



CERPE, VIVES, LOVANIUM

SIMULATION AND GRAPHIC PRESENTATION

OF THREE RADICAL PROPOSALS FOR

A MORE TRANSPARENT FUNDING OF BELGIUM'S REGIONS

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IMPORTANT WARNING

The present note is an attempt to compare systematically three proposals for reforming the Special Financing Act which we regard as interesting and important. One of these proposals is ours, and the comparison contains, albeit implicitly, part of the reasons why we prefer it to the other two. It is possible, however, that we may have misunderstood some aspects of the other two proposals as presented in Re-Bel e-book n°5. In the short time available, we did our best to accommodate the useful feedback received from both CERPE and VIVES, but perhaps not yet perfectly.

Anyway, we shall be happy to add further refinements and make any other correction needed in a later version of this note. We also invite CERPE, VIVES and any other research team to propose — and publish on the Re-Bel website — alternative simulations that make the various proposals intuitively comparable, and by the same token, show why they believe their own proposal is better than the one we currently find best.

Any fruitful debate also involves recognizing one's mistakes and misunderstandings and making honest attempts to grasp arguments one might have overlooked.

A.D & P.V.P.

1 INTRODUCTION

As part of the Re-Bel initiative (www.rethinkingbelgium.eu), an e-book was published containing three proposals for making the funding of the Regions more transparent through a radical reform of the Special Finance Act (henceforth SFA).¹

The purpose of this note is to simulate the core of each of these proposals in order to highlight the way each attempts to articulate regional responsibility and inter-regional solidarity in a far more transparent way than the very opaque and heterogeneous set of dispositions that makes up the current SFA. The ambition is not to model every detail of each proposal nor the difference each would make under various circumstances compared to the existing SFA, and even less the transitional measures that would be needed to get smoothly to the new system. It is to clarify the discussion by getting to the heart of each proposal and showing graphically how the way in which solidarity is being implemented in each affects the financial incentives of regional authorities.

What will be called *the CERPE proposal* was presented in a lead piece entitled "A new structure for the financing of Belgium's Regions and Communities through personal income tax" co-authored by several members of the *Centre de recherches en Economie Régionale et Politique Economique* of the University of Namur.

What will be called *the VIVES proposal* was presented in a lead piece entitled "Towards a more efficient and responsible financing mechanism for the Belgian federation" co-authored by three members of the *Vlaams Instituut Voor Economie en Samenleving* and Center for Economic Studies of the KULeuven.

Finally, what will be called *the LOVANIUM proposal* was sketched in a comment entitled "Towards more responsible Regions" co-authored by André Decoster (KULeuven) and Philippe Van Parijs (UCLouvain).

Some of the subtleties in some of the proposals may have escaped us, in which case we shall be happy to correct our exercise. But we believe we have modelled the core of each proposal and provided a framework for reflecting in a fruitful way on further variants of each, as well as on different proposals altogether.

¹ The e-book can be downloaded from <http://www.rethinkingbelgium.eu/rebel-initiative-ebooks/ebook-5-efficient-and-fair-funding-of-belgian-regions>

2 THREE WAYS OF STRUCTURING INTER-REGIONAL SOLIDARITY

Each of the three proposals has its own way of structuring inter-regional solidarity in a way consistent with the financial responsabilization of regional governments. The core of each can be presented as follows ²:

- In the CERPE proposal, the federal state partially neutralizes the impact on regional revenues of the difference in taxable base between regions. The percentage by which the difference is neutralized, or the rate of compensation, is given by a parameter (called gamma in the graphs below). In CERPE's specific proposal, γ is put at 0.85. We will present simulations where parameter γ varies from 0 to 1. In a nutshell, the CERPE proposes to fund regions by a return to the regions of (part of) personal taxes collected in them, corrected by *vertical solidarity* in the form of the federal state bringing the poorer region(s) closer to the average.
- In the VIVES proposal each region is guaranteed a minimal level of personal income tax revenues per capita. This guaranteed level is expressed as a percentage (parameter v in the graphs below) of the federal personal income tax per capita. In VIVES's specific proposal, v is put at 95%. That means that a region which has a per capita personal income tax revenue which is lower than 95% than the average gets a transfer to fill the gap. These transfers are financed by the regions with personal income tax revenues per capita above the average. We present simulations with parameter v varying from 0 to 100. In a nutshell, the VIVES proposes to fund regions by a return to the regions of personal taxes collected in them, corrected by *horizontal solidarity* in the form of the richer region(s) transferring revenues to the poorer one(s) so as to keep it above some percentage of the average.
- In the LOVANIUM proposal, a region's revenues per capita are a simple weighted average between a per capita grant which is equal to the federal average personal income tax per capita and the regional personal income tax per capita. We have called parameter λ the relative weight given to the first component and have varied it from 0 (regional revenues are only determined by the regions' own personal income taxes) to 1 (full equalization of the regional per capita revenues to the federal average). In a nutshell, the LOVANIUM proposes to fund regions by an equal per capita grant allocated to the regions (which could be called a *sokkel-solidarity*) supplemented by a return to the region of personal taxes collected in the regions.

² The appendix presents how the three proposals have been formally implemented.

3 BASIC DATA FOR THE SIMULATIONS

We used the following data to illustrate the three proposals:

TABLE 1: DATA ON WHICH THE STARTING SITUATION IS CALIBRATED

	Flanders	Wallonia	Brussels	Belgium
PIT-revenue 2007 in Mn €	20 401	9 128	2 710	32 239
Population 01.01.2007	6 117 440	3 435 879	1 031 215	10 584 534
Taxable Base in Mn €	91 663	45 543	12 288	149 493
Population share	0.5780	0.3246	0.0974	1.0000
PIT/capita in €	3334.9	2656.8	2628.0	3045.9
PIT/capita relative to BEL	1.0949	0.8722	0.8628	1.0000
Tax Base/capita in €	14 983.8	13 255.1	11 915.6	14 123.7
Tax Base/capita relative to BEL	1.0609	0.9385	0.8437	1.0000
Implicit tax rate	0.2226	0.2004	0.2206	0.2157

Source: PIT-revenues (row 1) and Population (row 2) from Algoed, K. and Van Den Bossche, W. (2009), *Bijzondere Financieringswet in een notendop (met een illustratie voor het jaar 2009)*, Documentatieblad Ministerie van Financiën, 69(2), 63-90. The taxable base for the three regions was downloaded from ADSEI for taxable year 2007. All other rows are own calculations.

4 RESULTS

We present two sets of graphs:

- Figures 1 to 3 show how the gap between the per capita revenues of the three Belgian regions varies for all possible values of the “solidarity” parameter in each of the three proposals. They thereby show that any degree of gap closing between regions (i.e. of "solidarity" or "de-responsibilization") can be realized through a suitable choice of the parameter in each of the three systems.
- Figures 4 to 6 illustrate the financial incentive patterns for the regions under each of the three proposals. The taxable base of each region is made to increase stepwise, while keeping the taxable base for the other two regions constant. We assume the tax revenue elasticity to be 1 and incorporate the solidarity component of each proposal. We then plot the per capita revenues for each region as a function of the increase in its own taxable base.

4.1 CLOSING THE GAP

Figures 1 to 3 illustrate how the difference in regional revenues per capita shrinks as we increase the solidarity parameter in the reform proposals. Figure 1, 2 and 3 illustrate the CERPE, VIVES and LOVANIUM proposals, respectively. The three regions are shown in the same graph.

On the vertical axis we display the regions' per capita revenues expressed as a percentage of the federal average. For the VIVES proposal (Figure 2) and the LOVANIUM proposal (Figure 3), the

curves start at the left side with the current per capita level of revenues from personal income tax collected in the region (no solidarity). The basic data in Table 1 showed that Flanders has personal income taxes per capita at 109,49% of the federal average, whereas Wallonia and Brussels are respectively at 87,22% and 86,28%. This is the gap we start at in Figures 2 and 3. In the CERPE proposal (Figure 1) the regions' net revenues when the solidarity parameter is put at zero are given not by the tax revenues collected in the region but by the regional tax base multiplied by the federal average tax rate. Whereas the per capita tax revenues are only slightly lower in Brussels than in Wallonia, row 8 in Table 1 reveals that the tax base is much lower (84% for Brussels compared to 94% for Wallonia).

Figure 1 shows how the gap in net revenues (relative to the Belgian average net revenues per capita) is narrowed as the solidarity parameter in the CERPE-proposal is increased. The value of the parameter in CERPE's specific proposal (0,85) is indicated by a vertical dotted line. For this specific value of the parameter, the remaining gap in revenue per capita between Flanders and Wallonia is 7%, and between Flanders and Brussels 8,4%.

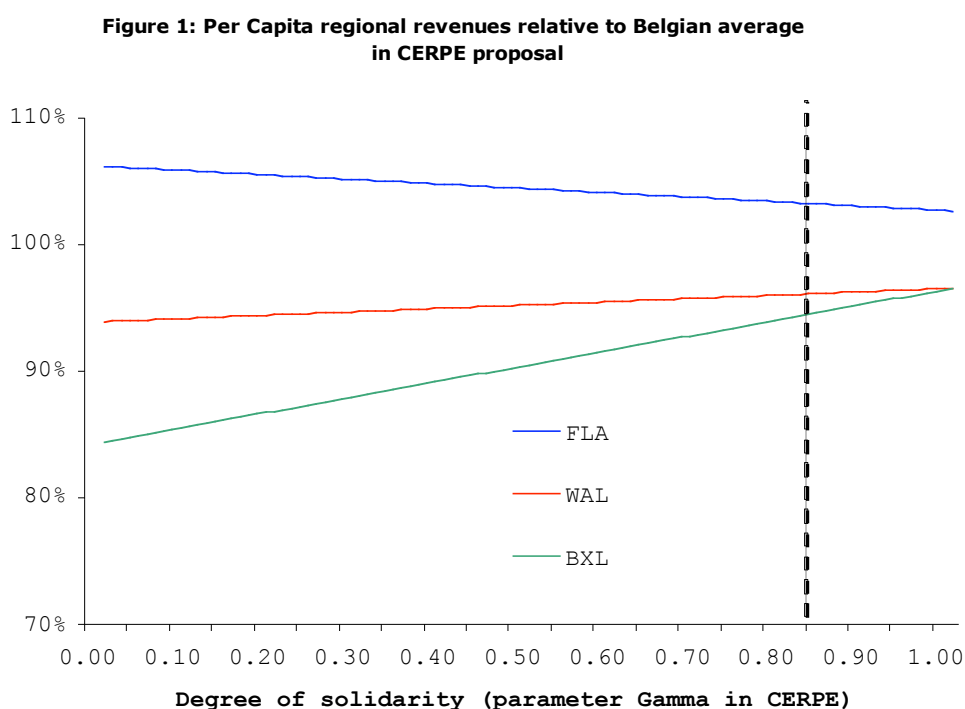


Figure 2 shows the VIVES proposal. We now start from the current per capita level of revenues from personal income tax collected in the region (relative to the federal average) at the left side of the graph (no solidarity). As the divergence in per capita personal income taxes between Wallonia and Brussels is much smaller than the divergence in the tax base, the lines for Wallonia and Brussels now start very close to each other. Whether and by how much the gap is to be closed by transfers depends on the value of parameter v . Since at the present moment none of the regions has PIT-revenues per capita lower than 86,28% (see row 6 in Table 1), the transfer condition is not binding as long as the value chosen for parameter v is below 86,28%. This shows up in the flat lines (there is no inter-regional transfer between the regions for all parameter values lower than 86,28%). For parameter values above

86% the gap is being closed. With the specific value of the parameter proposed by VIVES ($\nu = 0,95$), the remaining gap for both Wallonia and Brussels is 8,65%

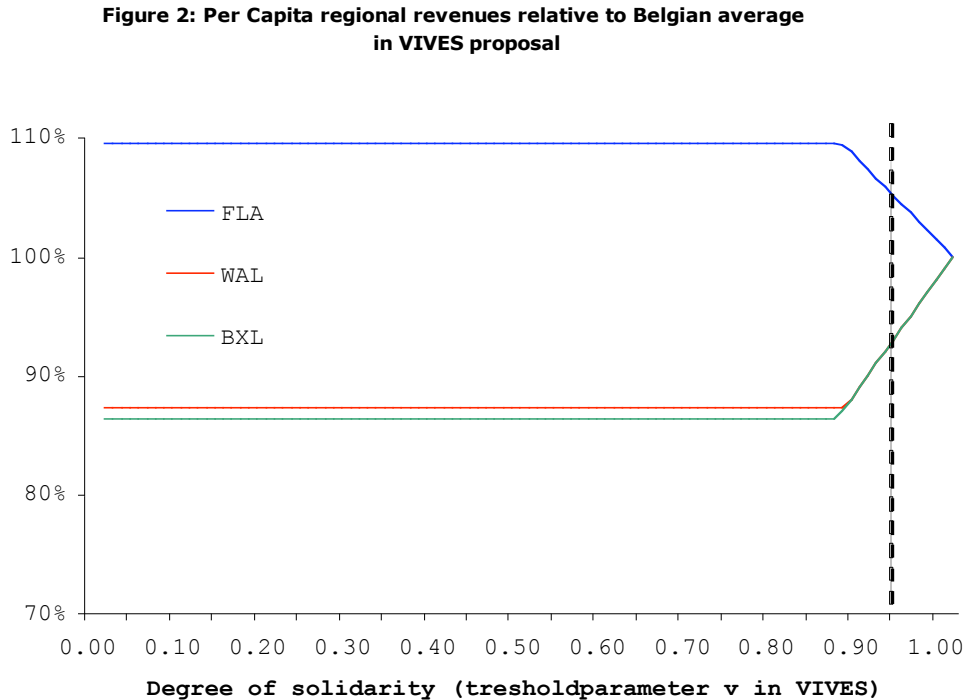
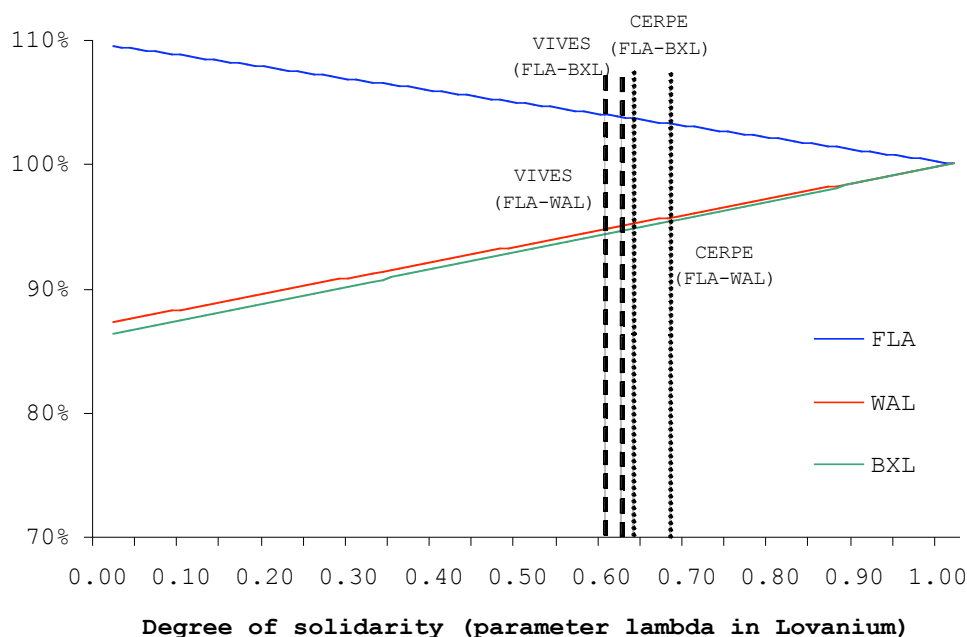


Figure 3 shows the LOVANIUM proposal, with on the extreme left again the no-solidarity point, where all revenues are coming from personal income taxes collected in the region. As the value of parameter λ (i.e. the share of the equal per capita federal grant) rises, the gap shrinks smoothly up to the point where the per capita personal tax revenues of all three regions are equal to the federal average. The dotted lines indicate the values that need to be chosen for parameter λ to emulate the other two proposals, i.e. to close the gap between richer Flanders and the other two regions to the same extent. $\lambda = 0,68$ and $\lambda = 0,64$ are needed to emulate the degree of solidarity implied by the CERPE proposal between Flanders and Wallonia and between Flanders and Brussels, respectively. To achieve the same extent of gap-closing as the VIVES-proposal, on the other hand, we need to pitch the value of our parameter at 0,61 (for Wallonia) and 0,63 (for Brussels), respectively.

Figure 3: Per Capita regional revenues relative to Belgian average in Lovanium proposal



SOME OBSERVATIONS

- The CERPE proposal is more generous than the VIVES proposal for both Wallonia and Brussels. This is not inherent to the schemes, however, and could be reversed through a different choice of the value of the parameters (lower than 0.85 for CERPE, higher than 0.95 for VIVES).
- In the CERPE, proposal, the slope of the line is much steeper for Brussels than for Wallonia as the parameter increases. As a result, the CERPE proposal implies far more solidarity with Brussels than with Wallonia. This is due to the fact that (1) the compensation required is calculated as a percentage of the tax base and not of tax revenues, and (2) whereas the per capita tax revenues are only slightly lower in Brussels than in Wallonia, the tax base is much lower. See row 8 in Table 1 (84% for Brussels compared to 94% for Wallonia). Further research is needed (including on the technical definition of the "tax base") to explain this striking difference.
- The *sokkel solidarity* of the LOVANIUM proposal can easily be calibrated to achieve exactly the same degree of gap closing as either of the other two proposals. The most meaningful way of implementing this *sokkel solidarity* is not to keep the parameter constant, but to link the level of the federal grant directly to the federal tax base (or GDP or tax revenues), with the parameter then being allowed to vary exogenously as a consequence of each region making use of its tax autonomy.

4.2 INCENTIVES FOR THE REGIONS

However it is organized, financial solidarity reduces the financial gain to be expected from its own prosperity by each party involved in the transfer scheme, whether on the contributor or on the beneficiary side. In the case of our regions, there is no evidence showing any significant impact on the regional government's policies of the inter-regional solidarity incorporated in the existing Special Financing Law: governments have of course many other reasons to try to make their region's prosperous than being able to raise more taxes. But the current SFA has one feature — the so-called "development trap" highlighted by Philippe Cattoir and Magali Verdonck — which is widely regarded as undesirable, namely the fact that the revenues of a regional government may fall as a result of its tax base increasing, and rise as a result of its tax base decreasing. The aim of the three proposals is not only to make the funding of our regions simpler and more transparent, but also to get rid of such a perverse incentive. Do they succeed?

We investigate this question by looking at how regional revenues evolve when their *own* regional PIT revenues increase. This simulation is being done in a purely static way, without any speculation about the effects of a sounder incentive structure on the tax base of the three regions. We increase the tax base of one region stepwise and keep the tax base of the other two regions constant. For each level of the tax base we calculate the level of personal income tax revenues by assuming an elasticity of 1 (that is a proportional increase in tax revenues). Next we calculate, for each of the three proposals, the change (if any) in the solidarity component for the region under consideration. The graph then plots the net revenues of each region (vertical axis) as a function of its own regionally collected personal income taxes (horizontal axis).

There is one graph per region, with the horizontal line starting at the current level of personal income taxes per capita in the region. The incentive structure of each proposal is represented by one line. For VIVES and CERPE we chose the specific solidarity parameter mentioned in their proposal ($\nu = 0.95$ for VIVES and $\gamma = 0.85$ for CERPE). For LOVANIUM we have fixed λ at 0.66. In addition, the 45° line separates net beneficiaries and net contributors. If net revenues per capita of the region are above the 45° line, the region is a net recipient of transfers from one or eventually two other regions. If a line crosses the 45° line from above, the region switches from a recipient to a contributor status, owing to the increase of its income. Solidarity implies slopes that are less than 45° over at least part of the range. Sound incentives requires that the slopes should never be negative. If the line were to drop, it would mean that an increase in the regionally collected tax revenues leads to a decrease in the net revenues per capita for the region.

Figure 4: Per Capita Revenues for Flanders as a function of per capita PIT collected in Flanders, with taxable income in Wallonia and Brussels fixed

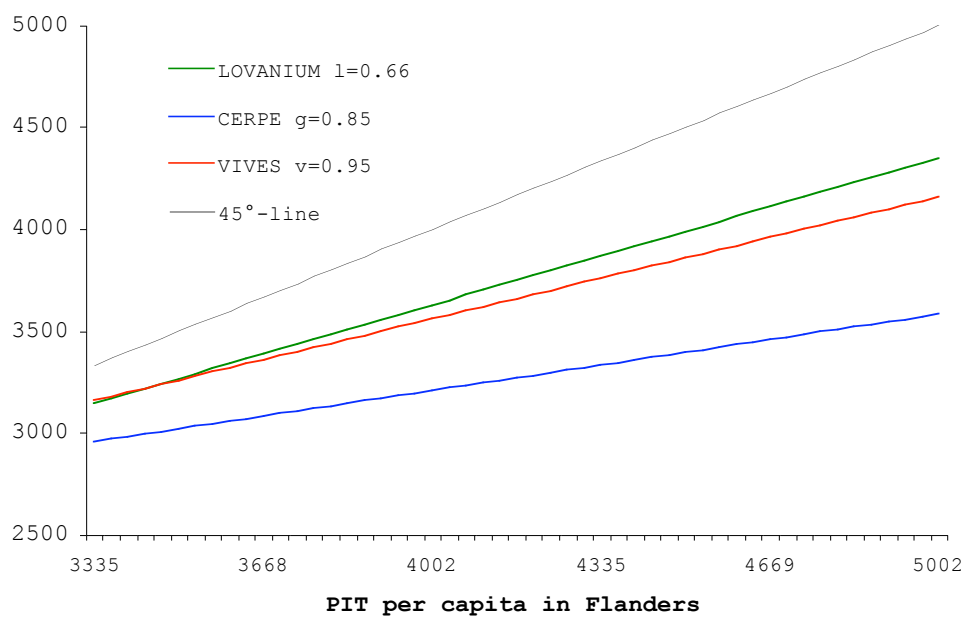


Figure 5: Per Capita Revenues for Wallonia as a function of per capita PIT collected in Wallonia, with taxable income in Flanders and Brussels fixed

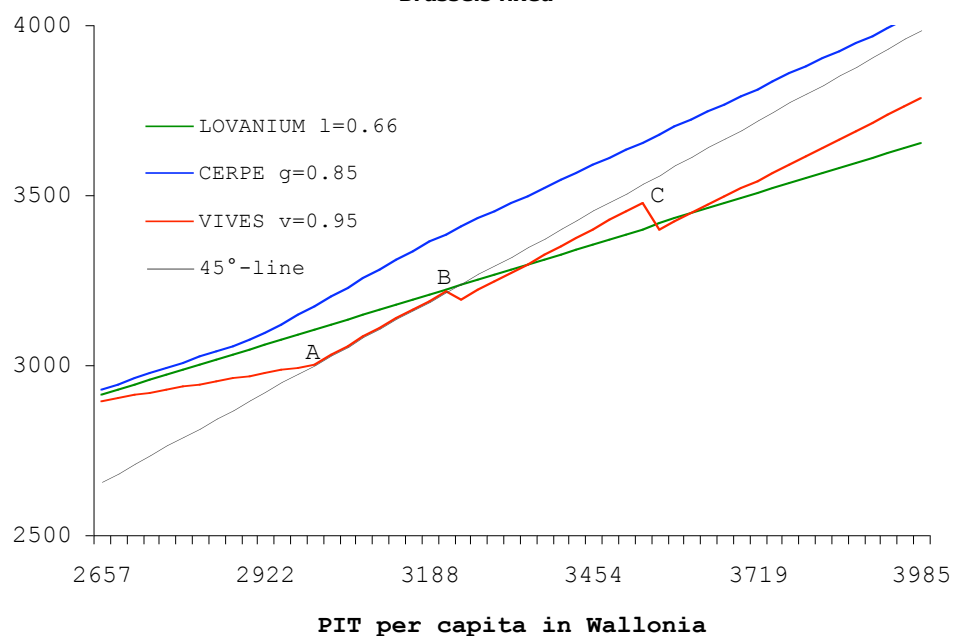
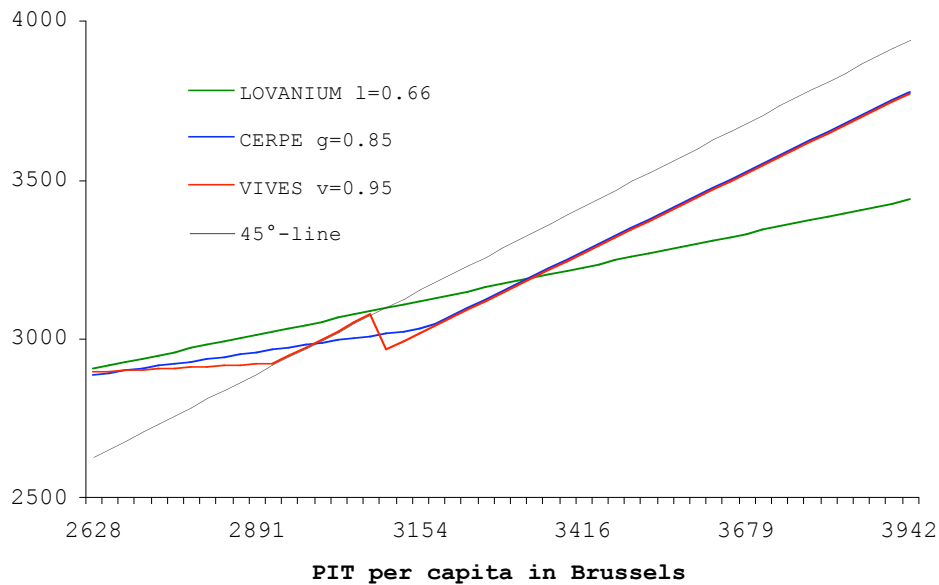


Figure 6: Per Capita Revenues for Brussels as a function of per capita PIT collected in Brussels, with taxable income in Flanders and Wallonia fixed



SOME OBSERVATIONS

- **Figure 4** shows that none of the proposals involves a development trap for the richer region. All lines are below the 45° degree line, since richer Flanders will of course continue to remain a net contributor to the other two regions when it grows richer and the incomes of the other two remain constant. The more generous nature of the CERPE-proposal shows up in a lower curve, but as we explained above, the position of the line can be shifted up and down by a suitable choice of the solidarity parameter. Here we focus on the slope of the line, not on the position.
- **Figures 5 and 6** show some more surprising results in the case of the regions that are net beneficiaries at the start. Take the case of Wallonia in Figure 5. All three proposals produce net revenues per capita for Wallonia above the 45° line in the current situation (starting point on the left side of the horizontal axis). The more generous transfers in the CERPE proposal compared to the other two show up in the relative position of the three lines at the starting point. But the slope of the lines is quite different. Net per capita revenues increase more slowly under the VIVES proposal, than under the CERPE and LOVANIUM proposal. For the chosen values of the parameters the incentive mechanisms are least pronounced in VIVES, and most pronounced in CERPE and LOVANIUM.
- Even more striking than the difference in slope is the fact that the VIVES proposal introduces new development traps for the currently poorer regions. The explanation for the negative slopes is the following. Take Figure 5 for Wallonia. The flatter slope of the VIVES-proposal up to point A comes from the fact that the transfer to Wallonia is diminished when Wallonia approaches the 95% of the federal average PIT per capita. Between point A and B Wallonia receives no transfers anymore, and does not yet have to contribute to the transfers. From point B on, Wallonia contributes to the transfers in order to bring Brussels up to the 95% level of average PIT-revenues. But a second kink occurs when Wallonia becomes rich enough to influence the federal PIT

average in such a way that Flanders stops contributing to the transfers to Brussels. Flanders is still above the 95% level, and does not receive transfers. But the whole transfer to Brussels is now financed by the much smaller population in Wallonia. This leads to a remarkable downward shift of the curve. The point of this graphic illustration is not so to show the exact income levels at which these kinks occur, or the exact amount of transfers, given the choice of the value of the parameter. What we want to highlight is the structural elements in each proposal, such as the fixed 95% guaranteed floor in the VIVES proposal, which introduce new development traps as poorer regions become richer.

- The same is illustrated in Figure 6 for Brussels. Unsurprisingly, the effect is even more pronounced here, owing to the even smaller population of Brussels.
- The CERPE proposal displays (minor) changes in the slope of the net revenue curve, but no negative slopes, and hence no development traps. The first kink for the CERPE-line in Figure 5 is due to the fact that the transfer to Wallonia, which gradually faded out, is stopped at this income level (and hence not fading out any more at higher income levels). The next kink lowers the slope of the curve since Flanders now starts receiving transfers that are funded by federal revenues to which Wallonia contributes.
- By contrast, the line that describes changes in the region's revenues under the LOVANIUM proposal is boringly well behaved: the region's revenues rise regularly as a result of the direct contribution of its growing prosperity to the personal tax collected in the region and indirectly through the rise of the federal grant, from which the other regions also benefit.

CONCLUSION

This exploratory exercise is by no means a full presentation and justification of a particular proposal. It provides a framework for thinking about alternative ways of improving our funding system that can be win-win-win for our three regions. More specifically, it pinpointed some surprising implications that may be worth looking into in order to formulate improved variants.

Our exercise should also have strongly suggested that the simple *sokkel solidarity* implemented in the LOVANIUM scheme is definitely no worse than the two schemes based on the so-called *juste retour* with subsequent corrections through vertical or horizontal transfers. Unless something important eluded our analysis, there is strictly no argument based on efficiency, incentives or responsabilization that justifies preferring schemes of the latter kind to a simple and transparent system of equal per capita federal grants for the *sokkel* of the regions' funding, leaving each region to supplement this *sokkel* with revenues linked to its own performance.

APPENDIX

We use the following notation to summarize the three proposals (with PIT standing for Personal Income Tax):

$T = \sum_r T^r$ with T^r denoting the PIT revenues for region r and T for the federation;

$N = \sum_r N^r$ with N and N^r the populations in the federation and region r respectively;

$Y = \sum_r Y^r$ with Y and Y^r the tax base in the federation and region r respectively;

$\tau = \frac{T}{Y}$ and $\tau^r = \frac{T^r}{Y^r}$ the implicit tax rates for the federation and regions respectively;

$y = \frac{Y}{N}$ and $y^r = \frac{Y^r}{N^r}$ the per capita tax bases for the federation and regions respectively;

$t = \frac{T}{N}$ and $t^r = \frac{T^r}{N^r}$ the per capita PIT for the federation and regions respectively;

4.3 CERPE

The equalization mechanism on p. 10 of E-Book 5 reads as:

$$E^r = \gamma \cdot \alpha \cdot \left[\frac{Y}{N} - \frac{Y^r}{N^r} \right] \cdot N^r, \quad (1)$$

where E^r is the total transfer received by the regions whose per capita tax base is below the federal average. Parameter α in equation (1) is the share of the tax base returned to the region and γ the solidarity parameter.

The CERPE-proposal puts α at 0.0837 and γ at 0.85. The original CERPE model calibrates the value of α to insure the current Special Financing Act revenues for the Brussels region on day one of the new scheme. As a consequence, in the original model, α decreases when solidarity increases. Additionally, Flanders and Wallonia receive a fixed compensation with the same aim. However as our objective is to illustrate the convergence when the solidarity parameter increases, we ignore those features. For the sake of simplicity, we consider that α is a constant and that there are no fixed compensations.

We have simulated a simplified way of financing the transfers out of the federal personal income taxes, by allocating the burden of this transfer in a per capita way over the whole population of the federation. Total revenues for the region then become³:

³ It is with this subtraction of the third term that we explicitly deviate from the more sophisticated proposal of CERPE itself.

$$R^r = a \cdot Y^r + E^r - \frac{E}{N} \cdot N^r. \quad (2)$$

We shall illustrate the mechanism for α equal to the federal implicit tax rate of 0.2206 and for values of the solidarity parameter: $0 \leq \gamma \leq 1$. For $\gamma = 0$, equation (2) reduces to the “juste retour”. The higher we put γ , the further we deviate from this juste retour and the more solidarity we introduce.

4.4 VIVES

The VIVES proposal consists of guaranteeing that no region falls below a threshold defined as a percentage of the federal PIT-revenues per capita:

$$R^r = T^r + \left[v \cdot \frac{T}{N} - \frac{T^r}{N^r} \right] \cdot N^r \text{ if } \frac{T^r}{N^r} \leq v \cdot \frac{T}{N}. \quad (3)$$

Parameter $v = 0.95$ in the VIVES-proposal. The transfer is financed by the regions with per capita tax revenues above the average (a horizontal mechanism). This mechanism is not further specified in the proposal, which causes a problem (or a degree of freedom) in our simulations of increasing tax bases, ceteris paribus. Of course in the actual situation, only Flanders has to contribute to the transfers to close the gap up to 95% of the average federal per capita tax revenue. But when we simulate an increase in Wallonia’s tax base and go far enough to make also Wallonia cross the threshold, then both Flanders and Wallonia have to transfer funds to Brussels. To decide who contributes what, we calculated the total amount of transfers needed, and then shared the burdens in proportion to the populations in the contributing regions. Another possibility would be to distribute the burden in proportion to their share in their total tax base.

4.5 LOVANIUM

Our own equalization mechanism is a weighted average between full equalization (up to the average federal PIT per capita) and full “juste retour”:

$$\frac{R^r}{N^r} = \lambda \cdot \frac{T}{N} + (1 - \lambda) \cdot \frac{T^r}{N^r}. \quad (4)$$

For $\lambda = 0$ we have no solidarity and apply the “juste retour”. For $\lambda = 1$ we have full equalization of the regional personal income taxes per capita to the federal average.