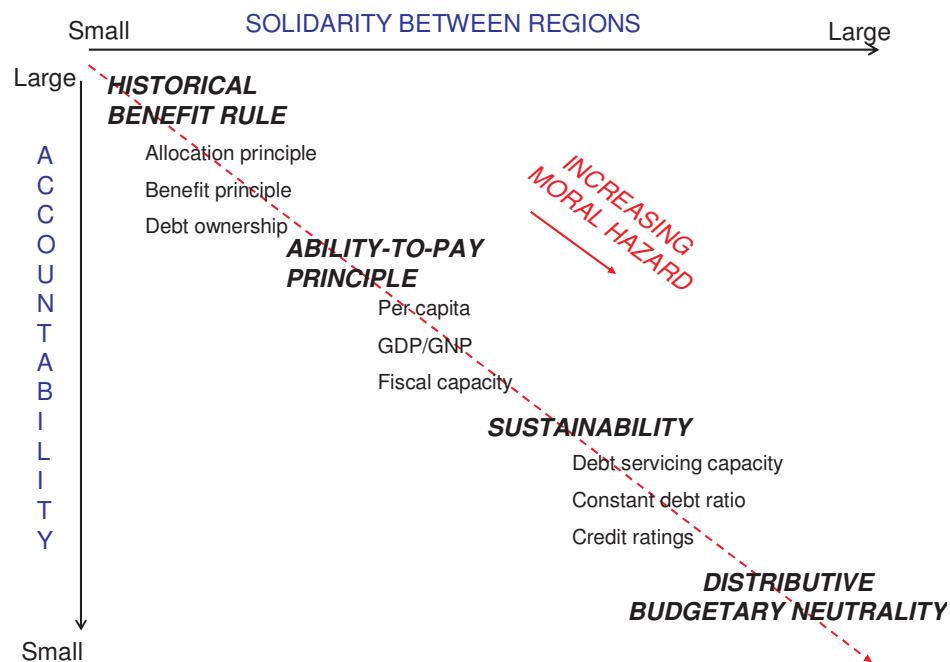
	Region 1	Region 2	Region 3	Share Region 1	Share Region 2	Share Region 3
Revenues	20	40	30	22.2%	44.4%	33.3%
Primary exp.	22	30	36	25.0%	34.1%	40.9%
Primary balance	-2	10	-6	-100.0%	500.0%	-300.0%
Effort parameter 10%						
Revenues	22	44	33	22.2%	44.4%	33.3%
Primary exp.	19.8	27	32.4	25.0%	34.1%	40.9%
Primary balance	2.2	17	0.6	11.1%	85.9%	3.0%
Effort parameter 20%						
Revenues	24	48	36	22.2%	44.4%	33.3%
Primary exp.	17.6	24	28.8	25.0%	34.1%	40.9%
Primary balance	6.4	24	7.2	17.0%	63.8%	19.1%

4.3.5 Classification of rules

We made a classification of the previous rules of debt division according to the extent to which one cares about accountability or solidarity. The trade-off is illustrated in Figure 7. The historical benefit rule is the best from an accountability perspective, linking debt division to the region who is responsible for its creation. The ability-to-pay principle makes a connection with the amount of debt a region is able to bear, according to its population, its economic performance, or its ability to raise taxes or revenues. A region, however, remains fully responsible for its own expenditures, which is no longer the case when applying the budgetary distributive neutral rule, being an extreme form of the sustainability principle.

⁶¹In theory, when fiscal effort is applied to a primary balance of zero, this causes the share of this region to increase with infinity.

Figure 7: Classification of rules of horizontal debt division



4.3.6 Which rule to choose?

When looking into the trade-off between efficiency and solidarity in horizontal debt division in Figure 7, the ability-to-pay principle appears the most appropriate rule of debt division (in-between the historical benefit principle, which only cares about responsibility, and budgetary distributive neutrality, which neglects every form of responsibility). Fiscal capacity (with own tax competences) is important for the management and repayment of debt. Moreover, empirical evidence w.r.t. historical break-ups showed that some form of ability-to-pay is the most applied principle in practice.

Since in section 3 it was already stated that tax capacity and competences are an important principle for vertical debt division, in the simulations in the next section both vertical and horizontal debt division are linked to the amount of fiscal competences across government levels and across regions.⁶²

⁶²The question arises whether rules for vertical and horizontal debt partitioning should differ from each other. The principles of vertical debt division, which were outlined in section 3, could be used for horizontal distribution across regions too because they all refer to a government's current accounts or balance sheet. On the other hand, not all horizontal rules are applicable for vertical division. For example, per capita, relative GDP or debt ownership rules, or other criteria linked to population, economic performances or territory are only horizontally separable.

5 Empirical application for Belgium

In this section, simulations are made of the optimal *vertical* partitioning of debt between the federal and regional government level, and the optimal *horizontal* division of debt between the different regions, deriving recommendations for reform. Local and social security debts are ignored in the analysis.

5.1 Current situation

The current situation in Belgium is illustrated in Table 9. Data for 2008 is shown for the federal government and three regional debt bearing entities⁶³, merging debt of the Walloon Region and the French Community (hereafter referred to as “Wallonia”), and excluding the small German Community from the analysis.⁶⁴ The geographical boundaries of the Belgian regions and communities are shown in Figure 13 in Appendix D. The three regions are clearly separated, but the Flemish and French Community overlap in the Region of Brussels. Table 9 shows that, when ignoring local and social security debt, about 95.4%, or the large majority of total aggregated debt, is federal in origin. The current horizontal shares in regional debt are 9% for Flanders, 73% for Wallonia and 18% for Brussels. The information in this table will be used as a reference point in order to formulate recommendations for a reallocation of debt between the different authorities.

Table 9: Overview of current debt division in Belgium (2008) (Source: Studiedienst Vlaamse Regering, INR and own calculations)

	Absolute amount (in billion euro)	Share in total debt (%)	Share in national GDP (%)
<i>Federal government</i>	<i>290.59</i>	<i>95.43</i>	<i>84.3</i>
<i>Regional governments</i>	<i>13.9</i>	<i>4.57</i>	<i>4.03</i>
- Flanders	1.28	0.42	0.37
- Walloon Region & French Community	10.17	3.34	2.95
- Brussels	2.45	0.80	0.71
<i>TOTAL</i>	<i>304.49</i>	<i>100.00</i>	<i>88.33</i>

⁶³In Belgium, regional borrowing is allowed since the state reform of 1989 with the introduction of the Special Financing Act (SFA), which regulates the financing of Regions and Communities (R&C). The SFA stipulates that R&C can issue debt subject to central government approval. There are no official constraints on the amount of regional debt, although the monitoring of the High Council of Finance can lead to a cap on regional borrowing for two years.

⁶⁴The Flemish Community and the Region of Flanders merged into one government in 1980. We don't record the French Community as a separate debt-bearing entity (its 3,733 million euro of debt in 2008 is added to that of the Walloon Region), since our debt division criterion of fiscal autonomy is only applicable to the Regions; the financing of the Belgian Communities is entirely grants-based.

5.2 Optimal vertical division of debt

As previously argued, the optimal vertical debt sharing between the federal and regional level should be derived from the degree of *fiscal capacity*, measured by fiscal contributions and tax competences. More specifically, regional tax collections, under the condition that regional authorities have full discretion on rates and reliefs, are used as a proxy. It is important however to see that there can be a gap between tax returns and real fiscal capacity. Tax competition and a possible race-to-the-bottom of regional tariffs could lower tax returns and hence the vertical share of the regional level. Horizontally, using tax returns as a substitute for fiscal capacity could be inaccurate if tariffs or tax efforts differ across regions. Therefore, we can consider to use tax bases instead of tax collections⁶⁵, but then the effect of the progressivity of the tax system on tax collections is ignored.

5.2.1 Methodology

In order to derive recommendations for a vertical reallocation of debt between the federal and regional level, we first calculate the optimal debt load of both layers of government. The optimal share in total public debt is derived from the share in taxes over which the respective governments have full autonomy. With own regional taxes $\sum_i T^i$ (with T^i tax of region i), federal taxes T^f and total taxes $T^T = \sum_i T^i + T^f$, the optimal regional and federal share in total debt, $\sum_i \lambda^i$ and λ^f , are given in equations 16 and 17.

$$\sum_i \lambda^i = \frac{\sum_i T^i}{T^T} \quad (16)$$

$$\lambda^f = \frac{T^f}{T^T} = 1 - \sum_i \lambda^i \quad (17)$$

Correcting for already present regional and federal debt, the room for extra debt regionalisation $\sum_i \rho^i$, or for additional debt federalisation ρ^f , as a share of total debt B^T , is derived as follows

$$\sum_i \rho^i = \sum_i \lambda^i - \sum_i \beta^i \quad (18)$$

$$\rho^f = \lambda^f - \beta^f \quad (19)$$

With $\sum_i \beta^i = \frac{\sum_i B^i}{B^T}$ the current regional debt share

and $\beta^f = \frac{B^f}{B^T}$ the current federal debt share

In absolute amounts, the regional and federal optimal debt loads, $\sum_i L^i$ and L^f ,

⁶⁵Which we did when assuming that in every region the same tariff on regional tax base data is applied under a reformed NSFA (cf. infra). In practice, this boils down to a division of debt partly based on regional PIT bases.

become

$$\sum_i L^i = B^T \sum_i \lambda^i \quad (20)$$

$$L^f = B^T \lambda^f \quad (21)$$

Where total debt B^T equals the sum of current regional debt $\sum_i B^i$ and current federal debt B^f .

The absolute amount of debt to be regionalized, $\sum_i R^i$, or to be federalized, R^f , results from the following equations

$$\sum_i R^i = B^T \sum_i \rho^i = \sum_i L^i - \sum_i B^i \quad (22)$$

$$R^f = B^T \rho^f = L^f - B^f \quad (23)$$

5.2.2 Results for vertical debt division

Results for the current SFA Under the current funding system of regional governments, which is laid down in the Special Financing Act (SFA) of 1989 and the Lambermont Agreement of 2001, the amount of fiscal autonomy is rather limited. The difference between own regional tax revenues and total regional revenues, which is called the *vertical fiscal gap*, is large in Belgium. Only 20% of regional revenue is financed out of own taxation, 80% comes from a variety of federal grants. Regional fiscal capacity is limited to the current regional taxes⁶⁶ which comprise, among others, inheritance and property taxes, registration rights, radio and television licence fees, taxes on betting and gambling and road tax on motor vehicles. The taxes which belong to the realm of the federal government are personal income taxes, corporate taxes, VAT taxes, custom duties and excises.

The relative amounts of own federal and regional taxes, which represent the optimal debt loads λ^f and $\sum_i \lambda^i$ of equations 16 and 17, are illustrated in the second column in Table 10.⁶⁷ Remark that the PIT and VAT grants of the federal government to the regions are also part of the fiscal capacity of the federal level, since regions have no discretion over these taxes.⁶⁸ When comparing these optimal debt shares to the current shares in total debt β^f and $\sum_i \beta^i$ in the third column, optimal debt rebalancing recommends a regionalisation of 4.4% of total debt, or 13.5 billion euro in absolute amounts. This means that 4.6% of the current federal debt can be regionalized.

⁶⁶The regions are also allowed to levy surcharges on personal income taxes (PIT) with may not exceed 6.75% of federal PIT revenues in that particular region. This “potential” fiscal autonomy is, however, not or hardly used in practice (Heremans et al. 2010b).

⁶⁷When taking into account the potential surcharges regional governments can levy on federal PIT, the optimal regional debt load of 9% is enlarged to 11%.

⁶⁸Also, the federal transfers to social security are part of the federal fiscal capacity. Custom duties which are directly transferred to the European Union are deducted.

Table 10: Vertical reallocation of debt for the SFA

	Fiscal capacity (billion euro)	Vertical share	Starting position	Vertical reallocation of debt (% of total debt)	Vertical reallocation of debt (billion euro)
Federal gov.	79.26	91.01%	95.43%	-4.42%	-13.45
Regional gov.	7.83	8.99%	4.57%	4.42%	13.45

Results for a new NSFA Since the potential for debt regionalisation under the current system is limited due to the lack of sufficient regional fiscal autonomy, we repeat the analysis under the assumption of an enlarged fiscal autonomy of the regions. This hypothetical situation is not unrealistic, given both academic and political recommendations for more regional fiscal responsibility in the SFA.⁶⁹ Recent proposals for a reformed SFA (NSFA) by Heremans et al. (2010), Chaidron et al. (2009) and E. Kirsch⁷⁰ point at more personal income tax (PIT) autonomy by replacing various grants by an own PIT rate (split rate model) or by surcharges on federal personal income taxes.

For our calculations, we implement the proposal of Heremans et al. (2009), introducing a regional PIT rate of 11.8% and thus transferring approximately half of federal PIT to the regions.⁷¹ This shift of personal income tax autonomy enlarges the optimal regional debt load to 28%, as indicated by the second column in Table 11. Deducting the already present debt of both government layers, 23.6% of total debt, or about 72 billion euro in absolute amounts, can be transferred to the regions. This means that 24.7% of federal debt can be regionalized.

Results for a new extended NSFA When, on top of this NSFA proposal, the VAT grant to the communities, which amounts to 13 billion euro in 2008, is replaced by own regional fiscal autonomy⁷² (for the vertical division it is left aside whether this is done by more regional PIT, corporate tax or VAT autonomy), the results are depicted in Table 12. 38.7% of total debt, or 117.7 billion euro in absolute amounts (which is 40.5% of federal debt) can be regionalized.

⁶⁹The lack of accountability and other deficiencies of the SFA are documented in Cattoir and Verdonck (2002), Algoed, Heremans and Peeters (2007 and 2008), Heremans, Peeters and Van Hecke (2010a), Deschamps et al. (2009).

⁷⁰The proposal of E.Kirsch, chief of staff of Prime Minister Yves Leterme, was not published.

⁷¹Replacing the current PIT grant to the Regions, PIT grant to the Communities, radio and television licence fees, the grant for unemployment relief works and the grant for foreign students, which amounts to about 17 billion euro in 2008 with a regional PIT rate of 11.8% on federally determined tax bases, leaving a rate of approximately 11% to the federal authority. We assume that the same rate is applied across regions. Different rates, which reflect real tax autonomy, are not informative for our analysis.

⁷²Such that in total 93% of the current revenues of regional governments are replaced by fiscal autonomy.

Table 11: Vertical reallocation of debt for a new SFA (NSFA)

	Fiscal capacity (billion euro)	Vertical share	Starting position	Vertical reallocation of debt (% of total debt)	Vertical reallocation of debt (billion euro)
Federal gov.	62.56	71.83%	95.43%	-23.60%	-71.86
Regional gov.	24.53	28.17%	4.57%	23.60%	71.86

Table 12: Vertical reallocation of debt for a new extended NSFA (NSFA+)

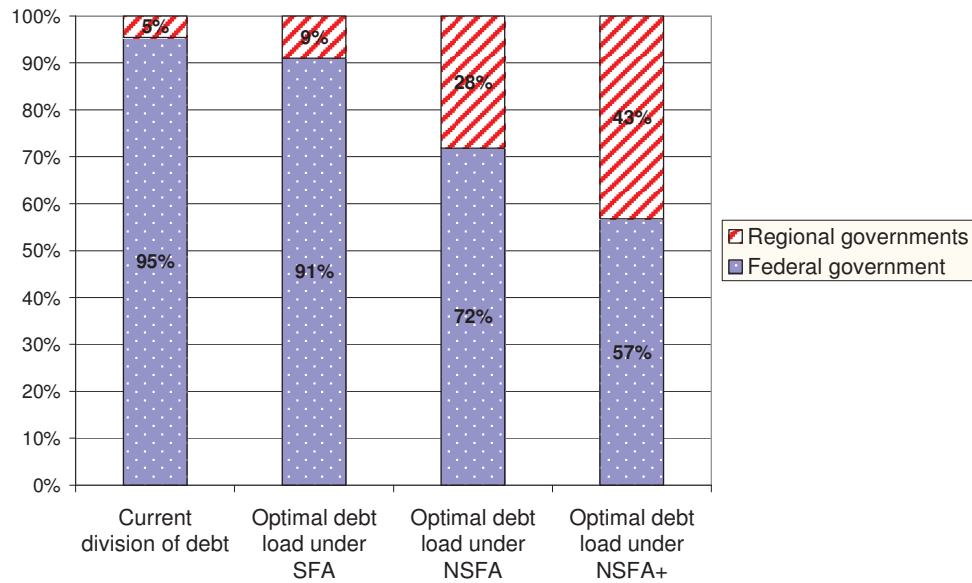
	Fiscal capacity (billion euro)	Vertical share	Starting position	Vertical reallocation of debt (% of total debt)	Vertical reallocation of debt (billion euro)
Federal gov.	49.45	56.78%	95.43%	-38.65%	-117.68
Regional gov.	37.64	43.22%	4.57%	38.65%	117.68

Overview Figure 8 gives an overview of the optimal debt load of the federal and regional government level under the considered scenarios. We see that the limited regional tax competences under the current SFA severely restrict the opportunity for debt regionalisation. However, when the recently proposed new financing system of regional governments in Belgium is implemented, which regionalizes about half of personal income taxes, the optimal debt load becomes 28%. If on top of this new proposal for a NSFA, VAT grants are replaced by regional fiscal competences, 45% of total Belgian debt (local debt excluded) can be assigned to the regional level. To achieve these optimal debt loads starting from the current situation depicted in the first column of Figure 8, the regionalisation of debt under the different scenarios evolves from 4.4% over 23.6% till 38.7% of total debt, which equals respectively 4.6%; 24.7% and 40.5% of the current federal debt.

5.3 Optimal horizontal division of debt

Once the amount of debt to be regionalized is stipulated, the question for a horizontal debt division rule is addressed. For allocating debt to particular regions, the same criterion as for vertical distribution is used, namely *fiscal capacity*. The main difference with the analysis of vertical debt division is that no correction is made for already present regional debt. The main reason is that a region should be held responsible for interregional differences in debt accumulation. Accountability for initial regional debt seems to be fair, since for this debt category there never was a “common” federal responsibility. Furthermore, this is in line with customary international law, which states that when countries split up, both local debt (contracted by subnational authorities) and localized debt (contracted by the former

Figure 8: Optimal debt load of the federal and regional level under different scenarios



national state on behalf of the subnational authorities) automatically pass onto the successor states (Hasani, 2006). Second, if we assume that this debt contributed to a region's wealth (if it was used for investments, the debt is transferred into valuable assets which furthermore probably yielded income), it reflects the ability-to-pay of a region. For illustrative purposes, the analysis with a correction for initial regional debt is included in Appendix E.

5.3.1 Methodology

The optimal horizontal share R^i in the regionalized amount of debt $\sum_i R^i$ each region has to assume, is defined δ^i and is again derived from the regional share in taxes, as can be seen in equation 24.

$$\delta^i = \frac{R^i}{\sum_i R^i} = \frac{\rho^i}{\sum_i \rho^i} = \frac{T^i}{\sum_i T^i} \quad (24)$$

Remark that δ^i equals the relative share of region i 's optimal debt load λ^i in the optimal debt load assigned to the aggregated regional level $\sum_i \lambda^i$ since

$$\frac{T^i}{\sum_i T^i} = \frac{T^i/T^T}{\sum_i T^i/T^T} = \frac{\lambda^i}{\sum_i \lambda^i}$$

The regionalized debt of region i , as a share of total debt, is derived from equation 24 and given by

$$\rho^i = \delta^i \sum_i \rho^i \quad (25)$$

Because a *vertical* correction for initial aggregated regional debt was made, the regionalized share of total debt is not given by $\rho^i = \lambda^i - \beta^i$, but by equation 26.⁷³

$$\rho^i = \lambda^i - \delta^i \sum_i \beta^i \quad (26)$$

The absolute amount of debt assigned to region i equals

$$R^i = \rho^i B^T \quad (27)$$

5.3.2 Results for horizontal debt division

Results for the current SFA Under the current SFA, reallocation of subnational debt is based on the relative share of own regional taxes, as can be seen in Table 13. When 13.45 billion euro is regionalized, the resulting absolute amounts of debt assigned to the regions are shown in the last column of Table 13.⁷⁴

Table 13: Horizontal division of regionalized debt for the current SFA

	Fiscal capacity (billion euro)	Horizontal share	Absolute amount of regionalized debt (billion euro)
Flanders	4.42	56.39%	7.58
Walloon Region	2.26	28.86%	3.88
Brussels	1.16	14.75%	1.98

Results for a new NSFA Under the proposed new Special Finance Act (NSFA), the new debt division key will, next to the share in regional taxes, also take into account a region's capacity to raise PIT. Hence, the large share of Brussels is reduced when PIT competences are granted to the regions because of the high unemployment rate among its inhabitants. The regional debt shares can be found in Table 14.⁷⁵ When 71.86 billion euro is regionalized, the resulting absolute amounts of debt assigned to Flanders, Wallonia and Brussels are respectively 43.3, 21.4 and 7.2 billion euro.

⁷³Which is derived as follows: $\rho^i = \delta^i \sum_i \rho^i = \delta^i (\sum_i \lambda^i - \sum_i \beta^i) = \delta^i \sum_i \lambda^i - \delta^i \sum_i \beta^i = \lambda^i - \delta^i \sum_i \beta^i$

⁷⁴Including the optional 6.75% surcharges on PIT the regions are allowed to raise under the current system, the horizontal shares for Flanders, Wallonia and Brussels are respectively 57.89%, 28.74% and 13.37%.

⁷⁵Remark that in the proposal for a new financing system, part of the own regional PIT is redistributed between the regions through a horizontal revenue equalization mechanism. We calculated fiscal capacity without considering these solidarity transfers, since received solidarity grants don't reflect fiscal capacity.

Table 14: Horizontal division of regionalized debt for a new NSFA

	Fiscal capacity (billion euro)	Horizontal share	Absolute amount of regionalized debt (billion euro)
Flanders	14.79	60.26%	43.30
Walloon Region	7.30	29.76%	21.38
Brussels	2.45	9.98%	7.17

Table 15: Horizontal division of regionalized debt for a new extended NSFA+

	Fiscal capacity (billion euro)	Horizontal share	Absolute amount of regionalized debt (billion euro)
Flanders	23.06	61.26%	72.09
Walloon Region	10.83	28.78%	33.87
Brussels	3.74	9.96%	11.72

Results for a new extended NSFA When regional fiscal autonomy in Belgium is enlarged with 13 billion euro VAT revenues (equal to the current federal grants out of VAT to the communities), the new shares in regionalized debt can be found in Table 15. Since regional VAT data is not available, we used regional GNP (GDP adjusted for commuting) as a division key to regionalize VAT returns, which means that this third proposed debt division key is composed of a region’s share in regional taxes, PIT base and GNP. A region’s participation in the 117.68 billion euro of regionalized debt in absolute amounts is illustrated in the last column of Table 15.

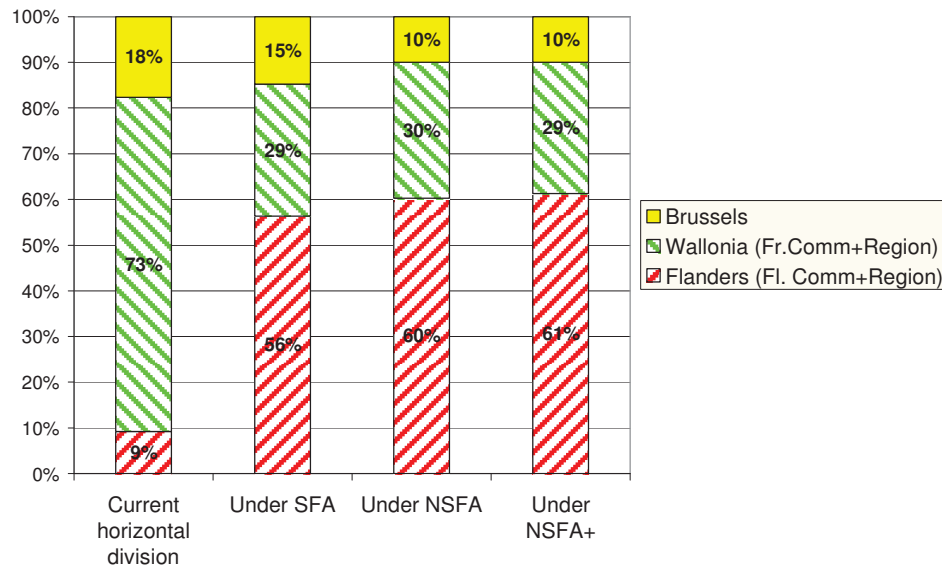
Overview Figure 9 gives a visual illustration of the regional shares in regionalized debt under the different scenarios of regional fiscal autonomy.

5.3.3 Dynamic extension of the horizontal division rule

The horizontal division rule of the previous section is essentially a *static* rule, since it is derived from current regional shares in taxes, irrespective of regional economic and demographic prospects. Since these prospects are part of the capacity to service debt in the future, the rule is made *dynamic* by including expected future developments. The potential of regions for economic growth –and of low performing regions to catch up– is internalized in the debt division formula. A larger growth or convergence potential increases the share of debt a region has to bear.⁷⁶

⁷⁶It is important to see that, to the extent that the potential of regions exceeds their current performance, deriving debt division from the status quo triggers undue solidarity. A region that is currently low performing has to bear a smaller part, assuming it will perform low forever. Moreover, to the extent that low fiscal performance is the result of moral hazard, a reward is given for irresponsible behaviour.

Figure 9: Overview of horizontal debt division under different scenarios



Thus taking into account the growth potential of regions gives better incentives for good policy and performances in line with those regions' potential. Especially in the Belgian case, stimulating a region to perform in accordance with its economic potential is important, keeping in mind that serious fiscal efforts will be needed to balance budgets in the future.⁷⁷

Remark that including macroeconomic prospects not only influences the horizontal debt division rule, but it could also alter vertical debt division rules. The latter effect is minor, since national macro-economic growth is just a weighted average of regional growth rates, but it is present when particular income categories do not evolve proportionally with economic growth (f.e. federal and regional taxes can have different elasticities) or when the weight of regional growth in national growth differs from the regional share in tax income. A dynamic rule for vertical debt reallocation is, however, not included in this paper.

Methodology The dynamic version of the static rule which was defined in equation 24, is illustrated in formula 28. The annual nominal discount rate r is fixed at 4%.

$$\delta^i = \frac{\sum_{s=t}^T \frac{T_s^i}{(1+r)^{s-t}}}{\sum_{s=t}^T \frac{T_s^i}{(1+r)^{s-t}}} \quad (28)$$

⁷⁷A critique that can be raised is that, to take into account future situations, solidarity should be based on real (ex post) figures and not on projected (ex ante) outcomes. However, a yearly revision of the horizontal key of debt division worsens moral hazard problems, since when better performances are penalized by a larger share in federal debt servicing costs, this may lead to another development trap.

$$\text{With } T_s^i = T_t^i \prod_{j=t}^s (1 + g_j^i) \quad (29)$$

In practice, estimations for future tax returns T_s^i are made until year T by updating current tax receipts with yearly growth rates g_j^i (cf. equation 29), which could be altered according to the scenario under consideration. Discounting future regional revenues to the reference period t allows for the calculation of dynamic regional shares in fiscal capacity δ^i , as can be seen in equation 28.

Two macroeconomic scenarios will be considered. The static rule⁷⁸ will serve as a benchmark. The scenarios take into account potential growth and convergence prospects, respectively. For the calculations, the simulation model Vladymo⁷⁹ is used.

In the *potential growth scenario*, regional growth rates g_j^i of equation 29 are estimated, based on a labour supply-driven macroeconomic model. The input of regional parameters such as population, activity rates, natural unemployment rates (NAIRU) and productivity, lead to calculations of the economic growth potential of regions. Projections of potential real growth rates of GNP⁸⁰ are illustrated in Figure 10. Notice that, mainly based on demographic evolutions⁸¹ (or the number of people available on the labour market), the potential for the Walloon Region and Brussels is higher. The ageing of the population is more pronounced in Flanders, lowering the share of the active population more than in the other two regions.

The second macroeconomic scenario is a *convergence scenario*. More particularly, *on top of including potential growth*, which is the consequence of demographic evolutions in a supply-driven model, we assume a convergence of the NAIRU of Brussels and Wallonia to the current Flemish level over a period of 20 years. Results can be found in Figure 11.

Results for dynamic horizontal debt division Table 16, 17 and 18 illustrate the dynamic horizontal shares in regional debt according to the potential growth and convergence scenario and the differences with the static rule. Under the different scenarios of regional fiscal autonomy (SFA: only regional taxes, NSFA: regional and PIT taxes, or NSFA+: regional, PIT and VAT taxes), Flanders has to bear a lower share, at the expense of the Walloon Region and Brussels.

⁷⁸The static rule can be considered as a macroeconomic scenario with an exogenous economic growth equal to all regions. This just mimics the current shares when tax revenues only increase by this growth rate over time.

⁷⁹Vlaams Dynamisch Model van de overheidsfinancien. Data, assumptions and the methodological build-up of the macromodel can be found in Algoed, Heremans and Van Hecke (2009).

⁸⁰Regional GNP is used instead of regional GDP, because regional taxes and personal income taxes are linked to the place of residence of the tax payers. Regional GDP gives a distortion for the small region of Brussels, since the capital of Belgium attracts a lot of commuters.

⁸¹Evolution of the population according to the prospects of the Federal Planning Office, assuming an increase in activity rate in the age category 50 to 64 years.

Figure 10: Potential regional GNP growth

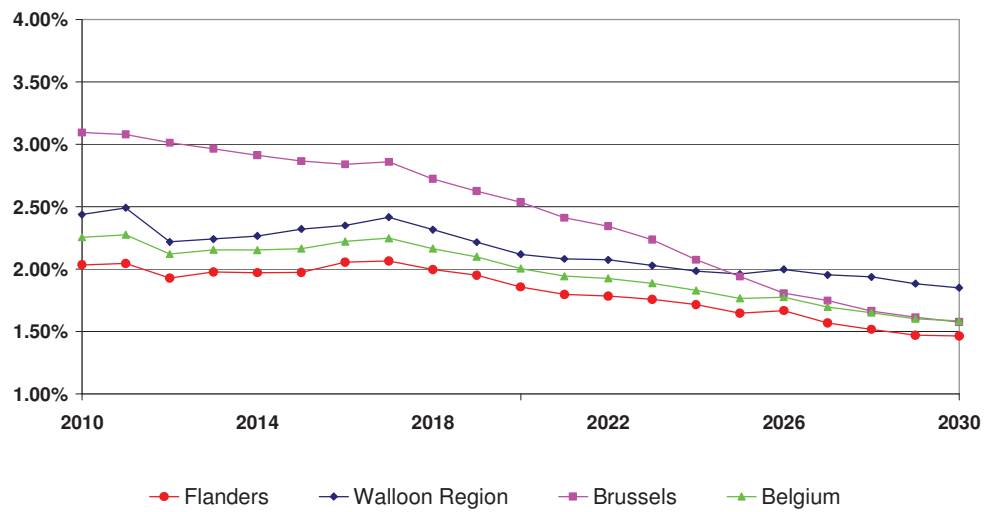


Figure 11: Potential regional GNP growth in a convergence scenario

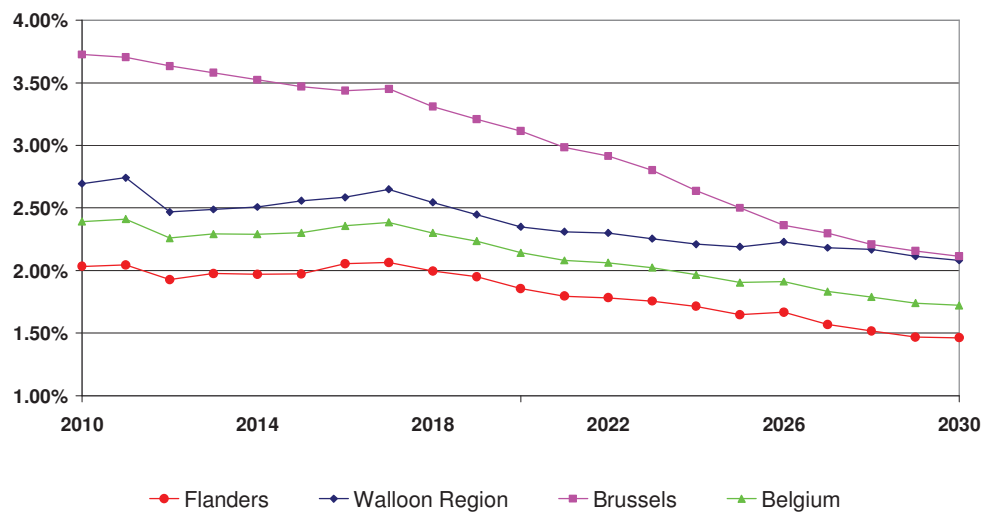


Table 16: Horizontal share in regionalized debt for the SFA: dynamic rule

	Pot. growth scenario	<i>Difference with static rule</i>	Convergence scenario	<i>Difference with static rule</i>
Flanders	54.80%	-1.59%	53.70%	-2.69%
Walloon Region	29.40%	0.54%	29.60%	0.74%
Brussels	15.80%	1.05%	16.70%	1.95%

Table 17: Horizontal share in regionalized debt for a new NSFA: dynamic rule

	Pot. growth scenario	<i>Difference with static rule</i>	Convergence scenario	<i>Difference with static rule</i>
Flanders	58.85%	-1.41%	57.89%	-2.37%
Walloon Region	30.39%	0.63%	30.75%	0.99%
Brussels	10.76%	0.78%	11.36%	1.38%

Table 18: Horizontal share in regionalized debt for a new extended NSFA+: dynamic rule

	Pot. growth scenario	<i>Difference with static rule</i>	Convergence scenario	<i>Difference with static rule</i>
Flanders	59.89%	-1.37%	58.94%	-2.32%
Walloon Region	29.39%	0.61%	29.74%	0.96%
Brussels	10.72%	0.76%	11.31%	1.35%

5.4 Current and future debt

Reallocation of debt in a federation can be seen in a broader perspective, when not only current debt but also “future debt”, which is contained in a government’s future liabilities (e.g for pensions, health care expenses of an ageing population, . . .), is considered. Gokhale and Smetters (2003) stress the importance of this “future debt”, defined as the difference between the present value of future expenditures (without interest payments) and the present value of future revenues under unchanged policy, as a policy indicator. Gokhale and Smetters’ new debt concept, called “fiscal imbalance”, is the sum of current and future debt, and it indicates how much money the government needs today to achieve a sustainable fiscal policy.⁸² In this section, we therefore investigate what would be the result when we reallocate both current and future debt in the Belgian federation.

Remark that by taking into account this future debt, future expenditure patterns are in fact corrected for⁸³, but they do not influence the division rule (or the measure of ability-to-pay); they only influence the starting position.

Methodology The former analysis is extended by a new interpretation of regional debt $\sum_i B^i$ and federal debt B^f , which now include current debt as well as future debt. Former calculations for vertical debt division are repeated, incorporating the new measure of initial regional and federal debt defined in equations 30 and 31.

⁸²Fiscal imbalance can be linked to the solvency condition of the IMF, cf. infra.

⁸³This methodology can be questioned (cf. critique on the budgetary distributive neutral division rule).

$$\sum_i B^i = \sum_i B_t^i + \sum_i \sum_{s=t}^T \frac{Exp_s^i - Rev_s^i}{(1+r)^{s-t}} \quad (30)$$

$$B^f = B_t^f + \sum_{s=t}^T \frac{Exp_s^f - Rev_s^f}{(1+r)^{s-t}} \quad (31)$$

With B_t^i debt of government i at time t

Exp_s^i expenditures of government i at time s

Rev_s^i revenues government i at time s

r the interest rate

Results for vertical debt division including future debt For the time horizon 2008-2030, the results are given in Table 19. The first column illustrates the resulting “future” debt, which is added to the current debt in the second column. For the calculation of “future” debt, it is assumed that future social security deficits are filled by the federal government.⁸⁴ The future debt of regional governments is a consequence of the non-indexing of the residual category of “other grants” at the revenue side of the regions. The communities receive higher revenues due to increasing VAT-grants, but incur even more increasing expenditures.⁸⁵

Table 19: Optimal vertical division of future and current debt (=fiscal imbalance)

	Future debt (billion euro)	Fiscal imbalance (billion euro)	New starting position	Optimal debt load	Vertical reallocation (% of total debt)	Vertical reallocation of debt (billion euro)
Federal gov. (incl. SS)	-33.6	256.99	78.71%	91.01%	12.30%	37.45
Regional gov.	55.6	69.5	21.29%	8.99%	-12.30%	-37.45

In the third column of Table 19 it can be seen that the sum of current and future debt is more decentralized, since the regional share now amounts to 21.3% (which can be compared to 4.6% in Table 9). Comparing this new division of initial debt to the optimal vertical debt load in the fourth column of Table ?? (which is taken from Table 10), it is found that 12.3% of total current and future debt, or 37.5 billion euro should be federalized. Including future debt thus removes the scope for debt regionalization under the current SFA.

⁸⁴Even though officially the intervention of the federal government in social security finances is limited to the transfer of some tax receipts and the allotment of a yearly allowance, which is assumed to grow with inflation over time.

⁸⁵The latter is explained by the increasing cost of education for communities because of the growing number of young people and the assumed increasing participation rate in higher education. In Flanders, the expenditures for the Flemish care insurance go up as a result of the ageing of the population.

6 Conclusion

This paper contributes to the theory of optimal public debt sharing between the different governments in a federal state.

First, it is investigated what the optimal *vertical* division of public debt between higher and lower tier governments in a federation looks like. A discussion of arguments pro and contra reveals that the scope for debt decentralisation depends on the federal fiscal framework. A large degree of regional fiscal competences is needed to avoid reliance on federal bailouts and to establish an own reputation of creditworthiness on financial markets. It is argued that the worrisome situation of Belgium's large federal debt would benefit from a more balanced division of the responsibility for debt stabilization. Devolving part of federal debt to the regions improves *regional accountability* and efforts for debt servicing. Debt decentralisation also increases regional *debt autonomy*, which allows for a better use of the credit market for smoothing out temporary asymmetric macro-economic shocks and for a better accommodation of investment decisions to the particular preferences of a constituency. Moreover, regional competences for public works and transport, housing, environment and education, indicate that debt as a tool for financing productive investments is especially needed at the subnational level. An important argument against debt decentralisation is that regional governments face higher risk and liquidity premiums, which could increase the total cost of debt in a federation when assigning debt to the regions. However, to the extent that a more balanced debt division across entities triggers better fiscal performance, which is an essential determinant of interest rates too, this problem is alleviated. An illustrative example is the current credit rating of Flanders which is better than that of the Belgian federal government. Finally, to lower the risk of debt explosions in economically weak regions, debt division can be based on the ability-to-pay of the different regions. Monitoring and control of regional debt by the High Council of Finance will remain necessary.

The choice of a *vertical division key* is approached from different perspectives. First, debt decentralisation is linked to the amount of regional tax competences. In comparison with other federal European countries, the imbalance between the regional share in tax revenues, as defined by the OECD tax autonomy indicator, and the share in total debt, is the largest for the Belgian regions. However, it was found that much depends on the definition of fiscal competences, since when only *real* fiscal capacity is considered, in the sense that regions have full discretion on rates and reliefs, the scope for debt regionalisation in Belgium is limited under the current SFA. Second, for the vertical division of debt we can also look at the asset side of the balance sheet. The devolution of assets to the regions during the regionalisation process in Belgium created a situation where regional assets are worth a multiple of regional liabilities, indicating that regional governments are capable of bearing more debt. Third, thinking about the *golden rule*, which claims that debt should only be used for investment purposes, the optimal debt sharing between governments can be derived from the regional share in capital expenditures.

Different practical scenarios for debt regionalisation are drafted. Federal debt can be converted into regional obligations, or can be assigned to a common debt agency which manages the debt on behalf of the regions. In the latter case, regional debt servicing contributions are determined by a fixed horizontal division key. The precedent of the Amortization Fund for the Liabilities in Social Housing (ALESH) in Belgium illustrates this is a realistic scenario. Moreover, a common debt agency can be used for pooling new debt emissions of the regions, analogous to the German Jumbos. A final scenario is a mere indirect debt decentralisation which makes regions participate in federal interest payments, an option which is particularly preferable when limited regional fiscal competences do not allow for true debt decentralisation.

In section 4, an elaborate search for an optimal *horizontal* division rule between the different regional governments is conducted. In international law w.r.t. the break-up of states no clear criteria that go beyond the definition of vague principles are established. Looking at historical precedents, rules of debt division are diverse, but seem to be based on some form of ability-to-pay of the successor states. Economic criteria for debt division are classified according to the amount of accountability or solidarity involved. The *historical benefit rule* assigns the debt to the region who benefited from the accumulation of federal debt in the past, maximizing accountability. Both the *ability-to-pay principle* and the *sustainability principle* look at the capacity of a region (or its population) to bear debt, although sustainability also takes into account expenditure “patterns” of regions. A rather extreme form of solidarity can be found in the *budgetary distributive neutrality principle*, which states that a region aiming for secession should pay for all future transfers to the remainder of the former state, making secessions Pareto-improvements. “Budgetary neutrality” ensures that after the break-up former transfer-receiving regions are able to maintain the same level of contributions and expenditures as before. Many theoretical and technical criticisms can be raised w.r.t. this method which was applied in two Belgian studies which assign under particular circumstances more than 100% of the debt to Flanders.

An empirical application for Belgium is made in section 5, linking the debt servicing capacity of an entity to its fiscal competences. Since tax competences are limited under the current SFA, 91% of total debt should remain at the federal level, and only 13.4 billion euro can be devolved to the regional level. The results are compared to the situation of a reformed financing system of regional governments, where more fiscal competences are transferred to the regions. In this case, 28% of debt, or 71.9 billion euro can be assigned to the regional level.

Simulations w.r.t. the horizontal division between the different regions assign 56% of the debt to Flanders, 29% to Wallonia and 15% to Brussels, according to the regional shares in own regional taxes under the current Special Finance Act (SFA). When regional fiscal autonomy is enlarged to half of federal PIT, the shares of Flanders and Wallonia increase to respectively 60% and 30%, and Brussels’ share decreases to 10%. Making this criterion of horizontal debt division *dynamic* by including *potential growth* and *convergence* prospects of the regions, the share of Flanders is decreased with 1.6% in the potential growth scenario and with 2.7% in the convergence scenario under the current SFA. Finally, “*future*” debt, which is

contained in a government's future liabilities, is incorporated in the analysis Simulation over a time horizon of 22 years show that in this case there is no scope for debt decentralisation any more.

Suggestions for further research

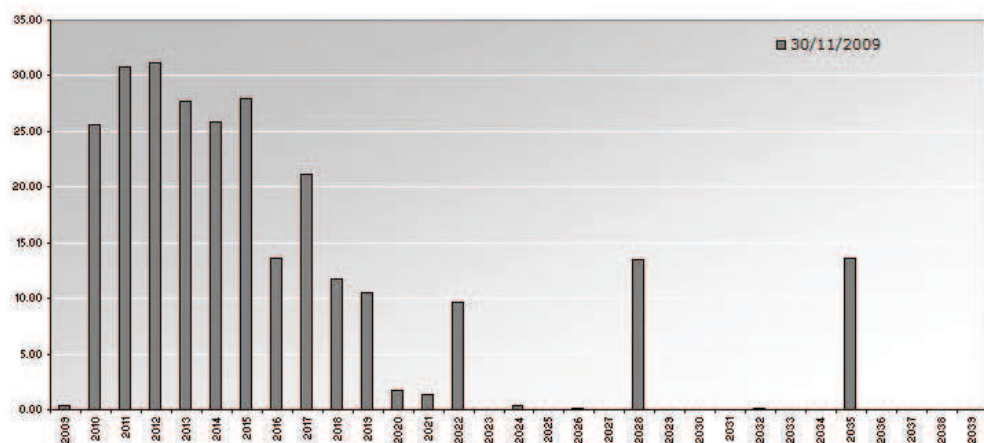
1. A first important remark is that the criterion of fiscal capacity used in the simulations in section 5 neglects other sources of wealth of regions. For example, to the extent that regional assets, financed by federal debt creation, have an economic value or generate income, these should be taken into account as an additional criterion of debt division. As can be seen in Table 3, this would lower the share of Flanders, since the share in devolved tangible immovable assets of this region is only 50%. It seems reasonable to divide the part of the debt which was used for investments according to this criterion.
2. Second, if we assume that interest rates for regional governments in general, and poor regions in particular, are higher, a correction to the debt division rule could be made to take this effect into account.⁸⁶ However, interest rates also depend on economic performance and fiscal effort, which in turn is determined by the way debt is (re)allocated in a federation. Consequently some endogeneity problem arises when debt division is partially based on expected interest rates, which are mainly determined by the amount of debt a region has to assume.

⁸⁶For example the discount rate across entities could be altered in the dynamic debt division formula.

Appendix A: Maturity Schedule of the Belgian long-term Euro Debt

The maturity schedule in Figure 12 includes the debt issued or taken over by the Federal Government. OLOs which have been bought back and held in portfolio, have been deducted from the schedule.

Figure 12: Maturity Schedule long-term Euro Debt (billion euro) in Belgium (Source: Belgian debt agency)



Appendix B: Assessment of debt sustainability by credit rating agencies

When evaluating the sustainability of a region's debt, or rather the risk of default given a certain debt level, it is interesting to look at the instruments used by rating agencies to set credit ratings of regional governments. The performance of regions w.r.t. the evaluation criteria of rating agencies gives an idea about the ability of regions to bear debt. In general, ratings are based on two key factors: a region's intrinsic credit strength and the likelihood of support from a higher-tier government. To gauge a region's credit strength, Moody's⁸⁷ investigates six factors in its Baseline Credit Assessment (BCA): operating environment, institutional framework, financial position and performance, debt profile, governance and management practices and economic fundamentals. First, the six BCA determinants are explained. Second, we turn to the evaluation of possible higher-tier bailouts, as described by Moody's Joint Default Analysis (JDA) methodology⁸⁸.

Credit strength is first evaluated based on the *operating environment*, or the economic and political context in which regional governments operate. The focus is laid on the wealth of the national economy, its stability and the overall effectiveness of government, measured by a country's GDP, GDP volatility and the World Bank's Government Effectiveness Index, respectively.

The second factor, the *institutional framework*, refers to the arrangements that shape intergovernmental relations and regional governments' powers and responsibilities. Predictable and adequate financing, ability to alter the framework in response to changing needs, fiscal autonomy and spending flexibility contribute to a better credit rating. Concerning spending flexibility, for example, Standard & Poor's mentioned that Brussels Capital Region "locked in most of its expenditures in multiyear contracts, which constrains the region's future capacity to influence spending levels in case of need."⁸⁹

Third, a region's *financial position and budget performance* is evaluated. We look at how effective the government is at generating the revenues needed to cover its spending, including debt service. A government's taxing powers and its effectiveness in exercising those powers, together with the flexibility of adjusting expenditures are examined. Balanced budgets on a consistent basis move up the credit rating.

The fourth factor contains a region's *debt profile*, which refers to the stock and structure of debt obligations and the fiscal resources available to service these obligations. Moody's relates the government's debt level to measures of ability-to-pay such as the size of the revenue flow, the economic output (GDP) or the level of taxable property values of a jurisdiction. A precise observation of the debt structure (maturity schedule, reliance on short term and variable rate debt, foreign currency) is needed to judge the ability to cover debt payments with operating revenue. In this item, analysts also look for off-balance sheet transactions. For example, when commenting on Flanders' credit rating, Standard & Poor's warns for the use of public and

⁸⁷Moody's. 2008. Regional and Local Governments Outside the US.

⁸⁸Moody's. 2008. The application of Joint Default Analysis to Regional and Local Governments.

⁸⁹Gewest. 2007. Jaarverslag 2007. Brussels Gewest.

private companies to carry out public-service missions and investments and thereby guarantee debts and transferring budgetary funds.⁹⁰

Fifth, *governance and management* encompasses fiscal management, investment and debt management, transparency of financial disclosures and institutional capacity. When regions abide by a multi-year planning and accumulate experience in accessing capital markets, the credit rating improves.

Finally, *economic fundamentals* assess whether there is an economic base for supporting finances over the long term. Parameters are output, wealth, growth and demographic trends, labour market performance and sectoral diversification. The link between local economic performances and fiscal outcomes, which can be influenced by the institutional framework, is also considered.

The second key factor, important for assessing regional debt sustainability, is the probability of support from a higher-tier government, examined by Moody's Joint Default Analysis methodology. Moody's looks at the institutional framework (legal barriers, government policy stance, reputation risk, moral hazard), the historical behaviour (bailout history) and individual characteristics (too-big-to-fail, role of party affiliation). JDA methodology also considers the degree of default dependence between a region and its supporting government. Risks are correlated when two entities are subject to the same economic shocks or when vertical transfer arrangements are present.

⁹⁰Rapport van de Vlaamse regering over het gevoerde beleid inzake Kas-, Schuld- en Waarborgbeheer, 2008.

Appendix C: Generational accounting technique

Current generational accounts A *generational account* $n_{t,k}^i$ is defined as the expected net discounted payment to the state of a representative person of generation k in region i for the rest of his lifetime, given the current budgetary policy.

$$n_{t,k}^i = \sum_{s=t}^{k+D} \frac{T_{k,s}^i p_{k,s}^i}{(1+r)^{s-t}} \quad (32)$$

With $T_{k,s}^i$ net tax paid by remaining members of generation k in region i at time s
 $p_{k,s}^i$ the survival probability of a member of generation k in region i at time s
 (given that the person was alive at time t)
 D the age limit
 r the discount rate

The net aggregate lifetime tax $N_{t,k}^i$ of generation k in region i at time t is derived by multiplying the generational account with $P_{t,k}^i$, which is the total number of people of generation k in region i at time t .

$$N_{t,k}^i = n_{t,k}^i P_{t,k}^i \quad (33)$$

Taking the sum over all living generations, *current generational accounts* are defined by equation 34.

$$\sum_{s=0}^D N_{t,t-s}^i \quad (34)$$

Future generational accounts *Future generational accounts* measure the total net taxes which have to be paid by people that will be borne in the future, over their total life time. By assumption, the size of future generations is equal to the number of newborns in period t and every future newborn is subject to the same budgetary policy, meaning that the average net tax contributions are the same, corrected for growth g and discounted by r . Furthermore, it is assumed that the average generational account of individuals of future generations is a fraction π_F^i of the tax borne by newborns in region i at time t , which is $n_{t,t}^i$.

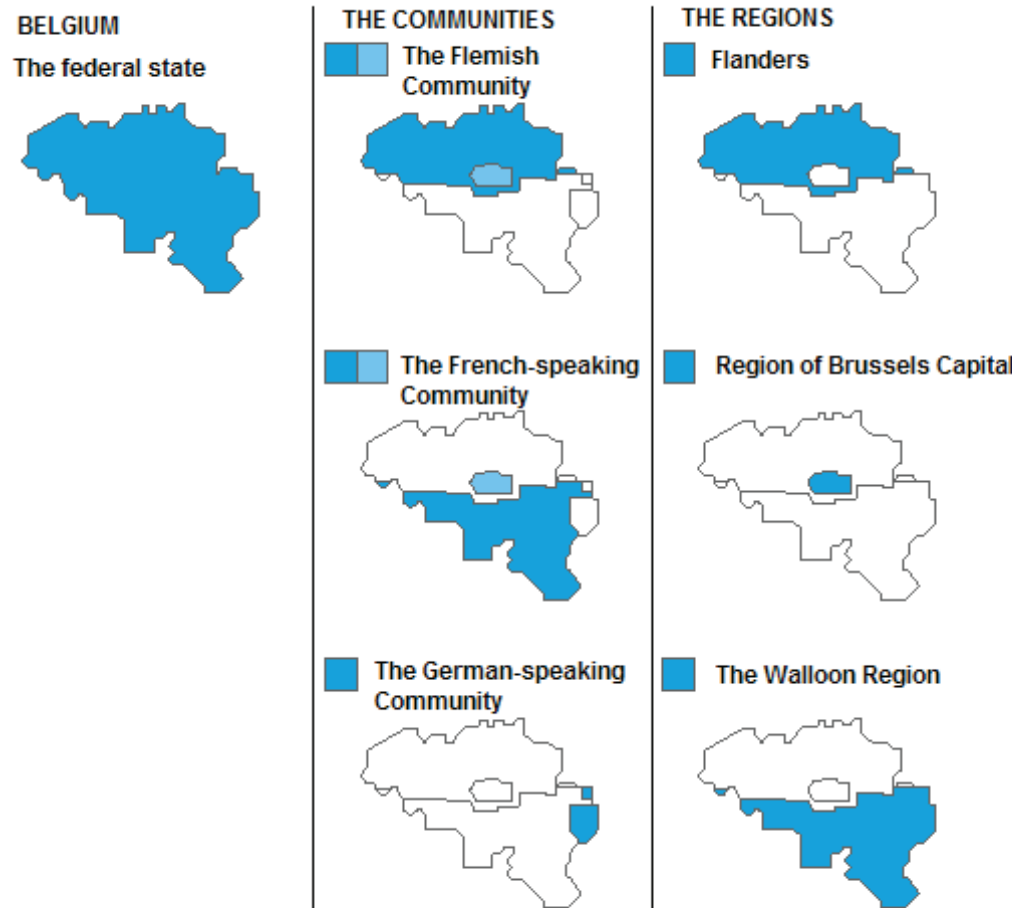
$$\pi_F^i n_{t,t}^i W_t^i \quad (35)$$

With W_t^i the weight (in efficiency units) of future generations in region i at time t , as can be seen in the following equation

$$W_t^i = \sum_{s=1}^{\infty} \frac{P_{t+s,t+s}^i (1+g)^s}{(1+r)^s} \quad (36)$$

Appendix D: Structure of the Belgian federal state

Figure 13: Structure of the Belgian federal state



Appendix E: Extension: correcting for initial debt

Methodology The regionalized amount of debt, as a share of total debt B^T is now given by equation 37. For calculating absolute amounts, equation 27 can be applied.

$$\rho^i = \lambda^i - \beta^i \quad (37)$$

The resulting horizontal share in regionalized amount of debt, δ^i , can be rewritten as

$$\delta^i = \frac{\rho^i}{\sum_i \rho^i} = \frac{\lambda^i - \beta^i}{\sum_i \lambda^i - \sum_i \beta^i} = \frac{T^i/T^T - B^i/B^T}{\sum_i T^i/T^T - \sum_i B^i/B^T} \quad (38)$$

Results The calculations under the different scenarios are repeated in Table 20, 21 and 22. Remark that, when correcting for initial debt, the resulting horizontal debt shares are very sensitive to the amount of debt that is regionalized, which was not the case in section 5.3.

Table 20: Horizontal share in regionalized debt for the SFA: correcting for initial debt

	Optimal debt load	Initial debt share	Regionalized amount (%)	Regionalized amount (billion euro)	Horizontal share in regionalized debt
Flanders	5.07%	0.42%	4.65%	14.16	104.95%
Walloon Region	2.59%	3.34%	-0.75%	-2.27	-16.83%
Brussels	1.33%	0.80%	0.53%	1.6	11.88%

Table 21: Horizontal share in regionalized debt for a new NSFA: correcting for initial debt

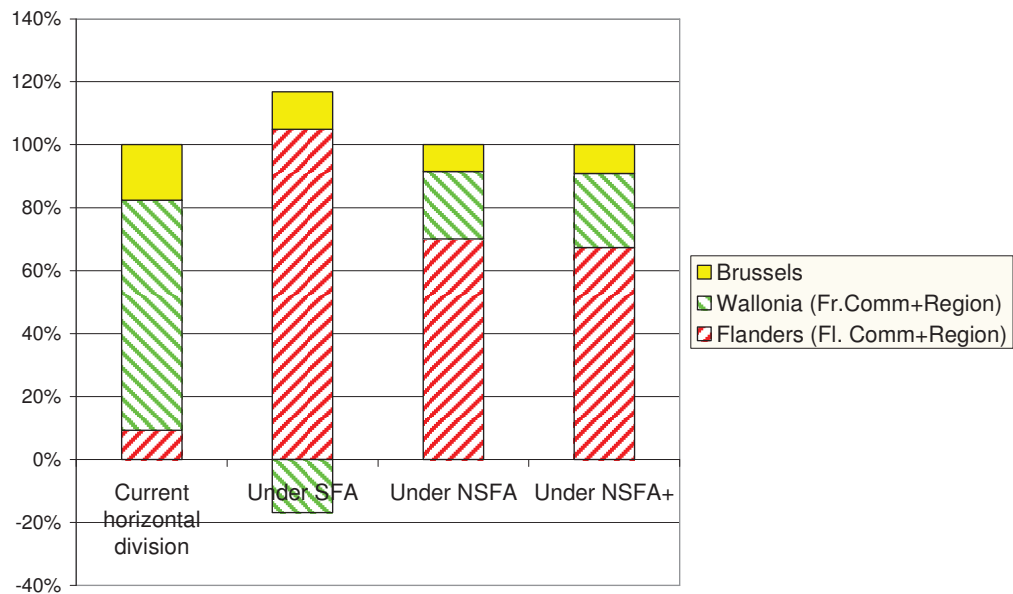
	Optimal debt load	Initial debt share	Regionalized amount (%)	Regionalized amount (billion euro)	Horizontal share in regionalized debt
Flanders	16.98%	0.42%	16.56%	50.41	70.12%
Walloon Region	8.38%	3.34%	5.04%	15.36	21.36%
Brussels	2.81%	0.80%	2.01%	6.12	8.52%

Figure 14 presents a visual illustration of the obtained results.

Table 22: Horizontal share in regionalized debt for a new extended NSFA+: correcting for initial debt

	Optimal debt load	Initial debt share	Regionalized amount (%)	Regionalized amount (billion euro)	Horizontal share in regionalized debt
Flanders	26.48%	0.42%	26.06%	79.34	67.40%
Walloon Region	12.44%	3.34%	9.10%	27.7	23.54%
Brussels	4.30%	0.80%	3.50%	10.67	9.07%

Figure 14: Overview of horizontal debt shares under different scenarios: correcting for initial regional debt



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